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Competition and Efficiency in the Regional Banking Industry: Empirical Implications of the Quiet-Life Hypothesis

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Abstract

Based on the generalized user-revenue model constructed by Homma (2009, 2012, 2018), this paper clarifies the empirical implications of the quiet-life hypothesis in the Japanese regional banking industry. The quiet-life hypothesis is accepted here but the efficient structure hypothesis is not. Moreover, the extended generalized-Lerner index (EGLI) on the cost frontier increases with the Herfindahl index in the previous period if and only if the quiet-life hypothesis is accepted, so it is possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis. Furthermore, intertemporal regular linkages (i.e., cyclical linkages) exist because the average loans are not large and only the quiet-life hypothesis is accepted. However, the linkage of the single-period EGLIs of the long-term loans on the cost frontier leads to convergence and is fixed at the very large values in the initial periods; thus, the linkage is judged to be undesirable to Japanese regional banks, similar to the linkages of single-period dynamic cost efficiencies and single-period optimal financial goods.

Keywords: Dynamic cost unneutral efficiency; Dynamic price inefficiency; Generalized user-revenue model; Generalized user-revenue price; Extended generalized-Lerner index; Efficient structure hypothesis; Quiet-life hypothesis; Intertemporal regular linkage
JEL classification: C33; C51; C61; D24; G21; L13

1 Introduction

Based on the generalized user-revenue model (hereafter the GURM) constructed by Homma (2009, 2012, 2018), this paper explores the implications of the quiet-life hypothesis in the Japanese regional banking industry by empirically clarifying a series of research topics that are crucial for the industrial organization of banking. The paper's treatment of each of these topics is briefly described below:

1. The static and dynamic cost unneutral efficiencies of Japanese regional banks. Thus far, in the extant literature other than Homma (2018), most empirical models that estimate cost efficiency assume a static cost neutral efficiency. However, as clarified by Homma (2018), the theoretical restriction of this assumption is very strict from a theoretical perspective. This is due to the fact that cost neutrality means that all the inefficiency coefficients in the static factor demand functions are equal and that static cost efficiency does not consider the effects of either the static cost efficiency in the previous period or the Herfindahl index in the previous period on cost efficiency in the current period. To explicitly account for both the efficient structure and quiet-life hypotheses, these effects need to be considered. For these reasons, this paper estimates the static and dynamic cost unneutral efficiencies of Japanese regional banks. The main purpose of this estimation is to clarify the structural inefficiency for which substantial improvement is difficult in the long term. Where this inefficiency exists, it is very difficult to drastically improve the dynamic cost unneutral efficiency of Japanese regional banks under present conditions.

2. The degree of relative risk-aversion for banks on the cost frontier and the actual cost. Thus far, in the extant literature other than Homma (2009, 2012, 2018), banks are assumed to be risk-neutral, similar to non-financial firms. However, it is difficult to consider banks that have experienced financial crises and natural disasters to still be risk-neutral. Furthermore, the existence of structural inefficiency may affect the risk attitude of banks. Accordingly, this paper indirectly estimates the degrees of relative risk-aversion of banks on the cost frontier and the actual cost through the stochastic Euler

equations derived by Homma (2018, Theorems 1 and 2, pp. 34-37). The risk attitude of banks on the cost frontier (i.e., the most efficient banks) is specified by differentiating it from that of banks on the actual cost. Although the former banks may be risk-neutral, it is highly likely that the latter are risk-averse.

3. Reference rates on the cost frontier and the actual cost. Thus far, in the extant literature other than Homma (2009, 2012, 2018), existing interest rate data (e.g., call rates) are used as the reference rate a priori. However, as noted by Homma (2018, pp. 39-56), these reference rates are crucial factors that determine the signs of the stochastic user-revenue prices (hereafter SURPs) on the cost frontier and the actual cost. Thus, they have a considerable effect on generalized user-revenue prices (hereafter GURPs) and the extended generalized-Lerner indices (hereafter EGLIs) on the cost frontier and the actual cost. For this reason, this paper indirectly estimates the reference rates on the cost frontier and the actual cost through stochastic Euler equations, similar to the above topics. Furthermore, the effects of the subjective rates of time preferences, quasi-short-run profits, and equity capital on these reference rates are also clarified.

4. The dynamic price inefficiency of each financial good. Thus far, in the extant literature other than Homma (2018), this inefficiency has not been addressed, although static price inefficiency has sometimes been considered. However, according to Homma (2018, pp. 32-56), dynamic price inefficiency is a main factor that affects the GURP and EGLI on the actual cost; thus, it is highly possible that it seriously affects them and causes a difference between the GURP and EGLI on the cost frontier and those on the actual cost. Consequently, this paper indirectly estimates the dynamic price inefficiency of each financial good through the stochastic Euler equations, similar to the above topics. Furthermore, the factors that affect this inefficiency are also clarified.

5. The generalized user-revenue prices (GURPs) on the cost frontier and the actual cost. Thus far, in the extant literature other than Homma (2009, 2012, 2018), these GURPs have not been considered. However, as emphasized by Homma (2009, 2012, 2018), these GURPs are crucial for the industrial

organization of banking. The reasons are as follows: First, they consider not only the market structure and conduct effect but also the equity capital effect, the risk-adjustment effect, and the cost and price inefficiencies. Second, it is highly possible that the latter effects and inefficiencies affect their GURPs more than the former effect under the present conditions of having experienced financial crises and natural disasters. Third, as clarified by Homma (2018), their GURPs crucially affect the EGLIs on the cost frontier and the actual cost from the theoretical perspective. Accordingly, this paper indirectly estimates the GURPs on the cost frontier and the actual cost through the stochastic Euler equations, similar to the above topics. The following effects are also clarified: the effects of the market structure and conduct, equity capital, and risk-adjustment on the GURP on the cost frontier, and the effects of these factors and the cost and price inefficiencies on the GURP on the actual cost.

6. The extended generalized-Lerner indices (EGLIs) on the cost frontier and the actual cost. Thus far, in the extant literature other than Homma (2009, 2012, 2018), these EGLIs have not been addressed, although the conventional Lerner index has been considered. However, as strongly emphasized by Homma (2009, 2012, 2018), these EGLIs are crucial for the industrial organization of banking, similar to the GURPs on the cost frontier and the actual cost. In addition to the first two reasons given for the GURPs, these EGLIs become the strict criteria for the implementation and evaluation of industrial organization policy under the present conditions of having experienced financial crises and natural disasters.

The desirability of these EGLIs is judged from the truth and actuality of competition. The truth of competition implies that the bank concerned does not exhibit any uncompetitive behavior that could lead to cost and price inefficiencies and is completely devoted to competition. In contrast, the actuality of competition implies that the bank concerned shows some uncompetitive behavior that leads to cost and price inefficiencies and is not always devoted to competition. Where these inefficiencies are relatively small and easily eliminated, the EGLIs on the cost frontier have not only the truth of competition, but also the actuality of competition. However, where these inefficiencies are large and not easily eliminated, the EGLIs on the cost frontier do not have the actuality of competition. In this case, in order to make up for the actuality of competition, the EGLIs on the actual cost must also be considered. The reason for this is that the EGLI on the actual cost, which is the degree of competition of a bank with average efficiency that is used to represent all banks, is superior in the actuality of competition to the EGLI on the cost frontier, which is the degree of competition of the most efficient bank, although the former is inferior to the latter in terms of the truth of competition. From the perspective of the actuality of competition, which makes up for the truth of competition, it is desirable that the competitive positions of many banks be improved, although the truth of competition is most important from a policy perspective. Therefore, policies to improve not only the EGLIs on the cost frontier but also those on the actual cost are needed.

For the above reasons, this paper indirectly estimates the EGLIs on the cost frontier and the actual cost through the stochastic Euler equations, similar to the above topics. Furthermore, the effects similar to the above GURPs on these EGLIs are clarified.

7. Tests of the efficient structure and quiet-life hypotheses on the basis of the generalized user-revenue model (GURM). Thus far, in the extant literature, these tests on the basis of the GURM have not been considered, although tests on the basis of conventional models have been conducted.[1] However, as considered by Homma (2018), tests based on the GURM are more theoretically rigorous and more valid than those based on conventional models under the present conditions of having experienced the recent financial crises and natural disasters. The reason for this is that the GURM is a more general model that relaxes the following six implicit assumptions of Hancock's (1985, 1987, 1991) user-cost model of financial firms: (1) financial firms are risk-neutral, (2) there is no strategic interdependence between financial firms, (3) there is no asymmetric information in the market regarding financial assets and liabilities, (4) there is no uncertainty in holding revenues

[1] Homma et al. (2014, pp. 144-145) provides the details of these conventional model tests.

and costs, (5) the utility function of financial firms does not depend on equity capital, and (6) no cost and price inefficiencies exist in financial firms (i.e., financial firms are perfectly cost and price efficient). For this reason, the present paper tests the efficient structure and quiet-life hypotheses on the basis of the GURM. Based on the test results, the quiet-life hypothesis is accepted, but the efficient structure hypothesis is not. This result is different from that of Homma et al. (2014), where both hypotheses are accepted for city banks and long-term credit banks operating in a single nationwide market.

8. <u>The relation between the quiet-life hypothesis and the EGLI on the cost frontier</u>. Thus far, in the extant literature, this relation has not been completely considered. However, from Homma (2018, pp. 76-77), it is not always possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis. Consequently, this relation needs to be empirically clarified. In this study, it is found that the EGLIs on the cost frontier increase (i.e., the degree of competition on the cost frontier decreases) with the Herfindahl index in the previous period if and only if the quiet-life hypothesis is accepted. Thus, it is possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis in the Japanese regional banking industry.

9. <u>The intertemporal regular linkages of single-period dynamic cost efficiencies, single-period optimal financial goods, single-period Herfindahl indices, and single-period EGLIs on the cost frontier</u>. Thus far, in the extant literature, these linkages have not been fully considered. However, as these linkages serve to permit long-term forecasts and long-term dynamic analyses, they are absolutely critical for the industrial organization of banking. In the present study, it is found that all the linkages (i.e., the cyclical linkages) are present in the Japanese regional banking industry since the average loans are not large and only the quiet-life hypothesis is accepted (i.e., the efficient structure hypothesis is not accepted). However, the linkage of the single-period EGLIs of the long-term loans on the cost frontier on the basis of this linkage of single-period dynamic cost efficiencies leads to convergence and is fixed at the very large values in the initial periods. Consequently, this

linkage is judged to be undesirable for Japanese regional banks, similar to the linkages of single-period dynamic cost efficiencies and single-period optimal financial goods.

As noted above, there are no examples of studies that are rigorously comparable to this paper. However, if examples are to be quoted, those relating to the efficient structure hypothesis include Demsetz (1973), Weiss (1974), Smirlock (1985), Tirole (1988), Berger and Hannan (1989), and Berger (1995). Related to the quiet-life hypothesis is Berger and Hannan (1998). Relevant to the relationship between market power and firm efficiency are Maudos and de Guevara (2007), Turk Ariss (2010), Schaeck and Cihak (2010), Färe et al. (2011), and Koetter et al. (2012). The user-cost model of banking is addressed in Hancock (1985, 1987, 1991), Barnett (1987), Fixler and Zieschang (1991, 1992a, 1992b, 1993, 1999), Fixler (1993), Barnett and Zhou (1994), Barnett and Hahm (1994), Barnett et al. (1995), Homma et al. (1996), Ōmori and Nakajima (2000), Nagano (2002), and Homma and Souma (2005). The degree of competition in the Japanese financial industry is a focus of Tsutsui and Kamesaka (2005), Uchida and Tsutsui (2005), and Souma and Tsutsui (2010).

The remainder of this paper proceeds as follows: In Section 2, we summarize the theoretical concepts of Homma (2018) used in this paper. Section 3 explains our empirical application to the Japanese regional banking industry, which includes the empirical model specification and the estimation procedure. Section 4 presents the estimation results. The final section offers conclusions.

2 Theoretical Specification: A Summary of Homma (2018)

The theoretical concepts used in this paper follow those of Homma (2018). A summary, including sources, is provided in Table 2.1. For added detail, please refer to the sources listed.

<<Insert Table 2.1 about here>>

In Homma (2018), on the basis of the GURM of Homma (2009, 2012), we explored the efficient structure hypothesis proposed by Demsetz (1973) and the quiet-life hypothesis put forward by Berger and Hannan (1998). We developed mathematical formulations and theoretical interpretations of the two hypotheses, the relation between the hypotheses and the EGLI on the cost frontier proposed by Homma (2009, 2012), and the relation between the hypotheses and the existence of intertemporal regular linkages of single-period dynamic cost efficiencies, single-period optimal planned financial goods, single-period Herfindahl indices, and single-period EGLIs on the cost frontier. From the major results, the following two points are particularly noteworthy: 1) it is not always possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis, and 2) new industrial organization policies are required if support for the efficient structure hypothesis is undesirable. Furthermore, where there is an intertemporal regular linkage of single-period EGLIs on the cost frontier, the appropriate industrial organization policies must be determined based on a long-term perspective. If this linkage shows an upward trend caused mainly by an upwardly trending intertemporal regular linkage of single-period Herfindahl indices, then anti-monopoly and anti-concentration policies are justified from a long-term perspective. If the upward trend of the intertemporal regular linkage of single-period EGLIs on the cost frontier is, however, caused mainly by the intertemporal regular linkage of single-period dynamic cost efficiencies or single-period optimal planned financial goods, then other policies are desirable because, in that case, anti-monopoly and anti-concentration policies cause an unnecessary distortion in the economy.

3 Empirical Application

In order to apply Homma (2018) as summarized in Section 2 to Japanese regional banks and estimate the GURM extended by Homma (2018), we need to specify the model and create the data, and, at the same time, consider the estimation method for the specified model. These points are discussed next.

The empirical model of the GURM is created according to the following procedure: First, the endogenous state variables are specified, and their data are created. Furthermore, the exogenous state variables other than the following are specified, and their data are created: the static cost unneutral efficiencies from two periods prior through the previous period, the Herfindahl indices in the same periods, and the uncertain or unpredictable components of the stochastic dynamic endogenous holding-revenue rates (hereafter SDEHRRs) and the stochastic dynamic endogenous holding-cost rates (hereafter SDEHCRs). Second, the Herfindahl indices are specified, and their data are created. Moreover, the components of the SDEHRR and SDEHCR are specified and estimated, and their data are created. Third, the static variable cost function is specified and estimated, and the data for the static cost unneutral efficiency are created. Additionally, the dynamic variable cost function is specified and estimated, and the data for the dynamic cost unneutral efficiency and the dynamic frontier and actual marginal variable costs are created. Fourth, the utility function and the stochastic Euler equations are specified. Due to space restrictions, only the most important points, namely, the third and fourth points, are discussed in this section. The other points are discussed in the Appendix and in Homma (2012, pp. 22-24, pp. 63-87, p. 92, pp. 111-122). The period covered by the analysis is from fiscal year 1976 to fiscal year 2016. However, as stated below, this empirical model includes lag variables for two periods prior and the next period, so the data period in the estimate is actually from fiscal year 1974 to fiscal year 2017.

3.1 Empirical Model Specification

3.1.1 Static Variable Cost Functions and Static Cost Efficiency

3.1.1.1 The Relation Between the Static Actual and Frontier Variable Cost Functions and the Estimation Procedure for the Inefficiency Coefficients

The relation between the static actual and frontier variable cost functions is clarified by the following proposition.

Proposition 1 *The static actual variable cost function is related to the static* *frontier variable cost function as follows:*

$$C_i^{SAV}\left(\mathbf{a}_{i,t}^{SIE},\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)$$
$$=C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\cdot\left[a_{i,M,t}^{SIE}+\sum_{j=1}^{M-1}\left(a_{i,j,t}^{SIE}-a_{i,M,t}^{SIE}\right)\cdot CS_{i,j}^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\right], \tag{3.1.1.1.1}$$

where $C_i^{SAV}(\cdot,\cdot,\cdot,\cdot,\cdot)$ is the static actual variable cost function defined by Homma (2018, Definition 3, pp. 10-11), $C_i^{SFV}(\cdot,\cdot,\cdot,\cdot)$ is the static frontier variable cost function defined by Homma (2018, Definition 2, pp. 9-10), $a_{i,j,t}^{SIE}$ $(j=1,\ldots,M)$ are the inefficiency coefficients of static factor demand functions ($x_{i,j}^{SFD}(\cdot,\cdot,\cdot,\cdot)$, $j=1,\ldots,M$) given by Homma (2018, Definition 3, pp. 10-11), and $CS_{i,j}^{SFV}(\cdot,\cdot,\cdot,\cdot)$ $(=\left[p_{i,j,t}\cdot x_{i,j}^{SFD}(\cdot,\cdot,\cdot,\cdot)\right]/C_i^{SFV}(\cdot,\cdot,\cdot,\cdot)$, $j=1,\ldots,M)$ are the static cost shares of optimal inputs for cost minimization.

Proof. Rearranging Homma (2018, Eq. (2.1.3.1), p. 10) gives

$$\begin{aligned}
C_i^{SAV}\left(\mathbf{a}_{i,t}^{SIE},\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right) &= \sum\nolimits_{j=1}^{M}p_{i,j,t}\cdot a_{i,j,t}^{SIE}\cdot\frac{\partial C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)}{\partial p_{i,j,t}}\\
&\quad\left(=\sum\nolimits_{j=1}^{M}p_{i,j,t}\cdot a_{i,j,t}^{SIE}\cdot x_{i,j}^{SFD}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\right)\\
&=\sum\nolimits_{j=1}^{M}p_{i,j,t}\cdot a_{i,j,t}^{SIE}\cdot\frac{C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)}{p_{i,j,t}}\cdot\frac{\partial\ln C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)}{\partial\ln p_{i,j,t}}\\
&=C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\cdot\sum\nolimits_{j=1}^{M}a_{i,j,t}^{SIE}\cdot\frac{\partial\ln C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)}{\partial\ln p_{i,j,t}}\\
&=C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\cdot\sum\nolimits_{j=1}^{M}a_{i,j,t}^{SIE}\cdot CS_{i,j}^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\\
&=C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\cdot\left[\sum\nolimits_{j=1}^{M-1}a_{i,j,t}^{SIE}\cdot CS_{i,j}^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\right.\\
&\qquad\left.+a_{i,M,t}^{SIE}\cdot\left\{1-\sum\nolimits_{j=1}^{M-1}CS_{i,j}^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\right\}\right]\\
&=C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\cdot\left[a_{i,M,t}^{SIE}+\sum\nolimits_{j=1}^{M-1}\left(a_{i,j,t}^{SIE}-a_{i,M,t}^{SIE}\right)\cdot CS_{i,j}^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\tau_{i,t}\right)\right].
\end{aligned}$$

■

The inefficiency coefficients ($a_{i,j,t}^{SIE}$, $j = 1, \ldots, M$) are estimated according to the following procedure: First, the static frontier variable cost function is estimated, and the data for the discrepancy between the logarithm of the actual variable cost and the logarithm of the static frontier variable cost function (i.e., $\varepsilon_{i,t}^{SAV} = \ln C_{i,t}^{V} - \ln C_{i}^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)$) are created. Second, from Eq. (3.1.1.1.1), the following equation is estimated:

$$\exp\left(\varepsilon_{i,t}^{SAV}\right) = a_{i,M,t}^{SIE} + \sum\nolimits_{j=1}^{M-1} b_{i,j,t}^{SIE} \cdot CS_{i,j,t}^{SFV} + \varepsilon_{i,t}^{SFV}, \qquad (3.1.1.1.2)$$

where $b_{i,j,t}^{SIE} = a_{i,j,t}^{SIE} - a_{i,M,t}^{SIE}$ ($j = 1, \ldots, M-1$), $CS_{i,j,t}^{SFV} = CS_{i,j}^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)$, and $\varepsilon_{i,t}^{SFV}$ is an ordinary error term.

3.1.1.2 Specification of the Static Variable Cost Function and the Inefficiency Coefficients

Considering the concavity conditions of factor prices, with reference to Westbrook and Buckley (1990) on the basis of the Laurent expansion proposed by Barnett (1983, 1985), the static variable cost function is specified as follows:

$$
\begin{aligned}
\ln\left(C_{i,t}^{V}/\,p_{V,i,t}^{*}\right) &= \sum_{i} a_i\left(\tau_t^{*}\right)\cdot D_i^{B} + \sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} a_j\left(\mathbf{z}_{j,i,t}^{Q}\right)\cdot \ln q_{j,i,t}^{*} \\
&+ \sum_{j\in\{L,K\}} a_j\left(\mathbf{z}_{j,i,t}^{Q}\right)\cdot \ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right) \\
&- \sum_{j\in\{L,K\}} a_j^{B}\cdot\left\{\ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right)\right\}^{-1} \\
&+\frac{1}{2}\cdot \sum\sum_{j,h\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} b_{jh}^{QQ}\cdot \ln q_{j,i,t}^{*}\cdot \ln q_{h,i,t}^{*} \\
&+\frac{1}{2}\cdot \sum\sum_{j,h\in\{L,K\}} b_{jh}^{PP}\cdot \ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right)\cdot \ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}+\theta_h\right) \\
&-\frac{1}{2}\cdot \sum\sum_{j,h\in\{L,K\}} b_{jh}^{B}\cdot \left\{\ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right)\right\}^{-1}\cdot\left\{\ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}+\theta_h\right)\right\}^{-1} \\
&+ \sum\sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\},h\in\{L,K\}} b_{jh}^{QP}\cdot \ln q_{j,i,t}^{*}\cdot \ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}+\theta_h\right) \\
&+ \sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} b_{jT}^{QT}\cdot \ln q_{j,i,t}^{*}\cdot \tau_t^{*} + \sum_{j\in\{L,K\}} b_{jT}^{PT}\cdot \ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right)\cdot \tau_t^{*} \\
&+\nu_{i,t}, \qquad (3.1.1.2.1a)
\end{aligned}
$$

where $C_{i,t}^{V}$ $(= p_{V,i,t}\cdot x_{V,i,t} + p_{L,i,t}\cdot x_{L,i,t} + p_{K,i,t}\cdot x_{K,i,t})$ is the variable cost, $p_{V,i,t}$ is the current good price, $x_{V,i,t}$ is the amount (input) of current goods, $p_{L,i,t}$ is the wage, $x_{L,i,t}$ is the amount (input) of labor, $p_{K,i,t}$ is the physical capital price, and $x_{K,i,t}$ is the amount (input) of physical capital. Moreover, D_i^B is the individual bank dummy variable, and $q_{j,i,t}$ $(j \in \{SL, LL, S, C, CL, A, DD, TD, CM, CD\})$ are the real balances of financial goods, namely, short-term loans $(j = SL)$, long-term loans $(j = LL)$, securities $(j = S)$, cash $(j = C)$, due from banks and call loans $(j = CL)$, other financial assets $(j = A)$, demand deposits $(j = DD)$, time deposits $(j = TD)$, call money and borrowed money $(j = CM)$, and certificates of deposit and other liabilities $(j = CD)$. Furthermore, τ_t is the time trend and $\nu_{i,t}$ is the ordinary error term. Variables other than the time trend marked with * are normalized by dividing them by their sample mean, and the normalized time trend is $\tau_t^* = \tau_t - 1995$. θ_j

$(j = L, K)$ are parameters added in order to ensure that the static variable cost function in Eq. (3.1.1.2a) satisfies the concavity condition for the factor prices for a larger sample. We created this parameter with reference to the prior affine transformation presented by Barnett (1985) and we stipulated the following two conditions: First, the concavity condition for the factor prices is satisfied for a larger sample. Second, the coefficients of determination (R^2) of the cost share equations as given below are not small (i.e., they are all greater than 0.4). $a_i(\tau_t^*)$ is the coefficient of the individual bank dummy variable, which is specified as follows:

$$a_i(\tau_t^*) = a_i + a_{iT} \cdot \tau_t^* + a_{iTT} \cdot (\tau_t^*)^2 + a_{iTTT} \cdot (\tau_t^*)^3 . \qquad (3.1.1.2.1b)$$

The purpose of this specification is to make the coefficient time-varying and flexible about the normalized time trend. $a_j\left(\mathbf{z}_{j,i,t}^Q\right)$ $(j \in \{SL, LL, S, C, CL, A, DD, TD, CM, CD, L, K\})$ are the linear coefficients of the financial goods and the factor prices, which are specified as follows:

$$a_j\left(\mathbf{z}_{j,i,t}^Q\right) = a_j + \sum_h a_{j,h}^Z \cdot z_{h,i,t}^Q,$$
$$j \in \{SL, LL, S, C, CL, A, DD, TD, CM, CD, L, K\}, \qquad (3.1.1.2.1c)$$

where $z_{h,i,t}^Q$ $(h = 1, \ldots, M_Z)$ are the quality variables whose combinations can vary according to each financial good and each factor price.[2]

By taking the partial derivative of the static variable cost function in Eq. (3.1.1.2.1a) with respect to $\ln(p_{j,i,t}/p_{V,i,t})$ $(j \in \{L, K\})$, we can derive the cost share equations of labor and physical capital. By simultaneously estimating these cost share equations with the static variable cost function in Eq. (3.1.1.2.1a), we can obtain a more efficient estimate than if we estimate Eq. (3.1.1.2.1a) alone.

[2] For details, see the second note in Table 4.1.1.

The static cost share equations take the form

$$
\begin{aligned}
S_{i,t}^{h} \;=\; & \frac{p_{h,i,t}^{*}}{p_{h,i,t}^{*}+\theta_h\cdot p_{V,i,t}^{*}}\cdot\Bigg[a_h\left(\mathbf{z}_{h,i,t}^{Q}\right)+a_h^{B}\cdot\left\{\ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}+\theta_h\right)\right\}^{-2} \\
& +\sum_{j\in\{L,K\}} b_{hj}^{PP}\cdot\ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right)+b_{hh}^{B}\cdot\left\{\ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}+\theta_h\right)\right\}^{-3} \\
& +\sum_{j\neq h} b_{hj}^{B}\cdot\left\{\ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}+\theta_h\right)\right\}^{-2}\cdot\left\{\ln\left(p_{j,i,t}^{*}/p_{V,i,t}^{*}+\theta_j\right)\right\}^{-1} \\
& +\sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} b_{jh}^{QP}\cdot\ln q_{j,i,t}^{*}+b_{hT}^{PT}\cdot\tau_t^{*}\Bigg]+\varepsilon_{i,t}^{h},\; h\in\{K,L\}, \qquad (3.1.1.2.2)
\end{aligned}
$$

where $S_{i,t}^{h}$ $(h\in\{K,L\})$ are the cost shares of each input factor $\left(=\left(p_{h,i,t}\cdot x_{h,i,t}\right)/C_{i,t}^{V}=\partial\ln\left(C_{i,t}^{V}/p_{V,i,t}^{*}\right)/\partial\ln\left(p_{h,i,t}^{*}/p_{V,i,t}^{*}\right)\right.$, where $x_{h,i,t}$ is the input of the h-th factor), and $\varepsilon_{i,t}^{h}$ $(h\in\{K,L\})$ are the ordinary error terms.

From Eq. (3.1.1.2.1a), the static frontier variable cost function is given by

$$C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}^Q_{i,t},\tau_{i,t}\right)=p^*_{V,i,t}\cdot\exp\Bigg[\min_i a_i\left(\tau^*_t\right)+\sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}}a_j\left(\mathbf{z}^Q_{j,i,t}\right)\cdot\ln q^*_{j,i,t}$$
$$+\sum_{j\in\{L,K\}}a_j\left(\mathbf{z}^Q_{j,i,t}\right)\cdot\ln\left(p^*_{j,i,t}/p^*_{V,i,t}+\theta_j\right)$$
$$-\sum_{j\in\{L,K\}}a^B_j\cdot\left\{\ln\left(p^*_{j,i,t}/p^*_{V,i,t}+\theta_j\right)\right\}^{-1}$$
$$+\frac{1}{2}\cdot\sum\sum_{j,h\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}}b^{QQ}_{jh}\cdot\ln q^*_{j,i,t}\cdot\ln q^*_{h,i,t}$$
$$+\frac{1}{2}\cdot\sum\sum_{j,h\in\{L,K\}}b^{PP}_{jh}\cdot\ln\left(p^*_{j,i,t}/p^*_{V,i,t}+\theta_j\right)\cdot\ln\left(p^*_{h,i,t}/p^*_{V,i,t}+\theta_h\right)$$
$$-\frac{1}{2}\cdot\sum\sum_{j,h\in\{L,K\}}b^{B}_{jh}\cdot\left\{\ln\left(p^*_{j,i,t}/p^*_{V,i,t}+\theta_j\right)\right\}^{-1}\cdot\left\{\ln\left(p^*_{h,i,t}/p^*_{V,i,t}+\theta_h\right)\right\}^{-1}$$
$$+\sum\sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\},h\in\{L,K\}}b^{QP}_{jh}\cdot\ln q^*_{j,i,t}\cdot\ln\left(p^*_{h,i,t}/p^*_{V,i,t}+\theta_h\right)$$
$$+\sum_{j\in\{SL,LL,S,C,CL,A,DD,TD,CM,CD\}}b^{QT}_{jT}\cdot\ln q^*_{j,i,t}\cdot\tau^*_t+\sum_{j\in\{L,K\}}b^{PT}_{jT}\cdot\ln\left(p^*_{j,i,t}/p^*_{V,i,t}+\theta_j\right)\cdot\tau^*_t\Bigg],\tag{3.1.1.2.3}$$

where $\min_i a_i\left(\tau^*_t\right)$ is the minimum of $a_i\left(\tau^*_t\right)$ in year t and all others are as per the static variable cost function in Eq. (3.1.1.2.1a). Using this equation, data for the discrepancy between the logarithm of the actual variable cost and the logarithm of the static frontier variable cost function (i.e., $\varepsilon^{SAV}_{i,t}=\ln C^V_{i,t}-\ln C^{SFV}_i\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}^Q_{i,t},\tau_{i,t}\right)$) can be created.

The specification of the discrepancy between the actual variable cost and the static frontier variable cost function in Eq. (3.1.1.1.2) needs to consider the following conditions: First, the inefficiency coefficients can vary according to each individual bank. Second, their coefficients are time-varying. Third, to restrict the inefficiency coefficient $a^{SIE}_{i,M,t}$ $(M=K)$ to the range [0, b], the following equation is used:

$$a_{i,M,t}^{SIE} = b \cdot \Phi\left(a_{i,K,t}^{SIE*}\right), \tag{3.1.1.2.4a}$$

where b is an extremely large value (i.e., $b = 10000000$), $\Phi\left(\,\cdot\,\right)$ is the standard normal distribution function, and $a_{i,K,t}^{SIE*}$ is the inefficiency coefficient to be estimated. Fourth, to restrict the inefficiency coefficients $b_{i,j,t}^{SIE}$ $(= a_{i,j,t}^{SIE} - a_{i,M,t}^{SIE},\ j = V, L)$ to the range $\left[-a_{i,M,t}^{SIE},\ b\right]$ (i.e., $a_{i,j,t}^{SIE} \in [0,\ b],\ j = V, L$), the following equations are used:

$$b_{i,j,t}^{SIE} = -b \cdot \Phi\left(a_{i,K,t}^{SIE*}\right) + \left(1 + \Phi\left(a_{i,K,t}^{SIE*}\right)\right) \cdot b \cdot \Phi\left(b_{i,j,t}^{SIE*}\right), \quad j = V, L, \tag{3.1.1.2.4b}$$

where $b_{i,j,t}^{SIE*}$ $(j = V, L)$ are the inefficiency coefficients to be estimated, and all others are as per $a_{i,M,t}^{SIE}$ $(M = K)$. From these conditions, the inefficiency coefficients $a_{i,K,t}^{SIE*}$, $b_{i,j,t}^{SIE*}$ $(j = V, L)$, and $a_{i,j,t}^{SIE}$ $(j = V, L)$ are specified as follows:

$$\begin{aligned} a_{i,K,t}^{SIE*} &= \sum\nolimits_i a_{i,K}^{SIE}\left(\mathbf{z}_{K,i,t}^{Q}, \tau_t^*\right) \cdot D_i^B \\ &= \sum\nolimits_i \left(a_{i,K}^{SIE} + \sum\nolimits_h a_{i,K,h}^{SIEZ} \cdot z_{h,i,t}^{Q} + a_{i,K}^{SIET} \cdot \tau_t^*\right) \cdot D_i^B, \end{aligned} \tag{3.1.1.2.4c}$$

$$\begin{aligned} b_{i,j,t}^{SIE*} &= \sum\nolimits_i b_{i,j}^{SIE}\left(\mathbf{z}_{j,i,t}^{Q}, \tau_t^*\right) \cdot D_i^B \\ &= \sum\nolimits_i \left(b_{i,j}^{SIE} + \sum\nolimits_h b_{i,j,h}^{SIEZ} \cdot z_{h,i,t}^{Q} + b_{i,j}^{SIET} \cdot \tau_t^*\right) \cdot D_i^B, \quad j = V, L, \end{aligned} \tag{3.1.1.2.4d}$$

$$a_{i,j,t}^{SIE} = b_{i,j,t}^{SIE} + a_{i,K,t}^{SIE} = \left(1 + \Phi\left(a_{i,K,t}^{SIE*}\right)\right) \cdot b \cdot \Phi\left(b_{i,j,t}^{SIE*}\right), \quad j = V, L, \tag{3.1.1.2.4e}$$

where $z_{h,i,t}^{Q}$ $(h = 1, \ldots, M_Z)$ are the quality variables in Eq. (3.1.1.2.1c) whose combinations can vary according to each factor input. If Eq. (3.1.1.1.2) with Eqs. (3.1.1.2.4a) to (3.1.1.2.4d) are estimated, then $a_{i,j,t}^{SIE}$ $(j = V, L)$ are derived from Eq. (3.1.1.2.4e). $CS_{i,j,t}^{SFV}$ $(j = V, L)$ are the right-hand side other than the ordinary error terms of Eq. (3.1.1.2.2).

3.1.1.3 Static Cost Unneutral Efficiency

From Eqs. (3.1.1.2.3), (3.1.1.2.4a) to (3.1.1.2.4e), and Homma (2018, Definitions 2 to 4, pp. 9-12), the static cost efficiency defined by Homma (2018, Definition 4, p. 12) is given by

$$
\begin{aligned}
EF_{i,t}^{S} &= \frac{C_i^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)}{C_i^{SAV}\left(\mathbf{a}_{i,t}^{SIE}, \mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)} \\
&= \frac{C_i^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)}{\sum\limits_{j\in\{V,L,K\}} p_{i,j,t}\cdot a_{i,j}^{SIE}\left(\mathbf{z}_{j,i,t}^{Q}, \tau_t\right)\cdot x_{i,j}^{SFD}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)},
\end{aligned}
\tag{3.1.1.3}
$$

where $C_i^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)$ corresponds to Eq. (3.1.1.2.3), $a_{i,j}^{SIE}\left(\mathbf{z}_{j,i,t}^{Q}, \tau_t\right)$ $(j \in \{V, L, K\})$ are expressed by Eqs. (3.1.1.2.4a) to (3.1.1.2.4e), and $x_{i,j}^{SFD}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)$ $\left(= \partial C_i^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)/\partial p_{i,j,t},\ j \in \{V, L, K\}\right)$ are the static factor demand functions referred to in Homma (2018, Definition 3, pp. 10-11).

The difference between this static cost efficiency and existing ones is that the former is cost unneutral, while the latter is cost neutral. Because the static cost unneutral efficiency has fewer theoretical restrictions, it is more desirable than the existing cost neutral ones that have the same inefficiency coefficient for all static factor demand functions.

3.1.2 Dynamic Variable Cost Functions and Dynamic Cost Efficiency

3.1.2.1 The Relation Between the Dynamic Actual and Frontier Variable Cost Functions and the Estimation Procedure for the Inefficiency Coefficients

Similar to Proposition 1, the relation between the dynamic actual and frontier variable cost functions is clarified by the following proposition:

Proposition 2 *The dynamic actual variable cost function is related to the* *dynamic frontier variable cost function as follows:*

$$C_i^{DAV}\left(\mathbf{a}_{i,t}^{DIE},\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\mathbf{HI}_{t-1},EF_{i,t-1}^{S},\tau_{i,t}\right)$$
$$=C_i^{DFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\mathbf{HI}_{t-1},EF_{i,t-1}^{S},\tau_{i,t}\right)$$
$$\cdot\left[a_{i,M,t}^{DIE}+\sum_{j=1}^{M-1}\left(a_{i,j,t}^{DIE}-a_{i,M,t}^{DIE}\right)\cdot CS_{i,j}^{DFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\mathbf{HI}_{t-1},EF_{i,t-1}^{S},\tau_{i,t}\right)\right], \tag{3.1.2.1.1}$$

where $C_i^{DAV}(\cdot,\cdot,\cdot,\cdot,\cdot,\cdot,\cdot)$ is the dynamic actual variable cost function defined by Homma (2018, Definition 7, pp. 18-19), $C_i^{DFV}(\cdot,\cdot,\cdot,\cdot,\cdot,\cdot)$ is the dynamic frontier variable cost function defined by Homma (2018, Definition 6, p. 17), $a_{i,j,t}^{DIE}$ $(j=1,\ldots,M)$ are the inefficiency coefficients of dynamic factor demand functions ($x_{i,j}^{DFD}(\cdot,\cdot,\cdot,\cdot,\cdot,\cdot)$, $j=1,\ldots,M$) given by Homma (2018, Definition 7, pp. 18-19), and $CS_{i,j}^{DFV}(\cdot,\cdot,\cdot,\cdot,\cdot,\cdot)$ $(=\left[p_{i,j,t}\cdot x_{i,j}^{DFD}(\cdot,\cdot,\cdot,\cdot,\cdot,\cdot)\right]/C_i^{DFV}(\cdot,\cdot,\cdot,\cdot,\cdot,\cdot)$, $j=1,\ldots,M)$ are the dynamic cost shares of optimal inputs for cost minimization.

Proof. The proof of this proposition is similar to the proof of Proposition 1, so we omit the derivation. ■

Similar to the inefficiency coefficients of the static factor demand functions, those of the dynamic factor demand functions are estimated according to the following procedure: First, the dynamic frontier variable cost function is estimated, and the data for the discrepancy between the logarithm of actual variable cost and the logarithm of the dynamic frontier variable cost function (i.e., $\varepsilon_{i,t}^{DAV}=\ln C_{i,t}^{V}-\ln C_i^{DFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\mathbf{HI}_{t-1},EF_{i,t-1}^{S},\tau_{i,t}\right)$) are created. Second, from Eq. (3.1.2.1.1), the following equation is estimated:

$$\exp\left(\varepsilon_{i,t}^{DAV}\right)=a_{i,M,t}^{DIE}+\sum\nolimits_{j=1}^{M-1}b_{i,j,t}^{DIE}\cdot CS_{i,j,t}^{DFV}+\varepsilon_{i,t}^{DFV}, \tag{3.1.2.1.2}$$

where $b_{i,j,t}^{DIE}=a_{i,j,t}^{DIE}-a_{i,M,t}^{DIE}$ $(j=1,\ldots,M-1)$, $CS_{i,j,t}^{DFV}=CS_{i,j}^{DFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{Q},\mathbf{HI}_{t-1},EF_{i,t-1}^{S},\tau_{i,t}\right)$, and $\varepsilon_{i,t}^{DFV}$ is an ordinary error term.

3.1.2.2 Specification of the Dynamic Variable Cost Function and the Inefficiency Coefficients

In order to explicitly account for the effects of the Herfindahl index of loans in the previous period and static cost unneutral efficiency in the previous period, Eqs. (3.1.1.2.1b) and (3.1.1.2.1c) are respectively replaced as follows:

$$a_i\left(EF^S_{i,t-1}, HI_{L,t-1}, \tau^*_t\right) = a_i + a^{EF}_i \cdot EF^S_{i,t-1} + a^{HI}_{i,L} \cdot HI_{L,t-1} + a^T_i \cdot \tau^*_t, \tag{3.1.2.2.1a}$$

$$a_j\left(EF^S_{i,t-1}, HI_{L,t-1}, \mathbf{z}^Q_{j,i,t}\right) = a_j + a^{EF}_j \cdot EF^S_{i,t-1} + a^{HI}_{j,L} \cdot HI_{L,t-1} + \sum\nolimits_h a^Z_{j,h} \cdot z^Q_{h,i,t}, \quad j \in \{SL, LL, S, C, CL, A, DD, TD, CM, CD\}, \tag{3.1.2.2.1b}$$

$$a_j\left(A^{SIE}_{i,j,t-1}, HI_{L,t-1}, \mathbf{z}^Q_{j,i,t}\right) = a_j + a^{SIE}_j \cdot A^{SIE}_{i,j,t-1} + a^{HI}_{j,L} \cdot HI_{L,t-1} + \sum\nolimits_h a^Z_{j,h} \cdot z^Q_{h,i,t}, \quad j \in \{L, K\}, \tag{3.1.2.2.1c}$$

where $HI_{L,t-1}$ is the Herfindahl index of loans (i.e., the sum of the short-term and long-term loans) in the previous period, $EF^S_{i,t-1}$ is the static cost unneutral efficiency in the previous period, $A^{SIE}_{i,j,t-1}$ ($j \in \{L, K\}$) are the inefficiency coefficients of the static factor demand functions in the previous period, and all others are as per Eqs. (3.1.1.2.1b) and (3.1.1.2.1c). The specifications other than Eqs. (3.1.2.2.1a) to (3.1.2.2.1c) of the dynamic variable cost function, the dynamic cost share equations, and the dynamic frontier variable cost function are respectively similar to Eqs. (3.1.1.2.1a), (3.1.1.2.2), and (3.1.1.2.3) other than Eqs. (3.1.1.2.1b) and (3.1.1.2.1c). Using this dynamic frontier variable cost function, data for the discrepancy between the logarithm of the actual variable cost and the logarithm of the dynamic frontier variable cost function (i.e., $\varepsilon^{DAV}_{i,t} = \ln C^V_{i,t} - \ln C^{DFV}_i\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}^Q_{i,t}, HI_{L,t-1}, EF^S_{i,t-1}, \tau_{i,t}\right)$) can be created.

Similar to Eqs. (3.1.1.2.4a) to (3.1.1.2.4e), the inefficiency coefficients in

Eq. (3.1.2.1.2) are specified as follows:

$$
\begin{aligned}
a_{i,M,t}^{DIE} &= b \cdot \Phi\left(a_{i,K,t}^{DIE*}\right) \\
&= b \cdot \Phi\left(\sum\nolimits_i a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*}\right) \cdot D_i^{B}\right) \\
&= b \cdot \Phi\left(\sum\nolimits_i \left(a_{i,K}^{DIE} + a_{i,K}^{DIEE} \cdot EF_{i,t-1}^{S} + a_{i,K,L}^{DIEH} \cdot HI_{L,t-1} + a_{i,K}^{DIET} \cdot \tau_t^{*}\right) \cdot D_i^{B}\right), \\
&\quad (M = K), \qquad (3.1.2.2.2\text{a}) \\
b_{i,j,t}^{DIE} &= -b \cdot \Phi\left(a_{i,K,t}^{DIE*}\right) + \left(1 + \Phi\left(a_{i,K,t}^{DIE*}\right)\right) \cdot b \cdot \Phi\left(b_{i,j,t}^{DIE*}\right) \\
&= -b \cdot \Phi\left(\sum\nolimits_i a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*}\right) \cdot D_i^{B}\right) \\
&\quad + \left(1 + \Phi\left(\sum\nolimits_i a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*}\right) \cdot D_i^{B}\right)\right) \\
&\quad \cdot b \cdot \Phi\left(\sum\nolimits_i b_{i,j}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*}\right) \cdot D_i^{B}\right) \\
&= -b \cdot \Phi\left(\sum\nolimits_i \left(a_{i,K}^{DIE} + a_{i,K}^{DIEE} \cdot EF_{i,t-1}^{S} + a_{i,K,L}^{DIEH} \cdot HI_{L,t-1} + a_{i,K}^{DIET} \cdot \tau_t^{*}\right) \cdot D_i^{B}\right) \\
&\quad + \left(1 + \Phi\left(\sum\nolimits_i \left(a_{i,K}^{DIE} + a_{i,K}^{DIEE} \cdot EF_{i,t-1}^{S} + a_{i,K,L}^{DIEH} \cdot HI_{L,t-1} + a_{i,K}^{DIET} \cdot \tau_t^{*}\right) \cdot D_i^{B}\right)\right) \\
&\quad \cdot b \cdot \Phi\left(\sum\nolimits_i \left(b_{i,j}^{DIE} + b_{i,j}^{DIEE} \cdot EF_{i,t-1}^{S} + b_{i,j,L}^{DIEH} \cdot HI_{L,t-1} + b_{i,j}^{DIET} \cdot \tau_t^{*}\right) \cdot D_i^{B}\right), \\
&\quad (j = V, L), \qquad (3.1.2.2.2\text{b}) \\
a_{i,j,t}^{DIE} &= b_{i,j,t}^{DIE} + a_{i,K,t}^{DIE} = \left(1 + \Phi\left(a_{i,K,t}^{DIE*}\right)\right) \cdot b \cdot \Phi\left(b_{i,j,t}^{DIE*}\right) \\
&= \left(1 + \Phi\left(\sum\nolimits_i a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*}\right) \cdot D_i^{B}\right)\right) \\
&\quad \cdot b \cdot \Phi\left(\sum\nolimits_i b_{i,j}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*}\right) \cdot D_i^{B}\right) \\
&= \left(1 + \Phi\left(\sum\nolimits_i \left(a_{i,K}^{DIE} + a_{i,K}^{DIEE} \cdot EF_{i,t-1}^{S} + a_{i,K,L}^{DIEH} \cdot HI_{L,t-1} + a_{i,K}^{DIET} \cdot \tau_t^{*}\right) \cdot D_i^{B}\right)\right) \\
&\quad \cdot b \cdot \Phi\left(\sum\nolimits_i \left(b_{i,j}^{DIE} + b_{i,j}^{DIEE} \cdot EF_{i,t-1}^{S} + b_{i,j,L}^{DIEH} \cdot HI_{L,t-1} + b_{i,j}^{DIET} \cdot \tau_t^{*}\right) \cdot D_i^{B}\right), \\
&\quad (j = V, L), \qquad (3.1.2.2.2\text{c})
\end{aligned}
$$

where all parameters, functions, and variables are as per Eqs. (3.1.1.2.4a) to (3.1.1.2.4e), and (3.1.2.2.1a).

3.1.2.3 Dynamic Cost Unneutral Efficiency

From the above dynamic frontier variable cost function, Eqs. (3.1.2.2.2a) to (3.1.2.2.2c), and Homma (2018, Definitions 6 to 8, pp. 17-20), the dynamic cost efficiency defined by Homma (2018, Definition 8, p. 20) is given by

$$\begin{aligned} EF_{i,t}^{D} &= \frac{C_i^{DFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right)}{C_i^{DAV}\left(\mathbf{a}_{i,t}^{DIE}, \mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right)} \\ &= C_i^{DFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right) \\ &\quad \Bigg/ \Bigg[\sum_{j \in \{V,L,K\}} p_{i,j,t} \cdot a_{i,j}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t\right) \\ &\quad \cdot x_{i,j}^{DFD}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right) \Bigg], \quad (3.1.2.3) \end{aligned}$$

where $C_i^{DFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right)$ is the dynamic frontier variable cost function, $a_{i,j}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t\right)$ $(j \in \{V, L, K\})$ are expressed by Eqs. (3.1.2.2.2a) to (3.1.2.2.2c), and $x_{i,j}^{DFD}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right)$ $(= \partial C_i^{DFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right) / \partial p_{i,j,t},\ j \in \{V, L, K\})$ are the dynamic factor demand functions referred to in Homma (2018, Definition 7, pp. 18-19).

The difference between this dynamic cost efficiency and the existing ones can be described as follows: First, the former is formulated to dynamically account for the effects of the Herfindahl index in the previous period and the static cost efficiency in the previous period, so it can explicitly account for both the efficient structure and quiet-life hypotheses; however, the latter cannot. Second, the former is cost unneutral, while the latter is cost neutral. Because the former has important policy implications and fewer theoretical restrictions, it is more desirable than the latter.

3.1.3 Utility Functions and Stochastic Euler Equations

3.1.3.1 Specifications of Utility Functions

The following three points need to be considered in the specification of the utility function used in Homma (2018, Eq. (2.2.2.2), p. 30): First, although it is difficult to directly estimate the utility function, it is possible to indirectly estimate it through the stochastic Euler equations derived by

Homma (2018, Theorems 1 and 2, pp. 34-37). Second, it is not desirable for the final empirical results to heavily depend on the restrictive functional form of the utility function, which has numerous theoretical restrictions assumed a priori. Third, it is possible for the risk attitude of banks on the cost frontier (i.e., the most efficient banks) to differ from that of banks on the actual cost. From the first and second points, considering the restriction on estimation in the first point, it is desirable to specify the utility function by as flexible a functional form as possible. Furthermore, from the third point, it is necessary to specify the risk attitude of banks on the cost frontier by differentiating it from that of banks on the actual cost.

In consideration of these points, the utility function of banks on the cost frontier is specified by using the Box-Cox functional form as follows:

$$\begin{aligned} u_{i,t}^{F} &= u^{F}\left(\pi_{i,t}^{QSF}, q_{e,i,t}\right) \\ &= \frac{\left(\pi_{i,t}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^{F}} - 1}{\gamma^{F}} + \alpha_{e}^{F} \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^{F}} - 1}{\gamma^{F}} \\ &\quad + \alpha_{\pi e}^{F} \cdot \frac{\left(\pi_{i,t}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^{F}} - 1}{\gamma^{F}} \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^{F}} - 1}{\gamma^{F}}, \qquad (3.1.3.1.1) \end{aligned}$$

where $u^{F}(\cdot, \cdot)$ is the utility function of banks on the cost frontier, $\pi_{i,t}^{QSF}$ is the quasi-short-run profit based on the dynamic frontier cost defined by Homma (2018, Definition 9, pp. 25-26), ϕ_{π}^{F} is the parameter established taking into account the possibility that the $\pi_{i,t}^{QSF}$ becomes negative, and $q_{e,i,t}$ is the equity capital given by Homma (2018, Eq. (2.2.2.5), p. 31).

Here, γ^{F} is the risk attitude parameter of banks on the cost frontier. Taking into account the possibility that its value varies depending on the period, we specify

$$\gamma^{F} = \sum\nolimits_{s} \gamma_{s}^{F} \cdot D_{s}^{Y} = \sum\nolimits_{s} \sin^{2}\left(\gamma_{s}^{F*}\right) \cdot D_{s}^{Y}, \qquad (3.1.3.1.2)$$

where D_{s}^{Y} is the period dummy variable for cases where the period covered by the analysis is split into several sub-periods (i.e., the dummy variable equals 1 in period s and 0 in the other periods); $\sin^2(\cdot)$ is the square of a sine function, and γ_s^{F*} is the risk attitude parameter to be estimated. This replacement introduces the following restriction:

$$0 \leq \gamma_s^F = \sin^2\left(\gamma_s^{F*}\right) \leq 1. \tag{3.1.3.1.3}$$

Although this restriction excludes the risk-lover case (i.e., $\gamma_s^F > 1$), it is imposed for two reasons: First, it is unrealistic for such a case to actually occur. Second, in case of no restriction, it often happens that $\left|\gamma^F\right|$ is extremely large. From Eqs. (3.1.3.1.1) and (3.1.3.1.2), $1 - \gamma_s^F$ indicates the degree of relative risk-aversion, which is expressed as

$$\begin{aligned} 1-\gamma^F &= 1-\sum\nolimits_s \gamma_s^F \cdot D_s^Y \\ &= -\left(\pi_{i,t}^{QSF} + \phi_\pi^F\right) \cdot \frac{\partial^2 u_{i,t}^F}{\partial \pi_{i,t}^{QSF2}} \bigg/ \frac{\partial u_{i,t}^F}{\partial \pi_{i,t}^{QSF}} = -q_{e,i,t} \cdot \frac{\partial^2 u_{i,t}^F}{\partial q_{e,i,t}^{\ 2}} \bigg/ \frac{\partial u_{i,t}^F}{\partial q_{e,i,t}}. \end{aligned} \tag{3.1.3.1.4}$$

Here, $0 \leq \gamma_s^F < 1 \ (= 1)$ (i.e., $1 - \gamma_s^F > 0 \ (= 0)$) indicates risk-averse (risk-neutral).

In order to interpret α_e^F and $\alpha_{\pi e}^F$, the Box-Cox functions are replaced as follows:

$$u^{FP}\left(\pi_{i,t}^{QSF}\right) = \frac{\left(\pi_{i,t}^{QSF} + \phi_\pi^F\right)^{\gamma^F} - 1}{\gamma^F}, \tag{3.1.3.1.5a}$$

$$u^{FE}\left(q_{e,i,t}\right) = \frac{\left(q_{e,i,t}\right)^{\gamma^F} - 1}{\gamma^F}, \tag{3.1.3.1.5b}$$

where $u^{FP}\left(\pi_{i,t}^{QSF}\right)$ and $u^{FE}\left(q_{e,i,t}\right)$ are respectively the unit utilities of the quasi-short-run profit based on the dynamic frontier cost and equity capital.

In this case, Equation (3.1.3.1.1) is expressed as

$$\begin{aligned} u_{i,t}^{F} &= u^{F}\left(\pi_{i,t}^{QSF}, q_{e,i,t}\right) \\ &= u^{FP}\left(\pi_{i,t}^{QSF}\right) + \alpha_{e}^{F} \cdot u^{FE}\left(q_{e,i,t}\right) + \alpha_{\pi e}^{F} \cdot u^{FP}\left(\pi_{i,t}^{QSF}\right) \cdot u^{FE}\left(q_{e,i,t}\right). \end{aligned} \tag{3.1.3.1.6}$$

From this equation, the two coefficients are represented as

$$\alpha_{e}^{F} = \frac{\partial u^{F}\left(\pi_{i,t}^{QSF}, q_{e,i,t}\right)}{\partial u^{FE}\left(q_{e,i,t}\right)} - \frac{\partial^{2} u^{F}\left(\pi_{i,t}^{QSF}, q_{e,i,t}\right)}{\partial u^{FP}\left(\pi_{i,t}^{QSF}\right) \partial u^{FE}\left(q_{e,i,t}\right)} \cdot u^{FP}\left(\pi_{i,t}^{QSF}\right), \tag{3.1.3.1.7a}$$

$$\alpha_{\pi e}^{F} = \frac{\partial^{2} u^{F}\left(\pi_{i,t}^{QSF}, q_{e,i,t}\right)}{\partial u^{FP}\left(\pi_{i,t}^{QSF}\right) \partial u^{FE}\left(q_{e,i,t}\right)}. \tag{3.1.3.1.7b}$$

From Eq. (3.1.3.1.7b), $\alpha_{\pi e}^{F}$ indicates the cross effect of the two unit utilities. From Eq. (3.1.3.1.7a), α_{e}^{F} demonstrates the subtraction of the product of this cross effect and the unit utility of the quasi-short-run profit based on the dynamic frontier cost from the marginal effect of the unit utility of the equity capital. Similar to γ^{F}, taking into account the possibility that the value of α_{e}^{F} varies depending on the period, α_{e}^{F} is specified as

$$\alpha_{e}^{F} = \sum\nolimits_{s} \alpha_{e,s}^{F} \cdot D_{s}^{Y}. \tag{3.1.3.1.8}$$

If $\alpha_{\pi e}^{F} = 0$, then the unit utility of the quasi-short-run profit based on the dynamic frontier cost is separable from that of the equity capital, meaning their marginal utilities are independent of each other. However, if $\alpha_{\pi e}^{F} \neq 0$, then they are mutually dependent.

Next, similar to the utility function of banks on the cost frontier, the utility function of banks on the actual cost is specified by using the Box-Cox functional form as follows:

$$\begin{aligned}
u_{i,t}^{A} &= u^{A}\left(\pi_{i,t}^{QSA}, q_{e,i,t}\right) \\
&= \frac{\left(\pi_{i,t}^{QSA}+\phi_{\pi}^{A}\right)^{\gamma^{F}-\gamma^{DA}}-1}{\gamma^{F}-\gamma^{DA}} + \left(\alpha_{e}^{F}+\alpha_{e}^{DA}\right)\cdot\frac{\left(q_{e,i,t}\right)^{\gamma^{F}-\gamma^{DA}}-1}{\gamma^{F}-\gamma^{DA}} \\
&\quad + \left(\alpha_{\pi e}^{F}+\alpha_{\pi e}^{DA}\right)\cdot\frac{\left(\pi_{i,t}^{QSA}+\phi_{\pi}^{A}\right)^{\gamma^{F}-\gamma^{DA}}-1}{\gamma^{F}-\gamma^{DA}}\cdot\frac{\left(q_{e,i,t}\right)^{\gamma^{F}-\gamma^{DA}}-1}{\gamma^{F}-\gamma^{DA}},
\end{aligned} \tag{3.1.3.1.9}$$

where $u^{A}(\cdot,\cdot)$ is the utility function of banks on the actual cost, $\pi_{i,t}^{QSA}$ is the quasi-short-run profit based on the dynamic actual cost defined by Homma (2018, Definition 10, pp. 26-27), and ϕ_{π}^{A} is, similar to ϕ_{π}^{F}, the parameter determined when taking into account the possibility that $\pi_{i,t}^{QSA}$ becomes negative.

Here, γ^{DA} is the difference parameter indicating the difference from γ^{F}. Taking into account the possibility that its value varies depending on the period, similar to γ^{F}, we specify

$$\gamma^{DA} = \sum\nolimits_{s}\gamma_{s}^{DA}\cdot D_{s}^{Y} = \sum\nolimits_{s}\sin^{2}\left(\gamma_{s}^{DA*}\right)\cdot D_{s}^{Y}. \tag{3.1.3.1.10}$$

In this case, γ_{s}^{DA} is the difference between the degree of relative risk-aversion of banks on the actual cost (i.e., $1-\left(\gamma_{s}^{F}-\gamma_{s}^{DA}\right)$) and that of banks on the cost frontier (i.e., $1-\gamma_{s}^{F}$). If $\gamma_{s}^{DA} > (=,<)\,0$, then the former is greater than (equal to, less than) the latter.

Furthermore, α_{e}^{DA} is the additive parameter to α_{e}^{F}, and $\alpha_{\pi e}^{DA}$ is the additive parameter to $\alpha_{\pi e}^{F}$. Similar to α_{e}^{F}, taking into account the possibility that the value varies depending on the period, α_{e}^{DA} is specified as

$$\alpha_{e}^{DA} = \sum\nolimits_{s}\alpha_{e,s}^{DA}\cdot D_{s}^{Y}. \tag{3.1.3.1.11}$$

Similar to α_{e}^{F} and $\alpha_{\pi e}^{F}$, in order to interpret $\alpha_{e}^{F}+\alpha_{e}^{DA}$ and $\alpha_{\pi e}^{F}+\alpha_{\pi e}^{DA}$, the

Box-Cox functions are replaced as follows:

$$u^{AP}\left(\pi_{i,t}^{QSA}\right) = \frac{\left(\pi_{i,t}^{QSA}+\phi_{\pi}^{A}\right)^{\gamma^F-\gamma^{DA}}-1}{\gamma^F-\gamma^{DA}}, \quad (3.1.3.1.12a)$$

$$u^{AE}\left(q_{e,i,t}\right) = \frac{\left(q_{e,i,t}\right)^{\gamma^F-\gamma^{DA}}-1}{\gamma^F-\gamma^{DA}}, \quad (3.1.3.1.12b)$$

where $u^{AP}\left(\pi_{i,t}^{QSA}\right)$ and $u^{AE}\left(q_{e,i,t}\right)$ are respectively the unit utilities of the quasi-short-run profit based on the dynamic actual cost and the equity capital.

In this case, Equation (3.1.3.1.9) is expressed as

$$\begin{aligned} u_{i,t}^{A} &= u^{A}\left(\pi_{i,t}^{QSA}, q_{e,i,t}\right) \\ &= u^{AP}\left(\pi_{i,t}^{QSA}\right) + \left(\alpha_e^F+\alpha_e^{DA}\right)\cdot u^{AE}\left(q_{e,i,t}\right) \\ &\quad + \left(\alpha_{\pi e}^F+\alpha_{\pi e}^{DA}\right)\cdot u^{AP}\left(\pi_{i,t}^{QSA}\right)\cdot u^{AE}\left(q_{e,i,t}\right). \quad (3.1.3.1.13) \end{aligned}$$

From this equation, $\alpha_e^F+\alpha_e^{DA}$ and $\alpha_{\pi e}^F+\alpha_{\pi e}^{DA}$ are represented as

$$\alpha_e^F+\alpha_e^{DA} = \frac{\partial u^{A}\left(\pi_{i,t}^{QSA}, q_{e,i,t}\right)}{\partial u^{AE}\left(q_{e,i,t}\right)} - \frac{\partial^2 u^{A}\left(\pi_{i,t}^{QSA}, q_{e,i,t}\right)}{\partial u^{AP}\left(\pi_{i,t}^{QSA}\right)\partial u^{AE}\left(q_{e,i,t}\right)}\cdot u^{AP}\left(\pi_{i,t}^{QSA}\right), \quad (3.1.3.1.14a)$$

$$\alpha_{\pi e}^F+\alpha_{\pi e}^{DA} = \frac{\partial^2 u^{A}\left(\pi_{i,t}^{QSA}, q_{e,i,t}\right)}{\partial u^{AP}\left(\pi_{i,t}^{QSA}\right)\partial u^{AE}\left(q_{e,i,t}\right)}. \quad (3.1.3.1.14b)$$

From Eq. (3.1.3.1.14b), $\alpha_{\pi e}^F+\alpha_{\pi e}^{DA}$ indicates the cross effect of the two unit utilities; thus, $\alpha_{\pi e}^{DA}$ demonstrates the subtraction of Eq. (3.1.3.1.7b) from this cross effect. From Eq. (3.1.3.1.14a), $\alpha_e^F+\alpha_e^{DA}$ indicates the subtraction of the product of this cross effect and the unit utility of the quasi-short-run profit based on the dynamic actual cost from the marginal effect of the unit utility of the equity capital. Therefore, α_e^{DA} is the subtraction of Eq. (3.1.3.1.7a) from this subtraction. If $\alpha_{\pi e}^F+\alpha_{\pi e}^{DA}=0$, then the unit utility of the quasi-short-run profit based on the dynamic actual cost is separable from that of the equity capital, so their marginal utilities are independent on each other. However, if $\alpha_{\pi e}^{F}+\alpha_{\pi e}^{DA} \neq 0$, then they are mutually dependent. Furthermore, if $\gamma^{DA}=\alpha_{e}^{DA}=\alpha_{\pi e}^{DA}=0$ and $\phi_{\pi}^{A}=\phi_{\pi}^{F}$, then $u^{A}(\cdot,\cdot)=u^{F}(\cdot,\cdot)$. However, if at least one of these assumptions is not supported, then $u^{A}(\cdot,\cdot) \neq u^{F}(\cdot,\cdot)$. Especially, if $\gamma^{DA} \neq 0$, then the risk attitude of banks on the cost frontier is different from that of banks on the actual cost.

3.1.3.2 Specifications of Stochastic Euler Equations

For the subjective rate of time preference (hereafter SRTP) $r_{i,t}^{D}$, which appears directly in Homma (2018, Eq. (2.2.2.2), p. 30) and indirectly in Homma (2018, Theorems 1 and 2, Eqs. (2.2.3.1) and (2.2.3.2), pp. 34-37), rather than using the existing interest rate data a priori, we consider estimating the SRTP indirectly through the stochastic Euler equations in Homma (2018, Theorems 1 and 2, Eqs. (2.2.3.1) and (2.2.3.2), pp. 34-37), just as we did with the utility function. The reason for this is that, as can be seen in Homma (2018, Eqs. (2.2.3.4) to (2.2.3.10), pp. 39-44), the SRTP plays an important role in classifying financial goods as outputs or inputs, so that estimating the SRTP that is most suitable for the GURM is more desirable than trying to forcibly relate the existing interest rate data to our purposes. For this reason, the SRTP is specified as

$$r_{i,t}^{D}=r_{t}^{D}=\sin^{2}(\delta^{s})\cdot r_{t}^{CR}, \tag{3.1.3.2.1}$$

where $r_{i,t}^{D}=r_{t}^{D}$ implies that the SRTP is identical for all banks. The reason for this is two-fold: First, if this is not assumed, then the estimation of the stochastic Euler equations becomes somewhat difficult. Second, even though this is assumed, the reference rates in Homma (2018, Eqs. (2.2.3.4) to (2.2.3.7), pp. 39-42) can vary according to each bank. Here, δ^{s} is the parameter to be estimated, and r_{t}^{CR} is the call rate, which is the interest rate for the most representative interbank market in Japan. If $\sin^{2}(\delta^{s}) \neq 1$, then r_{t}^{D} is different from r_{t}^{CR}. In this case, $0 \leq \sin^{2}(\delta^{s}) < 1$, regarding r_{t}^{CR}, as r_{t}^{D} overestimates its value.

From Eqs. (3.1.3.1.1) and (3.1.3.1.9), because the utility functions of banks on the cost frontier and the banks on actual cost are different, the respective stochastic Euler equations using these are estimated. From Eq. (3.1.3.1.9), the specification of the utility function of banks with respect to the actual cost uses the parameters of the banks on the cost frontier. For this reason, the stochastic Euler equations using the utility functions of banks on the cost frontier are estimated; next, taking these estimated parameters as given, the stochastic Euler equations using the utility functions of banks on the actual cost are estimated.

In these cases, the stochastic Euler equations in Homma (2018, Theorems 1 and 2, Eqs. (2.2.3.1) and (2.2.3.2), pp. 34-37) are expressed with an expectation operator or integral sign, so that it is extremely difficult to estimate these equations "as is." For this reason, we consider deriving estimation equations in a form that does not depend on an expectation operator or integral sign. First, we transform the stochastic Euler equations in Homma (

2018, Theorems 1 and 2, Eqs. (2.2.3.1) and (2.2.3.2), pp. 34-37) as follows:[3]

$$1 = \frac{1 + b_C \cdot \left(h^R_{i,j,t} + \eta_{i,j,t}\right)}{1 + \left(b_j \cdot p_{G,t}\right)^{-1} \cdot MC^{DFV}_{i,j,t} - MRS^{F\pi}_{e,i,t}} \cdot \beta_{i,t} \cdot \frac{E\left[\partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t}\right]}{\partial u^F_{i,t} \middle/ \partial \pi^{QSF}_{i,t}}$$
$$+ \beta_{i,t} \cdot \frac{\operatorname{cov}\left(\zeta_{i,j,t+1}, \partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t}\right)}{\left\{1 + \left(b_j \cdot p_{G,t}\right)^{-1} \cdot MC^{DFV}_{i,j,t} - MRS^{F\pi}_{e,i,t}\right\} \cdot \partial u^F_{i,t} \middle/ \partial \pi^{QSF}_{i,t}},$$
$$\left(j = 1, \ldots, N_A + N_L\right), \tag{3.1.3.2.2}$$

$$1 = \frac{1 + b_C \cdot \left(h^R_{i,j,t} + \eta_{i,j,t}\right)}{1 + \left(b_j \cdot p_{G,t}\right)^{-1} \cdot MC^{DAV}_{i,j,t} - MRS^{A\pi}_{e,i,t}} \cdot \beta_{i,t} \cdot \frac{E\left[\partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t}\right]}{\partial u^A_{i,t} \middle/ \partial \pi^{QSA}_{i,t}}$$
$$+ \beta_{i,t} \cdot \frac{\operatorname{cov}\left(\zeta_{i,j,t+1}, \partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t}\right)}{\left\{1 + \left(b_j \cdot p_{G,t}\right)^{-1} \cdot MC^{DAV}_{i,j,t} - MRS^{A\pi}_{e,i,t}\right\} \cdot \partial u^A_{i,t} \middle/ \partial \pi^{QSA}_{i,t}}$$
$$- \frac{PIE_{i,j,t}}{b_j \cdot p_{G,t} \cdot \left\{1 + \left(b_j \cdot p_{G,t}\right)^{-1} \cdot MC^{DAV}_{i,j,t} - MRS^{A\pi}_{e,i,t}\right\}},$$
$$\left(j = 1, \ldots, N_A + N_L\right), \tag{3.1.3.2.3}$$

where

$$E\left[\partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t}\right] = \int_Z \partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \, Q\left(\mathbf{z}_{i,t}, \mathbf{dz}_{i,t+1}\right),$$
$$E\left[\partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t}\right] = \int_Z \partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} \, Q\left(\mathbf{z}_{i,t}, \mathbf{dz}_{i,t+1}\right),$$
$$\operatorname{cov}\left(\zeta_{i,j,t+1}, \partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t}\right) = \int_Z \left(\zeta_{i,j,t+1} - E\left[\zeta_{i,j,t+1} \middle| \mathbf{z}_{i,t}\right]\right)$$
$$\cdot \left(\partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} - E\left[\partial u^F_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t}\right]\right) Q\left(\mathbf{z}_{i,t}, \mathbf{dz}_{i,t+1}\right),$$
$$\operatorname{cov}\left(\zeta_{i,j,t+1}, \partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t}\right) = \int_Z \left(\zeta_{i,j,t+1} - E\left[\zeta_{i,j,t+1} \middle| \mathbf{z}_{i,t}\right]\right)$$
$$\cdot \left(\partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} - E\left[\partial u^A_{i,t+1} \middle/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t}\right]\right) Q\left(\mathbf{z}_{i,t}, \mathbf{dz}_{i,t+1}\right).$$

Next, from these equations, Eqs. (3.1.3.2.2) and (3.1.3.2.3) can be expressed

[3] For the purpose of simplification, hereafter the symbol "*" in Homma (2018, Theorems 1 and 2, Eqs. (2.2.3.1) and (2.2.3.2), pp. 34-37) is omitted.

as

$$\int_Z \left[\frac{1 + b_C \cdot \left(h^R_{i,j,t} + \eta_{i,j,t} \right)}{1 + (b_j \cdot p_{G,t})^{-1} \cdot MC^{DFV}_{i,j,t} - MRS^{F\pi}_{e,i,t}} \cdot \beta_{i,t} \cdot \frac{\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1}}{\partial u^F_{i,t} \Big/ \partial \pi^{QSF}_{i,t}} \right.$$

$$+\beta_{i,t} \cdot \frac{\left(\zeta_{i,j,t+1} - E\left[\zeta_{i,j,t+1} \middle| \mathbf{z}_{i,t} \right] \right) \cdot \left(\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1} - E\left[\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t} \right] \right)}{\left\{ 1 + (b_j \cdot p_{G,t})^{-1} \cdot MC^{DFV}_{i,j,t} - MRS^{F\pi}_{e,i,t} \right\} \cdot \partial u^F_{i,t} \Big/ \partial \pi^{QSF}_{i,t}}$$

$$\left. -1 \right] Q\left(\mathbf{z}_{i,t}, \mathbf{dz}_{i,t+1} \right) = 0, \quad j = 1, \ldots, N_A + N_L, \qquad (3.1.3.2.4)$$

$$\int_Z \left[\frac{1 + b_C \cdot \left(h^R_{i,j,t} + \eta_{i,j,t} \right)}{1 + (b_j \cdot p_{G,t})^{-1} \cdot MC^{DAV}_{i,j,t} - MRS^{A\pi}_{e,i,t}} \cdot \beta_{i,t} \cdot \frac{\partial u^A_{i,t+1} \Big/ \partial \pi^{QSA}_{i,t+1}}{\partial u^A_{i,t} \Big/ \partial \pi^{QSA}_{i,t}} \right.$$

$$+\beta_{i,t} \cdot \frac{\left(\zeta_{i,j,t+1} - E\left[\zeta_{i,j,t+1} \middle| \mathbf{z}_{i,t} \right] \right) \cdot \left(\partial u^A_{i,t+1} \Big/ \partial \pi^{QSA}_{i,t+1} - E\left[\partial u^A_{i,t+1} \Big/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t} \right] \right)}{\left\{ 1 + (b_j \cdot p_{G,t})^{-1} \cdot MC^{DAV}_{i,j,t} - MRS^{A\pi}_{e,i,t} \right\} \cdot \partial u^A_{i,t} \Big/ \partial \pi^{QSA}_{i,t}}$$

$$\left. - \frac{PIE_{i,j,t}}{b_j \cdot p_{G,t} \cdot \left\{ 1 + (b_j \cdot p_{G,t})^{-1} \cdot MC^{DAV}_{i,j,t} - MRS^{A\pi}_{e,i,t} \right\}} - 1 \right] Q\left(\mathbf{z}_{i,t}, \mathbf{dz}_{i,t+1} \right) = 0,$$

$$j = 1, \ldots, N_A + N_L. \qquad (3.1.3.2.5)$$

Consequently, we consider making the expression inside the brackets the estimation equation. In this case, the problem is the treatment of $E\left[\zeta_{i,j,t+1} \middle| \mathbf{z}_{i,t} \right]$, $E\left[\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t} \right]$, $E\left[\partial u^A_{i,t+1} \Big/ \partial \pi^{QSA}_{i,t+1} \middle| \mathbf{z}_{i,t} \right]$, and $PIE_{i,j,t}$ ($= \varepsilon^P_{i,j,t} \Big/ \left(\partial u^A_{i,t} \Big/ \partial \pi^{QSA}_{i,t} \right)$). From Homma (2018, Theorems 1 and 2, Eqs. (2.2.3.1) and (2.2.3.2), pp. 34-37), $E\left[\zeta_{i,j,t+1} \middle| \mathbf{z}_{i,t} \right]$ is assumed to be zero. Regarding $E\left[\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t} \right]$, we assume the following:

$$E\left[\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t} \right] = \left(\sum_i a^{MU}_i \cdot D^B_i + \mathbf{b}^{MU\prime} \cdot \mathbf{z}_{i,t} \right) \cdot \left(\partial u^F_{i,t} \Big/ \partial \pi^{QSF}_{i,t} \right), \qquad (3.1.3.2.6a)$$

$$\partial u^F_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1} - \left(\sum_i a^{MU}_i \cdot D^B_i + \mathbf{b}^{MU\prime} \cdot \mathbf{z}_{i,t} \right) \cdot \left(\partial u^F_{i,t} \Big/ \partial \pi^{QSF}_{i,t} \right) = \varepsilon^{MUF}_{i,t+1}, \qquad (3.1.3.2.6b)$$

where D_i^B is the individual bank dummy variable, $\mathbf{z}_{i,t}$ is the vector of exogenous (state) variables affecting $\partial u_{i,t+1}^F \Big/ \partial \pi_{i,t+1}^{QSF}$, $\mathbf{b}^{MU}$ is the vector of coefficients corresponding to the exogenous (state) variables, and $\varepsilon_{i,t+1}^{MUF}$ is the ordinary error term. Regarding $E\left[\partial u_{i,t+1}^A \Big/ \partial \pi_{i,t+1}^{QSA} \middle| \mathbf{z}_{i,t}\right]$, we assume the following:

$$E\left[\partial u_{i,t+1}^A \Big/ \partial \pi_{i,t+1}^{QSA} \middle| \mathbf{z}_{i,t}\right] = b^{MUA} \cdot \left(\sum_i a_i^{MU} \cdot D_i^B + \mathbf{b}^{MU\prime} \cdot \mathbf{z}_{i,t}\right) \cdot \left(\partial u_{i,t}^A \Big/ \partial \pi_{i,t}^{QSA}\right), \tag{3.1.3.2.7a}$$

$$\partial u_{i,t+1}^A \Big/ \partial \pi_{i,t+1}^{QSA} - b^{MUA} \cdot \left(\sum_i a_i^{MU} \cdot D_i^B + \mathbf{b}^{MU\prime} \cdot \mathbf{z}_{i,t}\right) \cdot \left(\partial u_{i,t}^A \Big/ \partial \pi_{i,t}^{QSA}\right) = \varepsilon_{i,t+1}^{MUA}, \tag{3.1.3.2.7b}$$

where b^{MUA} $(= \left\{E\left[\partial u_{i,t+1}^A \Big/ \partial \pi_{i,t+1}^{QSA} \middle| \mathbf{z}_{i,t}\right] \Big/ E\left[\partial u_{i,t+1}^F \Big/ \partial \pi_{i,t+1}^{QSF} \middle| \mathbf{z}_{i,t}\right]\right\}$ $\Big/ \left\{\left(\partial u_{i,t}^A \Big/ \partial \pi_{i,t}^{QSA}\right) \Big/ \left(\partial u_{i,t}^F \Big/ \partial \pi_{i,t}^{QSF}\right)\right\})$ is the parameter to be estimated, which assumes that this ratio is constant, $\varepsilon_{i,t+1}^{MUA}$ is the ordinary error term, and all others are as per Eqs. (3.1.3.2.6a) and (3.1.3.2.6b). Regarding $PIE_{i,j,t}$, we assume

$$PIE_{i,j,t} = \left(\sum\nolimits_i a_{i,j}^{PIE} \cdot D_i^B + a_j^{PIEE} \cdot EF_{i,t-1}^S + a_j^{PIEH} \cdot HI_{j,t-1} + \sum\nolimits_h a_{j,h}^{PIEZ} \cdot z_{h,i,t}^Q\right) \Big/ \left(\partial u_{i,t}^A \Big/ \partial \pi_{i,t}^{QSA}\right), \quad j = 1, \ldots, N_A + N_L, \tag{3.1.3.2.8a}$$

where

$$\varepsilon_{i,j,t}^P = \sum\nolimits_i a_{i,j}^{PIE} \cdot D_i^B + a_j^{PIEE} \cdot EF_{i,t-1}^S + a_j^{PIEH} \cdot HI_{j,t-1} + \sum\nolimits_h a_{j,h}^{PIEZ} \cdot z_{h,i,t}^Q, \quad j = 1, \ldots, N_A + N_L, \tag{3.1.3.2.8b}$$

$HI_{j,t-1}$ $(j = 1, \ldots, N_A + N_L)$ are the Herfindahl indices corresponding to each financial good, and all others are as per Eqs. (3.1.1.2.4c) and (3.1.2.2.2a).

Taking into account the above considerations, the estimation equations inside the brackets are expressed as follows:[4]

$$\frac{1+b_C\cdot\left(h^R_{j,i,t}+\eta_{j,i,t}\right)}{1+\left(b_j\cdot p_{G,t}\right)^{-1}\cdot MC^{DFV}_{j,i,t}-MRS^{F\pi}_{e,i,t}}\cdot\beta_{i,t}\cdot\frac{\partial u^F_{i,t+1}\Big/\partial\pi^{QSF}_{i,t+1}}{\partial u^F_{i,t}\Big/\partial\pi^{QSF}_{i,t}}$$
$$+\beta_{i,t}\cdot\frac{\zeta_{j,i,t+1}\cdot\left[\partial u^F_{i,t+1}\Big/\partial\pi^{QSF}_{i,t+1}-\left(\sum_i a^{MU}_i\cdot D^B_i+\mathbf{b}^{MU\prime}\cdot\mathbf{z}_{i,t}\right)\cdot\left(\partial u^F_{i,t}\Big/\partial\pi^{QSF}_{i,t}\right)\right]}{\left\{1+\left(b_j\cdot p_{G,t}\right)^{-1}\cdot MC^{DFV}_{j,i,t}-MRS^{F\pi}_{e,i,t}\right\}\cdot\partial u^F_{i,t}\Big/\partial\pi^{QSF}_{i,t}}$$
$$-1=\varepsilon^{EUF}_{j,i,t+1},\quad j=SL,LL,S,C,CL,A,DD,TD,CM,CD,\qquad(3.1.3.2.9)$$

$$\frac{1+b_C\cdot\left(h^R_{j,i,t}+\eta_{j,i,t}\right)}{1+\left(b_j\cdot p_{G,t}\right)^{-1}\cdot MC^{DAV}_{j,i,t}-MRS^{A\pi}_{e,i,t}}\cdot\beta_{i,t}\cdot\frac{\partial u^A_{i,t+1}\Big/\partial\pi^{QSA}_{i,t+1}}{\partial u^A_{i,t}\Big/\partial\pi^{QSA}_{i,t}}$$
$$+\beta_{i,t}\cdot\frac{\zeta_{j,i,t+1}\cdot\left[\partial u^A_{i,t+1}\Big/\partial\pi^{QSA}_{i,t+1}-b^{MUA}\cdot\left(\sum_i a^{MU}_i\cdot D^B_i+\mathbf{b}^{MU\prime}\cdot\mathbf{z}_{i,t}\right)\cdot\left(\partial u^A_{i,t}\Big/\partial\pi^{QSA}_{i,t}\right)\right]}{\left\{1+\left(b_j\cdot p_{G,t}\right)^{-1}\cdot MC^{DAV}_{j,i,t}-MRS^{A\pi}_{e,i,t}\right\}\cdot\partial u^A_{i,t}\Big/\partial\pi^{QSA}_{i,t}}$$
$$-\frac{\sum_i a^{PIE}_{i,j}\cdot D^B_i+a^{PIEE}_j\cdot EF^S_{i,t-1}+a^{PIEH}_j\cdot HI_{j,t-1}+\sum_h a^{PIEZ}_{j,h}\cdot z^Q_{h,i,t}}{b_j\cdot p_{G,t}\cdot\left\{1+\left(b_j\cdot p_{G,t}\right)^{-1}\cdot MC^{DAV}_{j,i,t}-MRS^{A\pi}_{e,i,t}\right\}\cdot\partial u^A_{i,t}\Big/\partial\pi^{QSA}_{i,t}}$$
$$-1=\varepsilon^{EUA}_{j,i,t+1},\quad j=SL,LL,S,C,CL,A,DD,TD,CM,CD,\qquad(3.1.3.2.10)$$

where $\varepsilon^{EUF}_{j,i,t+1}$ and $\varepsilon^{EUA}_{j,i,t+1}$ ($j=SL,LL,S,C,CL,A,DD,TD,CM,CD$) are the ordinary error terms, and all others are as per the above equations. From Homma (2012, Eq. (6.2.1.1), p. 72) and Homma (2018, Eq. (2.2.3.8), p. 42), $h^R_{j,i,t}$ and $\eta_{j,i,t}$ ($j=SL,LL,S,C,CL,A,DD,TD,CM,CD$) are respectively

$$h^R_{j,i,t}=\begin{cases}r^R_{j,i}\left(Q_{j,t},\mathbf{z}^R_{j,i,t}\right)+r^Q_{j,i}\left(\mathbf{z}^Q_{j,i,t}\right)+h^S_{j,i,t}-h^D_{j,i}\left(\mathbf{z}^D_{j,i,t}\right) & (j=SL,LL)\\ r_{j,i,t}+h^S_{j,i,t}+h^C_{j,i,t}-h^D_{j,i,t} & (j=S,A)\\ 0 & (j=C)\\ r_{j,i,t} & (j=CL,CM,CD)\\ r^R_{j,i}\left(Q_{j,t},\mathbf{z}^R_{j,i,t}\right)+r^Q_{j,t}\left(\mathbf{z}^Q_{j,i,t}\right)+h^I_{j,i,t}+r^D_{i,t}\cdot\kappa_{j,i,t}-h^S_{j,i,t} & (j=DD,TD)\end{cases},\qquad(3.1.3.2.11)$$

[4]In accordance with the notation in the present section, the order of subscripts i and j is reversed.

and

$$\eta_{j,i,t} = \frac{\partial h^R_{j,i,t}}{\partial \ln q_{j,i,t}} = \frac{q_{j,i,t}}{Q_{j,t}} \cdot \frac{\partial h^R_{j,i,t}}{\partial \ln Q_{j,t}} \cdot \left(1 + \sum\nolimits_{k \neq i}^{N_F} \frac{\partial q_{j,k,t}}{\partial q_{j,i,t}}\right)$$
$$= \begin{cases} (q_{j,i,t}/Q_{j,t}) \cdot \beta^R_j \cdot \left(1 + \sum\nolimits_s \rho_{j,s} \cdot D^Y_s\right) & (j = SL, LL, DD, TD) \\ 0 & (j = S, A, C, CL, CM, CD) \end{cases}, \quad (3.1.3.2.12)$$

where $\sum\nolimits_s \rho_{j,s} \cdot D^Y_s$ is the parameterization of the conjectural derivative (i.e., $\sum\nolimits_{k \neq i}^{N_F} \partial q_{j,k,t} / \partial q_{j,i,t}$). Essentially, the conjectural derivative differs for each individual bank and for each fiscal year. However, with a simple parameterization, making this type of estimate is impossible. For this reason, we assume that the conjectural derivative is identical for all of the banks and that it is identical in each of the several sub-periods split from the period covered by the analysis. Where these types of assumptions are made, the number of parameters to be estimated is limited to the number of sub-periods. To avoid the identification problem, $\rho_{j,s}$ $(j = SL, LL, DD, TD)$ are obtained by the estimation of the following equations:

$$Q_{j,-i,t} = \sum\nolimits_i a^{CVI}_{i,j} \cdot D^B_i + \left(\sum\nolimits_s \rho_{j,s} \cdot D^Y_s\right) \cdot q_{j,i,t} + a^{CVE}_j \cdot EF^S_{i,t-1} + a^{CVH}_j \cdot HI_{j,t-1}$$
$$+ \sum\nolimits_h a^{CVZ}_{j,h} \cdot z^Q_{h,i,t} + \varepsilon^{CV}_{j,i,t}, \quad j = SL, LL, DD, TD, \quad (3.1.3.2.13)$$

where $Q_{j,-i,t}$ $(j = SL, LL, DD, TD)$ are the total j-th financial goods in the j-th financial goods market other than the j-th financial good of the i-th bank (i.e., $q_{j,i,t}$), $\varepsilon^{CV}_{j,i,t}$ $(j = SL, LL, DD, TD)$ are the ordinary error terms, and all others are as per Eq. (3.1.3.2.8b). From Eqs. (3.1.3.1.1) and (3.1.3.1.9), the marginal utilities in Eqs. (3.1.3.2.9) and (3.1.3.2.10) are derived as follows:

$$\partial u_{i,t}^{F} \Big/ \partial \pi_{i,t}^{QSF} = \left(\pi_{i,t}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^F - 1} \cdot \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^F} - 1}{\gamma^F}\right\}, \tag{3.1.3.2.14a}$$

$$\partial u_{i,t+1}^{F} \Big/ \partial \pi_{i,t+1}^{QSF} = \left(\pi_{i,t+1}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^F - 1} \cdot \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(q_{e,i,t+1}\right)^{\gamma^F} - 1}{\gamma^F}\right\}, \tag{3.1.3.2.14b}$$

$$\partial u_{i,t}^{F} / \partial q_{e,i,t} = \alpha_{e}^{F} \cdot \left(q_{e,i,t}\right)^{\gamma^F - 1} \cdot \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(\pi_{i,t}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^F} - 1}{\gamma^F}\right\}, \tag{3.1.3.2.14c}$$

$$\begin{aligned}\partial u_{i,t}^{A} \Big/ \partial \pi_{i,t}^{QSA} = {} & \left(\pi_{i,t}^{QSA} + \phi_{\pi}^{A}\right)^{\gamma^F - \gamma^{DA} - 1} \\ & \cdot \left\{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^F - \gamma^{DA}} - 1}{\gamma^F - \gamma^{DA}}\right\},\end{aligned} \tag{3.1.3.2.14d}$$

$$\begin{aligned}\partial u_{i,t+1}^{A} \Big/ \partial \pi_{i,t+1}^{QSA} = {} & \left(\pi_{i,t+1}^{QSA} + \phi_{\pi}^{A}\right)^{\gamma^F - \gamma^{DA} - 1} \\ & \cdot \left\{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \frac{\left(q_{e,i,t+1}\right)^{\gamma^F - \gamma^{DA}} - 1}{\gamma^F - \gamma^{DA}}\right\},\end{aligned} \tag{3.1.3.2.14e}$$

$$\begin{aligned}\partial u_{i,t}^{A} / \partial q_{e,i,t} = {} & \left(\alpha_{e}^{F} + \alpha_{e}^{DA}\right) \cdot \left(q_{e,i,t}\right)^{\gamma^F - \gamma^{DA} - 1} \\ & \cdot \left\{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \frac{\left(\pi_{i,t}^{QSA} + \phi_{\pi}^{A}\right)^{\gamma^F - \gamma^{DA}} - 1}{\gamma^F - \gamma^{DA}}\right\}.\end{aligned} \tag{3.1.3.2.14f}$$

From these marginal utilities, $MRS_{e,i,t}^{F\pi}$ in Eq. (3.1.3.2.9) and $MRS_{e,i,t}^{A\pi}$ in Eq.

(3.1.3.2.10) are respectively derived as follows:

$$\begin{aligned} MRS_{e,i,t}^{F\pi} &= \left(\partial u_{i,t}^{F} / \partial q_{e,i,t}\right) \Big/ \left(\partial u_{i,t}^{F} \Big/ \partial \pi_{i,t}^{QSF}\right) \\ &= \alpha_{e}^{F} \cdot \left(\frac{q_{e,i,t}}{\pi_{i,t}^{QSF} + \phi_{\pi}^{F}}\right)^{\gamma^{F}-1} \cdot \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(\pi_{i,t}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^{F}} - 1}{\gamma^{F}}\right\} \\ &\quad \Big/ \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^{F}} - 1}{\gamma^{F}}\right\}, \qquad (3.1.3.2.15a) \\ MRS_{e,i,t}^{A\pi} &= \left(\partial u_{i,t}^{A} / \partial q_{e,i,t}\right) \Big/ \left(\partial u_{i,t}^{A} \Big/ \partial \pi_{i,t}^{QSA}\right) \\ &= \left(\alpha_{e}^{F} + \alpha_{e}^{DA}\right) \cdot \left(\frac{q_{e,i,t}}{\pi_{i,t}^{QSA} + \phi_{\pi}^{A}}\right)^{\gamma^{F}-\gamma^{DA}-1} \\ &\quad \cdot \left\{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \frac{\left(\pi_{i,t}^{QSA} + \phi_{\pi}^{A}\right)^{\gamma^{F}-\gamma^{DA}} - 1}{\gamma^{F} - \gamma^{DA}}\right\} \\ &\quad \Big/ \left\{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^{F}-\gamma^{DA}} - 1}{\gamma^{F} - \gamma^{DA}}\right\}. \qquad (3.1.3.2.15b) \end{aligned}$$

From Eq. (3.1.2.1.1), $MC_{j,i,t}^{DAV}$ $(j = SL, LL, S, C, CL, A, DD, TD, CM, CD)$ in Eq. (3.1.3.2.10) are derived as

$$\begin{aligned} MC_{j,i,t}^{DAV} &= \frac{\partial C_{i,t}^{DAV}}{\partial q_{j,i,t}} \\ &= \frac{C_{i,t}^{DFV}}{q_{j,i,t}} \cdot \left[\frac{\partial \ln C_{i,t}^{DFV}}{\partial \ln q_{j,i,t}} \cdot \left\{a_{i,M,t}^{DIE} + \sum\nolimits_{h=1}^{M-1} \left(a_{i,h,t}^{DIE} - a_{i,M,t}^{DIE}\right) \cdot \frac{\partial \ln C_{i,t}^{DFV}}{\partial \ln p_{i,h,t}}\right\}\right. \\ &\quad \left. + \sum\nolimits_{h=1}^{M-1} \left(a_{i,h,t}^{DIE} - a_{i,M,t}^{DIE}\right) \cdot \frac{\partial^{2} \ln C_{i,t}^{DFV}}{\partial \ln q_{j,i,t} \partial \ln p_{i,h,t}}\right], \\ &\quad j = SL, LL, S, C, CL, A, DD, TD, CM, CD, \qquad (3.1.3.2.16a) \end{aligned}$$

where, from Eqs. (3.1.1.2.3), and (3.1.2.2.1a) to (3.1.2.2.1c), $C_{i,t}^{DFV}$, $\partial \ln C_{i,t}^{DFV}$ $/\partial \ln q_{j,i,t}$, and $\partial^{2} \ln C_{i,t}^{DFV} / \partial \ln q_{j,i,t} \partial \ln p_{i,h,t}$ $(j = SL, LL, S, C, CL, A, DD,$

TD, CM, CD) are respectively expressed as follows:

$$
\begin{aligned}
C_{i,t}^{DFV} = p_{V,i,t}^{*} \cdot \exp \Bigg[& \min_{i} a_i \left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^{*} \right) \\
& + \sum_{j \in \{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} a_j \left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{j,i,t}^{Q} \right) \cdot \ln q_{j,i,t}^{*} \\
& + \sum_{j \in \{L,K\}} a_j \left(A_{i,j,t-1}^{SIE}, HI_{L,t-1}, \mathbf{z}_{j,i,t}^{Q} \right) \cdot \ln \left(p_{j,i,t}^{*} / p_{V,i,t}^{*} + \theta_j \right) \\
& - \sum_{j \in \{L,K\}} a_j^{B} \cdot \left\{ \ln \left(p_{j,i,t}^{*} / p_{V,i,t}^{*} + \theta_j \right) \right\}^{-1} \\
& + \frac{1}{2} \cdot \sum\sum_{j,h \in \{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} b_{jh}^{QQ} \cdot \ln q_{j,i,t}^{*} \cdot \ln q_{h,i,t}^{*} \\
& + \frac{1}{2} \cdot \sum\sum_{j,h \in \{L,K\}} b_{jh}^{PP} \cdot \ln \left(p_{j,i,t}^{*} / p_{V,i,t}^{*} + \theta_j \right) \cdot \ln \left(p_{h,i,t}^{*} / p_{V,i,t}^{*} + \theta_h \right) \\
& - \frac{1}{2} \cdot \sum\sum_{j,h \in \{L,K\}} b_{jh}^{B} \cdot \left\{ \ln \left(p_{j,i,t}^{*} / p_{V,i,t}^{*} + \theta_j \right) \right\}^{-1} \cdot \left\{ \ln \left(p_{h,i,t}^{*} / p_{V,i,t}^{*} + \theta_h \right) \right\}^{-1} \\
& + \sum\sum_{j \in \{SL,LL,S,C,CL,A,DD,TD,CM,CD\}, h \in \{L,K\}} b_{jh}^{QP} \cdot \ln q_{j,i,t}^{*} \cdot \ln \left(p_{h,i,t}^{*} / p_{V,i,t}^{*} + \theta_h \right) \\
& + \sum_{j \in \{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} b_{jT}^{QT} \cdot \ln q_{j,i,t}^{*} \cdot \tau_t^{*} + \sum_{j \in \{L,K\}} b_{jT}^{PT} \cdot \ln \left(p_{j,i,t}^{*} / p_{V,i,t}^{*} + \theta_j \right) \cdot \tau_t^{*} \Bigg],
\end{aligned}
\tag{3.1.3.2.16b}
$$

$$
\begin{aligned}
\frac{\partial \ln C_{i,t}^{DFV}}{\partial \ln q_{j,i,t}} = {} & a_j \left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{j,i,t}^{Q} \right) + \sum_{h \in \{SL,LL,S,C,CL,A,DD,TD,CM,CD\}} b_{jh}^{QQ} \cdot \ln q_{h,i,t}^{*} \\
& + \sum_{h \in \{L,K\}} b_{jh}^{QP} \cdot \ln \left(p_{h,i,t}^{*} / p_{V,i,t}^{*} + \theta_h \right) + b_{jT}^{QT} \cdot \tau_t^{*}, \\
& j = SL, LL, S, C, CL, A, DD, TD, CM, CD,
\end{aligned}
\tag{3.1.3.2.16c}
$$

$$
\begin{aligned}
\frac{\partial^2 \ln C_{i,t}^{DFV}}{\partial \ln q_{j,i,t} \partial \ln p_{i,h,t}} = {} & \frac{p_{h,i,t}^{*}}{p_{h,i,t}^{*} + \theta_h \cdot p_{V,i,t}^{*}} \cdot b_{jh}^{QP}, \\
& j = SL, LL, S, C, CL, A, DD, TD, CM, CD.
\end{aligned}
\tag{3.1.3.2.16d}
$$

In addition, $MC_{j,i,t}^{DFV}$ ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) are expressed as follows:

$$MC_{j,i,t}^{DFV} = \frac{\partial C_{i,t}^{DFV}}{\partial q_{j,i,t}} = \frac{C_{i,t}^{DFV}}{q_{j,i,t}} \cdot \frac{\partial \ln C_{i,t}^{DFV}}{\partial \ln q_{j,i,t}},$$
$$j = SL, LL, S, C, CL, A, DD, TD, CM, CD, \quad (3.1.3.2.16e)$$

where $C_{i,t}^{DFV}$ and $\partial \ln C_{i,t}^{DFV} / \partial \ln q_{j,i,t}$ ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) are respectively given by Eqs. (3.1.3.2.16b) and (3.1.3.2.16c). Furthermore, from Eq. (3.1.3.2.1), the subjective discount factor (i.e., $\beta_{i,t}$) is obtained as

$$\beta_{i,t} = \beta_t = 1 / \left(1 + r_t^D\right) = 1 / \left(1 + \delta^s \cdot r_t^{CR}\right). \quad (3.1.3.2.17)$$

Finally, from Homma (2012, Eq. (6.2.1.18), p. 81), the uncertainty factors $\zeta_{j,i,t+1}$ ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) are obtained as follows:

$$\zeta_{j,i,t+1} = \begin{cases} \zeta_{j,i,t+1}^R + \zeta_{j,i,t+1}^Q + \zeta_{j,i,t+1}^S - \zeta_{j,i,t+1}^D & (j = SL, LL) \\ \zeta_{j,i,t+1}^S + \zeta_{j,i,t+1}^C - \zeta_{j,i,t+1}^D & (j = S, A) \\ 0 & (j = C, CL, CM, CD) \\ \zeta_{j,i,t+1}^R + \zeta_{j,i,t+1}^Q + \zeta_{j,i,t+1}^I - \zeta_{j,i,t+1}^S & (j = DD, TD) \end{cases}. \quad (3.1.3.2.18)$$

3.2 Estimation Procedure

All estimations in this paper use the Free Time Series Processor Ver.5.1 (hereafter FTSP Ver.5.1) (Clint Cummins (google.com)). FTSP Ver.5.1 was chosen because of its strength in nonlinear estimation and its ability to easily estimate implicit equations such as the stochastic Euler equations in Eqs. (3.1.3.2.9) and (3.1.3.2.10).

The estimation of the empirical model described in the previous subsection is executed in six stages. In the first stage, to obtain $h_{j,i,t}^R$ and $\zeta_{j,i,t+1}$ ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) in Eqs. (3.1.3.2.9) and (3.1.3.2.10), as in Homma (2012, Eq. (6.2.1.1), p. 72), the actual SDEHRR or SDEHCR ($H_{j,i,t+1}$) at the end of fiscal year t (= the beginning of fiscal year $t + 1$) is broken down into the certain or predictable components at the beginning of fiscal year t ($h^R_{j,i,t}$) and the uncertain or unpredictable components at the end of fiscal year t ($\zeta_{j,i,t+1}$). Basically, $H^k_{j,i,t+1}$ ($k = R, Q$; $j = SL, LL, DD, TD$) and $H^D_{j,i,t+1}$ ($j = SL, LL$) in Homma (2012, p. 73, p. 75, pp. 78-79) are respectively estimated using multivariate regression analyses of the modified equations that add the Herfindahl index of each financial good in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6a), (6.2.3.1.6b), (6.2.3.1.7a), (6.2.3.1.7b), and (6.2.3.2.3), pp. 73-87, pp. 111-122), broken down into the certain or predictable components of the independent variables and the uncertain or unpredictable components of the error term. The other components of $H_{j,i,t+1}$ ($j = S, CL, A, CM, CD$) are broken down into $h^R_{j,i,t}$ and $\zeta_{j,i,t+1}$, as shown in Homma (2012, pp. 72-87, pp. 111-122).

In the second stage, to obtain the static frontier variable cost function in Eq. (3.1.1.2.3), the static variable cost function in Eq. (3.1.1.2.1a) is simultaneously estimated with the static cost share equations in Eq. (3.1.1.2.2) by the Generalized Method of Moments (GMM). In this case, three potential problems in the estimation are addressed. First, the conditional heteroskedasticity of the error term is explicitly controlled. Second, autocorrelation is corrected when found. This is of particular importance because our panel data have a large T (time period). When including the moving average of the error term in the estimate of the covariance matrix of the orthogonality conditions, we use Bartlett's spectral density kernel proposed by Newey and West (1987) in order to guarantee that the estimate of the covariance matrix is a positive definite matrix. Furthermore, it is assumed that the moving average has a degree of three. Third, the endogeneity of some variables is taken into account by using different instrumental variables for each equation. These instrumental variables are the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and its square, the products of these dummies and its cube, and the logarithms of the financial goods in the previous period and the factor prices in the current period for all equations, the endogenous quality variables in the previous period, and the exogenous quality variables in the current period for all static cost share equations, the products of these quality variables and the logarithms of the factor prices in the current period, and the products of regional dummies and their logarithms for the static variable cost function and each static cost share equation, the products of the logarithms of the financial goods in the previous period and their quality variables, the products of the logarithms of their financial goods and the regional dummies, the products of two logarithms of their financial goods, the products of the logarithms of their financial goods and factor prices, the products of the logarithms of their financial goods and the normalized time trend, the products of two logarithms of their factor prices, the products of the logarithms of their factor prices and the normalized time trend, and other control dummies for the static variable cost function. Using the static frontier variable cost function resulting from this estimation, data for the discrepancy between the logarithm of the actual variable cost and the logarithm of the static frontier variable cost function (i.e., $\varepsilon_{i,t}^{SAV} = \ln C_{i,t}^{V} - \ln C_{i}^{SFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, \tau_{i,t}\right)$) are created. Furthermore, the inefficiency coefficients ($a_{i,j}^{SIE}\left(\mathbf{z}_{j,i,t}^{Q}, \tau_{t}\right)$, $j = V, L, K$) are estimated according to Eqs. (3.1.1.1.2), and (3.1.1.2.4a) to (3.1.1.2.4e). The details of this estimation are explained in the next subsection. Using these estimation results, the static cost unneutral efficiency in Eq. (3.1.1.3) is obtained.

In the third stage, to obtain the dynamic frontier variable cost function in Eq. (3.1.3.2.16b) and the dynamic frontier marginal variable costs in Eq. (3.1.3.2.16e), the dynamic variable cost function explained in Subsection 3.1.2.2 is simultaneously estimated with the dynamic cost share equations explained in the same subsection by GMM. Similar to the estimation of the static variable cost function in the second stage, this estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, in addition to those used in the estimation of the static variable cost function in the second stage (other than the products of the individual bank dummies and the square of the normalized time trend, and the products of these dummies and their cube), the following variables are used: the products of the individual bank dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period for all equations, the inefficiency coefficients of static factor demand functions in the previous period for each dynamic cost share equation, the Herfindahl index of loans in the previous period for all dynamic cost share equations, the products of the logarithms of the factor prices in the current period and the inefficiency coefficients of static factor demand functions in the previous period, and the products of the logarithms of their factor prices and the Herfindahl index of loans in the previous period for the dynamic variable cost function and each dynamic cost share equation, the products of the logarithms of the financial goods in the previous period and the static cost unneutral efficiency in the previous period, and the products of the logarithms of their financial goods and the Herfindahl index of loans in the previous period for the dynamic variable cost function. Using the dynamic frontier variable cost function resulting from this estimation, data for the discrepancy between the logarithm of the actual variable cost and the logarithm of the dynamic frontier variable cost function (i.e., $\varepsilon_{i,t}^{DAV} = \ln C_{i,t}^{V} - \ln C_{i}^{DFV}\left(\mathbf{p}_{i,t}, \mathbf{q}_{i,t}, \mathbf{z}_{i,t}^{Q}, HI_{L,t-1}, EF_{i,t-1}^{S}, \mathbf{A}_{i,t-1}^{SIE}, \tau_{i,t}\right)$) are created. Furthermore, the inefficiency coefficients ($a_{i,j}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_{t}\right)$, $j = V, L, K$) are estimated according to Eqs. (3.1.2.1.2), and (3.1.2.2.2a) to (3.1.2.2.2c). The details of this estimation are explained in the next subsection. Using these estimation results, the dynamic cost unneutral efficiency in Eq. (3.1.2.3) and the dynamic actual marginal variable costs in Eq. (3.1.3.2.16a) are obtained.

In the fourth stage, the conjectural derivative parameters ($\rho_{j,s}$, $j = SL, LL, DD, TD$, $s = 1, \ldots, N_{\rho}^{Y}$, $N_{\rho}^{Y} = 5, 6$, or 7) are obtained by the estimations of Eq. (3.1.3.2.13). These estimations are individually executed by GMM. Similar to the estimation of the dynamic variable cost function in the third stage, this estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. It is assumed that the degrees of the moving averages are respectively eight, fifteen, nine, and eight for the equations ($j = SL, LL, DD, TD$). For the instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and the Herfindahl index of each financial good in the previous period, the static cost unneutral efficiency in the previous period, the Herfindahl index of each financial good in the previous period, each financial good in the previous period, the endogenous quality variables in the previous period, the exogenous quality variables in the current period, and the products of period dummies and each financial good in the previous period.

In the fifth stage, the stochastic Euler equations using the utility functions of banks on the cost frontier in Eq. (3.1.3.2.9) are simultaneously estimated by GMM only for $j = SL, LL, C, CL, DD, TD$. The reasons for this limitation are as follows: First, the simultaneous estimation for all financial goods ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) exceeds the practical capacity of my computer. Second, the limited simultaneous estimation only for $j = SL, LL, C, CL, DD, TD$ can produce the estimates of all the parameters in Eq. (3.1.3.2.9), although the efficiency of the estimation decreases. Similar to the estimation in the fourth stage, this estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. It is assumed that the degree of the moving average is two. For the instrumental variables, the following variables are used: the individual bank dummies, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, the estimates of the dynamic actual variable costs in the current and next periods, the period dummies, the interest rates of some financial goods, some exogenous components of the actual SDEHCR for time deposits, some endogenous quality variables in the previous period, some exogenous quality variables in the current period, and the call rates in the previous and current periods for all stochastic Euler equations, the products of the individual bank dummies and the estimates of the dynamic frontier marginal variable costs with respect to some financial goods, the estimates of the dynamic actual marginal variable costs with respect to some financial goods, the market shares of some financial goods in the previous period, the elasticities of the certain or predictable components of the SDEHRRs and SDEHCRs for some financial goods with respect to the total market balances in the next period, these certain or predictable components in the same period, the uncertainty components of the actual SDEHRRs and SDEHCRs for some financial goods, and some exogenous components of the actual SDEHCRs of demand and time deposits for each stochastic Euler equation.

In the last stage, taking the estimated parameters in the fifth stage as given, the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) are simultaneously estimated by GMM only for $j = SL, LL, DD, TD$. The reasons of this limitation are the same as those for the fifth stage. For the remaining stochastic Euler equations ($j = S, C, CL, A, CM, CD$), taking the estimated parameters in this simultaneous estimation as given, only $\varepsilon^{P}_{i,j,t}$ ($j = S, C, CL, A, CM, CD$) in Eq. (3.1.3.2.8b) are individually estimated by GMM. Similar to the estimation in the fifth stage, these estimations take into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables in the simultaneous estimation, in addition to those in the estimation in the fifth stage, the following variables are used: the products of the individual bank dummies and the estimate of the quasi-short-run profit based on the dynamic frontier cost, the estimates of the quasi-short-run profits based on the dynamic actual costs in the current and next periods, the equity capital in the previous period, the estimate of $E\left[\partial u^{F}_{i,t+1} \middle/ \partial \pi^{QSF}_{i,t+1} \middle| \mathbf{z}_{i,t}\right]$ in Eq. (3.1.3.2.6a), the estimates of $\partial u^{F}_{i,t} \Big/ \partial \pi^{QSF}_{i,t}$, $\partial u^{F}_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1}$, and $\partial u^{F}_{i,t} / \partial q_{e,i,t}$ in Eqs. (3.1.3.2.14a) to (3.1.3.2.14c), the estimate of $MRS^{F\pi}_{e,i,t}$ in Eq. (3.1.3.2.15a), and the estimate of $\left(\partial u^{F}_{i,t+1} \Big/ \partial \pi^{QSF}_{i,t+1}\right) \Big/ \left(\partial u^{F}_{i,t} \Big/ \partial \pi^{QSF}_{i,t}\right)$ for all stochastic Euler equations, and the Herfindahl indices corresponding to each financial good for each stochastic Euler equation. For the instrumental variables of the single estimations, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and the estimate of the quasi-short-run profit based on the dynamic frontier cost, the products of these dummies and the estimate of the dynamic frontier marginal variable cost with respect to the financial good concerned, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, the estimates of the dynamic actual variable costs in the current and next periods, the estimates of the dynamic actual marginal variable costs with respect to some financial goods, the period dummies, the market shares of some financial goods in the previous period, the elasticities of the certain or predictable components of the SDEHRRs and SDEHCRs for some financial goods with respect to the total market balances in the next period, these certain or predictable components in the same period, the uncertainty components of the actual SDEHRRs and SDEHCRs for some financial goods, some exogenous components of the actual SDEHCRs of demand and time deposits, the interest rates of some financial goods, some exogenous components of the actual SDEHCR for time deposits, some endogenous quality variables in the previous period, some exogenous quality variables in the current period, the call rate, and the Herfindahl indices close to each financial good.

3.2.1 Estimation of Inefficiency Coefficients

The estimations of Eqs. (3.1.1.1.2) and (3.1.2.1.2) are executed in three steps. In the first step, the following equation is estimated:

$$y_{i,t} = D_F + D_A \cdot a^{IE}_{i,K,t} + \varepsilon^{FV}_{LV,i,t}, \tag{3.2.1.1}$$

where $y_{i,t}$ is $\exp\left(\varepsilon^{SAV}_{i,t}\right)$ in Eq. (3.1.1.1.2) or $\exp\left(\varepsilon^{DAV}_{i,t}\right)$ in Eq. (3.1.2.1.2), D_F is the frontier dummy (i.e., the dummy variable equals 1 if the bank concerned is on the cost frontier and 0 if it is on the actual cost), D_A is the actual dummy (i.e., the dummy variable equals 1 if the bank concerned is on the actual cost and 0 if it is on the cost frontier), $a^{IE}_{i,K,t}$ is $a^{SIE}_{i,K,t}$ if $y_{i,t}$ is $\exp\left(\varepsilon^{SAV}_{i,t}\right)$ in Eq. (3.1.1.1.2) and $a^{DIE}_{i,K,t}$ if $y_{i,t}$ is $\exp\left(\varepsilon^{DAV}_{i,t}\right)$ in Eq. (3.1.2.1.2), and $\varepsilon^{FV}_{LV,i,t}$ is the ordinary error term.

In the second step, the following equation is estimated:

$$\varepsilon^{FV}_{LV,i,t} / CS^{FV}_{i,L,t} = D_A \cdot b^{IE}_{i,L,t} + \varepsilon^{FV}_{V,i,t}, \tag{3.2.1.2}$$

where $\varepsilon^{FV}_{LV,i,t}$ and D_A are as per Eq. (3.2.1.1), $CS^{FV}_{i,L,t}$ and $b^{IE}_{i,L,t}$ are respectively $CS^{SFV}_{i,L,t}$ and $b^{SIE}_{i,L,t}$ if $y_{i,t}$ is $\exp\left(\varepsilon^{SAV}_{i,t}\right)$ in Eq. (3.1.1.1.2) and $CS^{DFV}_{i,L,t}$ and $b^{DIE}_{i,L,t}$

if $y_{i,t}$ is $\exp\left(\varepsilon_{i,t}^{DAV}\right)$ in Eq. (3.1.2.1.2), and $\varepsilon_{V,i,t}^{FV}$ is the ordinary error term.

In the third and final step, the following equation is estimated:

$$\left(\varepsilon_{V,i,t}^{FV} \cdot CS_{i,L,t}^{FV}\right) / CS_{i,V,t}^{FV} = D_A \cdot b_{i,V,t}^{IE} + \varepsilon_{B,i,t}^{FV}, \tag{3.2.1.3}$$

where $\varepsilon_{V,i,t}^{FV}$, $CS_{i,L,t}^{FV}$, and D_A are as per Eq. (3.2.1.2), $CS_{i,V,t}^{FV}$ and $b_{i,V,t}^{IE}$ are respectively $CS_{i,V,t}^{SFV}$ and $b_{i,V,t}^{SIE}$ if $y_{i,t}$ is $\exp\left(\varepsilon_{i,t}^{SAV}\right)$ in Eq. (3.1.1.1.2) and $CS_{i,V,t}^{DFV}$ and $b_{i,V,t}^{DIE}$ if $y_{i,t}$ is $\exp\left(\varepsilon_{i,t}^{DAV}\right)$ in Eq. (3.1.2.1.2), and $\varepsilon_{B,i,t}^{FV}$ is the ordinary error term.

These estimations are executed by GMM. Similar to the estimations in the previous subsection, these estimations take into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, and the products of these dummies and the normalized time trend for Eqs. (3.2.1.1) to (3.2.1.3) in Eqs. (3.1.1.1.2) and (3.1.2.1.2), the products of these dummies and some endogenous quality variables in the previous period for Eqs. (3.2.1.1) to (3.2.1.3) in Eq. (3.1.1.1.2), the products of these dummies and the estimate of the static cost share of the physical capital, and the products of these dummies, the normalized time trend, and this estimate for Eq. (3.2.1.1) in Eqs. (3.1.1.1.2) and (3.1.2.1.2), the products of these dummies, quality variables, and this estimate for Eq. (3.2.1.1) in Eq. (3.1.1.1.2), the products of these dummies and the estimate of the static cost share of the labor, the products of these dummies, the normalized time trend, and this estimate for Eq. (3.2.1.2) in Eqs. (3.1.1.1.2) and (3.1.2.1.2), the products of these dummies, quality variables, and this estimate for Eq. (3.2.1.2) in Eq. (3.1.1.1.2), the products of these dummies and this estimate, the products of these dummies, the normalized time trend, and the estimate of the static cost share of the current goods for Eq. (3.2.1.3) in Eqs. (3.1.1.1.2) and (3.1.2.1.2), the products of these dummies, quality variables, and this estimate for Eq. (3.2.1.3) in Eq. (3.1.1.1.2), the products of these dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period for Eqs. (3.2.1.1) to (3.2.1.3) in Eq. (3.1.2.1.2).

4 Estimation Results

4.1 Static Variable Cost Function and Static Cost Unneutral Efficiency

Tables 4.1.1 and 4.1.2 show the results for the simultaneous GMM estimation of the static variable cost function in Eq. (3.1.1.2.1a) with the static cost share equations in Eq. (3.1.1.2.2). Table 4.1.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies in Eq. (3.1.1.2.1b), while Table 4.1.2 shows the estimates of the coefficients.

<<Insert Table 4.1.1 about here>>
<<Insert Table 4.1.2 about here>>

From Table 4.1.1, the following three points can be inferred. First, the test statistic for the overidentification restriction is far from significant ($p = 0.483$). Therefore, we cannot reject the null hypothesis of overidentification. This means that the likelihood that there is an error in the specification of the static variable cost function is small. Second, the number of parameters with a p-value less than 0.1 is 190 out of 267 (i.e., the total number of parameters), meaning that these parameters account for 71 percent of all the parameters. Overall, then, this estimation result is highly reliable from a statistical perspective. Third, the coefficients of determination (R^2) for all equations are greater than 0.5, so there is no lack of explanatory power. Especially, the coefficient of determination of the static variable cost function is very high (above 0.99), making the specification of this cost function entirely appropriate. In addition, from Table 4.1.2, the number of the parameters with a p-value less than 0.1 is 355 out of 483, meaning that these parameters account for 73 percent of all the parameters. This estimation result is, therefore, highly reliable overall, similar to the case of Table 4.1.1. Consequently, the static frontier variable cost function in Eq. (3.1.1.2.3) resulting from these tables is also highly reliable from the same perspective.

Tables 4.1.3 to 4.1.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.1.1.2), respectively.

<<Insert Table 4.1.3 about here>>
<<Insert Table 4.1.4 about here>>
<<Insert Table 4.1.5 about here>>

From these tables, the following two points can be inferred: First, similar to Tables 4.1.1 and 4.1.2, the test statistics for the overidentification restriction are far from significant (the p-values are 0.300 in Table 4.1.3, 0.457 in Table 4.1.4, and 0.456 in Table 4.1.5). Therefore, we cannot reject the null hypothesis of overidentification. This means that the likelihood that there is an error in the specification of the inefficiency coefficients in Eqs. (3.1.1.2.4c) to (3.1.1.2.4e) is small. Second, also similar to Tables 4.1.1 and 4.1.2, the total number of parameters for which the p-value is less than 0.1 in these tables is 1032 ($= 392 + 354 + 286$) out of 1424 ($= 480 + 472 + 472$), meaning that these parameters account for 72 percent of all the parameters. These estimation results are, therefore, highly reliable overall from the perspective of statistics. Consequently, the inefficiency coefficients in Eqs. (3.1.1.2.4c) to (3.1.1.2.4e) resulting from these tables are also highly reliable from the same perspective.

From the above, we can draw the following conclusion: The static cost unneutral efficiency in Eq. (3.1.1.3) resulting from the above tables is statistically highly reliable.

Fig. 4.1.1 shows the static cost neutral and unneutral efficiencies resulting from the above tables.

<<Insert Fig. 4.1.1 about here>>

From this figure, the following three points can be made: First, the mean of the static cost unneutral efficiency is 0.319, indicating a large inefficiency in the Japanese regional banking industry. Second, the static cost unneutral efficiency is relatively stable compared to the static cost neutral efficiency. Third, the static cost unneutral efficiency shows a falling trend for forty-three years. There is, therefore, a structural inefficiency in the Japanese regional banking industry whose substantial improvement is difficult over the long term.

4.2 Dynamic Variable Cost Function and Dynamic Cost Unneutral Efficiency

Tables 4.2.1 and 4.2.2 show the results of the simultaneous GMM estimation of the dynamic variable cost function explained in Subsection 3.1.2.2, with the dynamic cost share equations explained in the same subsection. Table 4.2.1 gives the estimates of the parameters other than the coefficients of the individual bank dummies in Eq. (3.1.2.2.1a); Table 4.2.2 gives the estimates of the coefficients.

<<Insert Table 4.2.1 about here>>
<<Insert Table 4.2.2 about here>>

From Table 4.2.1, the following three inferences can be drawn: First, similar to Table 4.1.1, the test statistic for the overidentification restriction is far from significant ($p = 0.889$). Therefore, we cannot reject the null hypothesis of overidentification. This means that the likelihood that there is an error in the specification of the dynamic variable cost function is small. Second, the number of parameters for which the p-value is less than 0.1 is 215 out of 272, meaning that these parameters account for 79 percent of all the parameters. Similar to Table 4.1.1, this estimation result is, therefore, highly reliable overall from a statistical perspective. Third, also similar to Table 4.1.1, the coefficients of determination (R^2) for all equations are greater than 0.5, so there is no lack of explanatory power. In particular, the coefficient of determination of the dynamic variable cost function is very high (> 0.99), making the specification of this cost function entirely appropriate. In addition, from Table 4.2.2, the number of parameters for which the p-value is less than 0.1 is 368 out of 474, thus accounting for 78 percent of all the parameters. This estimation result is, therefore, highly reliable overall, similar to Table 4.2.1. Consequently, the dynamic frontier variable cost function in Eq. (3.1.3.2.16b) and the dynamic frontier marginal variable costs in Eq. (3.1.3.2.16e) resulting from these tables are also highly reliable from the same perspective.

Tables 4.2.3 to 4.2.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.2.1.2), respectively.

<<Insert Table 4.2.3 about here>>
<<Insert Table 4.2.4 about here>>
<<Insert Table 4.2.5 about here>>

From these tables, the following two points can be inferred: First, similar to Tables 4.2.1 and 4.2.2, the test statistics for the overidentification restriction are far from significant (the p-values are 0.589 in Table 4.2.3; 0.198 in Table 4.2.4; and 0.346 in Table 4.2.5). Therefore, we cannot reject the null hypothesis of overidentification. This means that the likelihood that there is an error in the specification of the inefficiency coefficients in Eqs. (3.1.2.2.2a) to (3.1.2.2.2c) is small. Second, also similar to Tables 4.2.1 and 4.2.2, the total number of parameters with a p-value less than 0.1 in these tables is 1355 ($= 467 + 451 + 437$) out of 1425 ($= 475 + 475 + 475$), meaning that these parameters account for 95 percent of all the parameters. These estimation results are, therefore, highly reliable overall from the perspective of statistics. Consequently, the inefficiency coefficients in Eqs. (3.1.2.2.2a) to (3.1.2.2.2c) resulting from these tables are also highly reliable from the same perspective.

From the above, we can draw the following conclusion: The dynamic cost unneutral efficiency in Eq. (3.1.2.3) and the dynamic actual marginal variable costs in Eq. (3.1.3.2.16a) resulting from the above tables are statistically highly reliable.

Fig. 4.2.1 shows the dynamic cost neutral and unneutral efficiencies resulting from the above tables.

<<Insert Fig. 4.2.1 about here>>

From this figure, the following three points can be established: First, similar to the static cost unneutral efficiency in Fig. 4.1.1, the mean of the dynamic cost unneutral efficiency is 0.311, meaning that there is a large inefficiency in the Japanese regional banking industry. Second, unlike the static cost unneutral and neutral efficiencies, the difference between the dynamic cost unneutral and neutral efficiencies is small. The unneutrality has little effect on the dynamic cost efficiency. Third, contrary to the static cost unneutral efficiency, the dynamic cost unneutral efficiency shows a rising trend for forty-one years. However, the improvement of the dynamic cost unneutral efficiency is very small (i.e., less than 5%) over these forty-one years. Therefore, even if we regard the economic behavior of regional banks as intertemporally dynamic, structural inefficiency is still observed. Under the present conditions, it is very difficult to drastically improve the dynamic cost unneutral efficiency of Japanese regional banks.

4.3 Conjectural Derivative Parameters

Tables 4.3.1 and 4.3.2 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for short-term loans ($j = SL$). Table 4.3.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.2 shows the estimates of these coefficients. Similarly, Tables 4.3.3 and 4.3.4, Tables 4.3.5 and 4.3.6, and Tables 4.3.7 and 4.3.8 show the results for long-term loans ($j = LL$), demand deposits ($j = DD$), and time deposits ($j = TD$), respectively.

<<Insert Table 4.3.1 about here>>
<<Insert Table 4.3.2 about here>>
<<Insert Table 4.3.3 about here>>
<<Insert Table 4.3.4 about here>>
<<Insert Table 4.3.5 about here>>
<<Insert Table 4.3.6 about here>>
<<Insert Table 4.3.7 about here>>
<<Insert Table 4.3.8 about here>>

From Table 4.3.1, we can infer the following: First, the test statistic for the overidentification restriction is far from significant ($p = 0.255$). Therefore, we cannot reject the null hypothesis of overidentification. This means that the likelihood that there is an error in the specification of the conjectural derivative is small. Second, the number of the parameters for which the p-value is less than 0.1 is 12 out of 13, accounting for 92 percent of all the parameters. This estimation result is, therefore, highly reliable overall from a statistical perspective. Third, the coefficient of determination (R^2) for this equation is greater than 0.75; thus, there is no lack of explanatory power. Fourth, the conjectural derivative parameters for all periods are significantly positive, so the relation between the bank concerned and rival banks is unconflictive or cooperative. This relation is strongest in the 1987-1989 period (i.e., the bubble period), but is weakest in the 1976-1986 period (i.e., before the bubble period). In addition, from Table 4.3.2, all parameters are significant at the 1% level, indicating that this estimation result is, overall, highly reliable, similar to the case in Table 4.3.1.

From Table 4.3.3, we can make the following inferences: First, the test statistic for the overidentification restriction is far from significant ($p = 0.203$), so the likelihood that there is an error in the specification of the conjectural derivative is small. Second, the parameters for which the p-value is less than 0.1 account for 77 percent of all parameters, indicating that this estimation result is, overall, highly reliable from a statistical perspective. Third, the coefficient of determination (R^2) for this equation is greater than 0.73, indicating that there is no lack of explanatory power. Fourth, the conjectural derivative parameter for the 1990-1995 period (i.e., after the bubble period and before the financial crisis and big bang period) is significantly positive, indicating that the relation between the bank concerned and rival banks is unconflictive or cooperative. In contrast, the conjectural derivative parameters for the 1996-2001 period (i.e., the financial crisis and big bang period) and the 2002-2007 period (i.e., after the financial crisis and big bang period and before the Lehman collapse and Great East Japan Earthquake period) are significantly negative, implying that the relation between the bank concerned and rival banks is conflictive. The conjectural derivative parameters for the other periods are not significant, making the bank concerned a Cournot firm. In addition, from Table 4.3.4, the parameters showing a p-value less than 0.1

account for 99 percent of all the parameters, indicating that this estimation result is, overall, highly reliable, similar to Table 4.3.3.

From Table 4.3.5, the first to third conclusions noted above are also supported. In addition, the conjectural derivative parameters for all periods other than the 1992-1995 period (i.e., before the financial crisis and big bang period) are significantly negative, so the relation between the bank concerned and rival banks is conflictive. Notably, this relation is strongest in the 1996-2001 period (i.e., the financial crisis and big bang period), but weakest in the 2011-2016 period (i.e., after the Great East Japan Earthquake period). The conjectural derivative parameter for the 1992-1995 period is not significant, so the bank concerned is a Cournot firm. Furthermore, from Table 4.3.6, all parameters are significant at the 1% level, indicating that this estimation result is, overall, highly reliable, similar to Table 4.3.5.

Finally, from Table 4.3.7, the first to third conclusions above are similarly supported. Moreover, the conjectural derivative parameters for the 1985-1989 period (i.e., before the bubble collapse), the 2002-2007 period, and the 2008-2010 period (i.e., the Lehman collapse and Great East Japan Earthquake period) are significantly negative, so the relation between the bank concerned and rival banks is conflictive. However, the conjectural derivative parameters for the other periods are not significant, indicating that the bank concerned is a Cournot firm. In addition, from Table 4.3.8, all parameters are significant at the 1% level, showing that this estimation result is, overall, highly reliable, similar to Table 4.3.7.

4.4 Stochastic Euler Equations Using the Utility Functions of Banks on the Cost Frontier

Tables 4.4.1 and 4.4.2 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the cost frontier in Eq. (3.1.3.2.9) for $j = SL, LL, C, CL, DD, TD$. Table 4.4.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies in Eqs. (3.1.3.2.6a) and (3.1.3.2.6b); Table 4.4.2 shows the estimates of these coefficients.

<<Insert Table 4.4.1 about here>>
<<Insert Table 4.4.2 about here>>

From Table 4.4.1, we can make the following inferences: First, the test statistic for the overidentification restriction is not at all significant ($p =$ 1.000). Therefore, we cannot reject the null hypothesis of overidentification. The implication is that the likelihood that there is an error in the specification of the stochastic Euler equations using the utility functions of banks on the cost frontier is near zero. Second, the number of the parameters whose p-value is less than 0.1 is 34 out of 39 (87%). This estimation result is, therefore, highly reliable overall from a statistical perspective. Third, $\alpha_{\pi e}^{F}$ in Eq. (3.1.3.1.1) (i.e., the cross effect of the unit utilities of the quasi-short-run profit based on the dynamic frontier cost and the equity capital in Eq. (3.1.3.1.7b)) is significantly negative. This means that the unit utility of the quasi-short-run profit based on the dynamic frontier cost is not separable from that of the equity capital, so their marginal utilities are negatively dependent on each other. Fourth, the parameters $\alpha_{e,s}^{F}$ ($s = 1, \ldots, 7$) other than $\alpha_{e,4}^{F}$ (i.e., $\alpha_{e,s}^{F}$ in the 1996-2001 period) in Eq. (3.1.3.1.8) are significantly positive. This means that the marginal effect of the unit utility of equity capital is greater than the product of the above cross effect and the unit utility of quasi-short-run profit based on the dynamic frontier cost in the periods other than the 1996-2001 period. Fifth, $1 - \sin^2(\delta^s)$ $(= 0.249)$ is not significant ($t = 1.388$), so r_t^D (i.e., the subjective rate of time preference) is not statistically different from r_t^{CR} (i.e., the call rate). In addition, from Table 4.4.2, all parameters are significant at the 5% level, so this estimation result is, overall, highly reliable, similar to Table 4.4.1.

4.5 Stochastic Euler Equations Using the Utility Functions of Banks on the Actual Cost

Tables 4.5.1 to 4.5.5 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) for $j = SL, LL, DD, TD$, taking the estimated parameters in the previous subsection as given. Table 4.5.1 shows the estimates of the parameters other than the parameters of $\varepsilon^P_{i,j,t}$ in Eq. (3.1.3.2.8b); Tables 4.5.2 to 4.5.5 show the estimates of the rest of the parameters. Similarly, Tables 4.5.6 to 4.5.11 show the results for the GMM estimations of $\varepsilon^P_{i,j,t}$ in Eq. (3.1.3.2.8b) for $j = S, C, CL, A, CM, CD$, respectively, taking the estimated parameters in this simultaneous estimation as given.

<<Insert Table 4.5.1 about here>>
<<Insert Table 4.5.2 about here>>
<<Insert Table 4.5.3 about here>>
<<Insert Table 4.5.4 about here>>
<<Insert Table 4.5.5 about here>>
<<Insert Table 4.5.6 about here>>
<<Insert Table 4.5.7 about here>>
<<Insert Table 4.5.8 about here>>
<<Insert Table 4.5.9 about here>>
<<Insert Table 4.5.10 about here>>
<<Insert Table 4.5.11 about here>>

From Table 4.5.1, the following five points can be inferred: First, similar to Table 4.4.1, the test statistic for the overidentification restriction is not at all significant ($p = 1.000$), so the likelihood that there is an error in the specification of the stochastic Euler equations using the utility functions of banks on the actual cost is near zero. Second, the parameters for which the p-value is less than 0.1 account for 94 percent of all the parameters (i.e., 16 out of 17), so this estimation result is, overall, highly reliable from a statistical perspective. Third, γ^{DA}_s ($s = 2, \ldots, 7$) in Eq. (3.1.3.1.10) are significantly positive, so the degree of relative risk-aversion of banks on the actual cost is larger than that of banks on the cost frontier in the periods other than the 1976-1986 period (i.e., before the bubble period). Fourth, $\alpha^{DA}_{e,s}$ ($s = 1, \ldots, 5, 7$) in Eqs. (3.1.3.1.9) and (3.1.3.1.11) are significantly negative, so $\alpha^F_e + \alpha^{DA}_e$ in Eq. (3.1.3.1.14a) is smaller than α^F_e in Eq. (3.1.3.1.7a) in the periods other than the 2008-2010 period (i.e., the Lehman collapse and Great East Japan Earthquake period). In contrast, $\alpha^{DA}_{e,6}$ in Eq. (3.1.3.1.11) is significantly positive, so $\alpha_e^F + \alpha_e^{DA}$ in Eq. (3.1.3.1.14a) is larger than α_e^F in Eq. (3.1.3.1.7a) in the 2008-2010 period. Furthermore, $\alpha_{\pi e}^{DA}$ in Eqs. (3.1.3.1.9) is significantly positive, so $\alpha_{\pi e}^F + \alpha_{\pi e}^{DA}$ in Eq. (3.1.3.1.14b) is, in terms of absolute value, smaller than $\alpha_{\pi e}^F$ in Eq. (3.1.3.1.7b) because $\alpha_{\pi e}^F$ is significantly negative. Fifth, b^{MUA} in Eqs. (3.1.3.2.7a) and (3.1.3.2.7b) is significantly positive and very small, so $E\left[\partial u_{i,t+1}^A \middle/ \partial \pi_{i,t+1}^{QSA} \middle| \mathbf{z}_{i,t}\right] \middle/ E\left[\partial u_{i,t+1}^F \middle/ \partial \pi_{i,t+1}^{QSF} \middle| \mathbf{z}_{i,t}\right]$ is much smaller than $\left(\partial u_{i,t}^A \middle/ \partial \pi_{i,t}^{QSA}\right) \middle/ \left(\partial u_{i,t}^F \middle/ \partial \pi_{i,t}^{QSF}\right)$. Consequently, from this point in addition to the third and fourth points, the utility function of banks on the actual cost is different from that of banks on the cost frontier. In addition, from Tables 4.5.2 to 4.5.5, respectively, the parameters that the p-value is less than 0.1 account for 92, 94, 99, and 95 percent of all parameters (where the numbers are 132, 135, 138, and 133 out of 143, 143, 140, and 140, respectively), so this estimation result is, overall, highly reliable, similar to Table 4.5.1. The details of these estimation results are explained in Subsection 4.8.

Similarly, from Tables 4.5.6 to 4.5.11, we can infer the following: First, the test statistics for the overidentification restriction are far from significant (the p-values are 0.401 in Table 4.5.6; 0.781 in Table 4.5.7; 0.423 in Table 4.5.8; 0.211 in Table 4.5.9; 0.620 in Table 4.5.10; and 0.845 in Table 4.5.11), so the likelihood that there is an error in the specification of $PIE_{i,j,t}$ in Eq. (3.1.3.2.8a) for $j = S, C, CL, A, CM, CD$ is small. Second, the parameters for which the p-value is less than 0.1 account for 97, 100, 100, 99, 99, and 100 percent of all parameters, respectively (where the numbers are 131, 135, 134, 134, 134, and 135 out of 135, 135, 134, 135, 135, and 135, respectively), so this estimation result is, overall, highly reliable, similar to Tables 4.5.2 to 4.5.5. The details of these estimation results are explained in Subsection 4.8.

4.6 Risk Attitude and Coefficient Parameters of Utility Functions

Table 4.6.1 shows the estimates of the degrees of relative risk-aversions of banks on the cost frontier and the actual cost, and the coefficient parameters of the utility functions of these banks (i.e., α_e^F in Eq. (3.1.3.1.7a) and $\alpha_e^F + \alpha_e^{DA}$ in Eq. (3.1.3.1.14a)).

<<Insert Table 4.6.1 about here>>

From this table, we can infer the following seven points:

1. The estimates of the degree of relative risk-aversion of banks on the cost frontier are very small and not significant, meaning that these banks are risk-neutral in all periods.

2. The estimates of the degree of relative risk-aversion of banks on the actual cost are significantly positive in the periods other than the 1976-1986 period (i.e., before the bubble period), indicating that these banks are risk-averse during these periods. Notably, the values are largest in the 2008-2010 period (i.e., the Lehman collapse and Great East Japan Earthquake period), while they are smallest in the 1996-2001 (i.e., the financial crisis and big bang period) because of the injection of public funds into financial institutions.

3. The estimates of the degree of relative risk-aversion of banks on the actual cost increase due to an increase in the standard deviation of the equity capital in the periods other than the 2008-2010 period. Similarly, they increase due to an increase in the standard deviation of the quasi-short-run profit based on the dynamic actual cost in periods other than the 1996-2001 and 2008-2010 periods.

4. In the 2008-2010 period, the growth rate of real GDP is only negative, and its standard deviation is largest. Furthermore, the degree of decrease in stock price is largest, the return on equity of borrower firms is lowest, and the loan loss provision rate is highest. For these reasons, although the standard deviations of the quasi-short-run profit based on the dynamic actual cost and equity capital are small, the estimate of the degree of relative risk-aversion of banks on the actual cost is largest.

5. In the 1996-2001 period, the standard deviation of the quasi-short-run profit based on the dynamic actual cost is large, but that of equity capital is small because of the injection of public funds into financial institutions. For this reason, although this period includes the financial

crisis, the estimate of the degree of relative risk-aversion of banks on the actual cost is small.

6. α_e^F in Eq. (3.1.3.1.7a) increases due to an increase in the standard deviation of the quasi-short-run profit based on the dynamic frontier cost in the periods other than the 2008-2010 period. Similarly, it increases due to an increase in the standard deviation of equity capital in the periods other than the 1996-2001 and 2008-2010 periods.

7. $\alpha_e^F + \alpha_e^{DA}$ in Eq. (3.1.3.1.14a) increases due to an increase in the estimate of the degree of relative risk-aversion of banks on the actual cost, so the third point applies in this case.

4.7 Reference Rate (Risk-Free Rate)

From Homma (2018, Corollary 1, pp. 39-40), the reference rate on the cost frontier is expressed as

$$\begin{aligned} r_{i,t}^{FF} &= 1\Big/E\left[\beta_{i,t}\cdot IMRS_{\pi,i,t+1}^{F}\,|\mathbf{z}_{i,t}\right]-1 \\ &= 1\Big/E\left[\beta_{i,t}\cdot\left(\partial u_{i,t+1}^{F}\Big/\partial\pi_{i,t+1}^{QSF}\right)\Big/\left(\partial u_{i,t}^{F}\Big/\partial\pi_{i,t}^{QSF}\right)|\mathbf{z}_{i,t}\right]-1 \\ &= \left(\partial u_{i,t}^{F}\Big/\partial\pi_{i,t}^{QSF}\right)\Big/\left(\beta_{i,t}\cdot E\left[\partial u_{i,t+1}^{F}\Big/\partial\pi_{i,t+1}^{QSF}\,|\mathbf{z}_{i,t}\right]\right)-1. \quad (4.7.1) \end{aligned}$$

Substituting Eqs. (3.1.3.2.14a) and (3.1.3.2.14b) into Eq. (4.7.1), under the assumption that $E\left[\partial u_{i,t+1}^{F}\Big/\partial\pi_{i,t+1}^{QSF}\,|\mathbf{z}_{i,t}\right]=\partial u_{i,t+1}^{F}\Big/\partial\pi_{i,t+1}^{QSF}$ (i.e., perfect prediction), leads to

$$\begin{aligned}
r_{i,t}^{FF} &= \left(\partial u_{i,t}^{F} \Big/ \partial \pi_{i,t}^{QSF}\right) \Big/ \left(\beta_{i,t} \cdot \partial u_{i,t+1}^{F} \Big/ \partial \pi_{i,t+1}^{QSF}\right) - 1 \\
&= \left(\pi_{i,t}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^F - 1} \cdot \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(q_{e,i,t}\right)^{\gamma^F} - 1}{\gamma^F}\right\} \\
&\quad \Big/ \left[\beta_{i,t} \cdot \left(\pi_{i,t+1}^{QSF} + \phi_{\pi}^{F}\right)^{\gamma^F - 1} \cdot \left\{1 + \alpha_{\pi e}^{F} \cdot \frac{\left(q_{e,i,t+1}\right)^{\gamma^F} - 1}{\gamma^F}\right\}\right] - 1 \\
&= \left(r_{i,t}^{D} + 1\right) \cdot \left(\frac{\pi_{i,t+1}^{QSF} + \phi_{\pi}^{F}}{\pi_{i,t}^{QSF} + \phi_{\pi}^{F}}\right)^{1-\gamma^F} \cdot \frac{\gamma^F + \alpha_{\pi e}^{F} \cdot \left\{\left(q_{e,i,t}\right)^{\gamma^F} - 1\right\}}{\gamma^F + \alpha_{\pi e}^{F} \cdot \left\{\left(q_{e,i,t+1}\right)^{\gamma^F} - 1\right\}} - 1.
\end{aligned} \tag{4.7.2}$$

From Eq. (3.1.3.1.2), $0 \leq \gamma^F \leq 1$, and from Table 4.4.1, $\alpha_{\pi e}^{F} < 0$. Therefore, the larger the increase in the quasi-short-run profit based on the dynamic frontier cost and the equity capital from the current period to the next period, the higher is the reference rate on the cost frontier. Furthermore, the higher the subjective rate of time preference, the higher is the reference rate on the cost frontier. Hereafter $r_{i,t}^{D} + 1$, $\left(\frac{\pi_{i,t+1}^{QSF} + \phi_{\pi}^{F}}{\pi_{i,t}^{QSF} + \phi_{\pi}^{F}}\right)^{1-\gamma^F}$, and $\frac{\gamma^F + \alpha_{\pi e}^{F} \cdot \left\{\left(q_{e,i,t}\right)^{\gamma^F} - 1\right\}}{\gamma^F + \alpha_{\pi e}^{F} \cdot \left\{\left(q_{e,i,t+1}\right)^{\gamma^F} - 1\right\}}$ are referred to as the effects of the subjective rate of time preference, quasi-short-run profit, and equity capital, respectively.

Similarly, the reference rate on the actual cost is expressed as follows:

$$\begin{aligned}
r_{i,t}^{FA} &= \left(\partial u_{i,t}^{A} \Big/ \partial \pi_{i,t}^{QSA}\right) \Big/ \left(\beta_{i,t} \cdot \partial u_{i,t+1}^{A} \Big/ \partial \pi_{i,t+1}^{QSA}\right) - 1 \\
&= \left(r_{i,t}^{D} + 1\right) \cdot \left(\frac{\pi_{i,t+1}^{QSA} + \phi_{\pi}^{A}}{\pi_{i,t}^{QSA} + \phi_{\pi}^{A}}\right)^{1-\left(\gamma^F - \gamma^{DA}\right)} \\
&\quad \cdot \frac{\left(\gamma^F - \gamma^{DA}\right) + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \left\{\left(q_{e,i,t}\right)^{\gamma^F - \gamma^{DA}} - 1\right\}}{\left(\gamma^F - \gamma^{DA}\right) + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \left\{\left(q_{e,i,t+1}\right)^{\gamma^F - \gamma^{DA}} - 1\right\}} - 1.
\end{aligned} \tag{4.7.3}$$

From Eq. (3.1.3.1.10), $0 \leq \gamma^F - \gamma^{DA} \leq 1$, and from Tables 4.4.1 and 4.5.1, $\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA} < 0$. Therefore, the larger the increase in the quasi-short-run profit based on the dynamic actual cost and the equity capital from the current period to the next period, the higher is the reference rate on the actual cost. Furthermore, the higher the subjective rate of time preference, the higher is the reference rate on the actual cost. Similar to the reference rate on the cost frontier, hereafter $r_{i,t}^{D}+1$, $\left(\frac{\pi_{i,t+1}^{QSA}+\phi_{\pi}^{A}}{\pi_{i,t}^{QSA}+\phi_{\pi}^{A}}\right)^{1-\left(\gamma^{F}-\gamma^{DA}\right)}$, and $\frac{\left(\gamma^{F}-\gamma^{DA}\right)+\left(\alpha_{\pi e}^{F}+\alpha_{\pi e}^{DA}\right)\cdot\left\{(q_{e,i,t})^{\gamma^{F}-\gamma^{DA}}-1\right\}}{(\gamma^{F}-\gamma^{DA})+(\alpha_{\pi e}^{F}+\alpha_{\pi e}^{DA})\cdot\left\{(q_{e,i,t+1})^{\gamma^{F}-\gamma^{DA}}-1\right\}}$ are referred to as the effects of the subjective rate of time preference, quasi-short-run profit, and equity capital, respectively.

Table 4.7.1 shows the estimates of the reference rates on the cost frontier and the actual cost.

<<Insert Table 4.7.1 about here>>

From this table, we can infer the following eight points:

1. Over the entire period, the effect of the subjective rate of time preference is largest, followed by the effect of equity capital. The effect of quasi-short-run profit is, however, extremely small. The effect of equity capital on the reference rate on the cost frontier is larger than its effect on the reference rate on the actual cost, so the reference rate on the cost frontier is higher than the reference rate on the actual cost. Furthermore, although the subjective rate of time preference is lower than the call rate, the reference rate on the cost frontier is higher than the call rate because of the effect of the equity capital. However, the effect of equity capital on the reference rate on the actual cost is small, so the reference rate on the actual cost is lower than the call rate.

2. The trend in the 1976-1986 period is similar to that over the entire period, other than a decrease in the quasi-short-run profit.

3. In the 1987-1989 period, with respect to the effect on the reference rate on the cost frontier, the effect of equity capital is largest, followed by the effect of the subjective rate of time preference. However, the effect

of quasi-short-run profit is extremely small. With respect to the effect on the reference rate on the actual cost, the effect of the subjective rate of time preference is largest, followed by the effect of quasi-short-run profit. The effect of equity capital is, however, extremely small. The effect of equity capital on the reference rate on the cost frontier is very large, so the reference rate on the cost frontier is much higher than the call rate and the reference rate on the actual cost. The effects of quasi-short-run profit and equity capital on the reference rate on the actual cost are small, so the reference rate on the actual cost is lower than the call rate.

4. In the 1990-1995 period, with respect to the effect on the reference rate on the cost frontier, the effect of the subjective rate of time preference is largest, followed by the decreasing effect of equity capital. However, the decreasing effect of quasi-short-run profit is extremely small. Moreover, with respect to the effect on the reference rate on the actual cost, the effect of the subjective rate of time preference is largest. The decreasing effects of equity capital and quasi-short-run profit are, however, very small. Comparing the reference rate on the cost frontier with the reference rate on the actual cost, the decreasing effects of equity capital on the former is relatively large, making the former lower than the latter. Furthermore, the subjective rate of time preference is lower than the call rate, and the quasi-short-run profit and the equity capital decrease, making the reference rates on the cost frontier and the actual cost lower than the call rate.

5. In the 1996-2001 period, with respect to the effect on the reference rate on the cost frontier, the decreasing effect of equity capital is largest, followed by the effect of the subjective rate of time preference. The decreasing effect of quasi-short-run profit is, however, extremely small. Notably, the decreasing effect of equity capital is much larger than the effect of the subjective rate of time preference; thus, the reference rate on the cost frontier is negative and, in terms of absolute value, relatively large. With respect to the effect on the reference rate on the actual cost,

the same results are observed. Consequently, the reference rate on the actual cost is also negative. Comparing the reference rate on the cost frontier with the reference rate on the actual cost, the decreasing effect of equity capital on the former is larger than it is on the latter, making the former much lower than the latter (i.e., the former is negative and, in terms of absolute value, much larger than the latter). Moreover, the call rate is positive, so the reference rates on the cost frontier and the actual cost are lower than the call rate. Indeed, the reference rates on the cost frontier are remarkably low.

6. In the 2002-2007 period, with respect to the effect on the reference rate on the cost frontier, similar to the 1996-2001 period, the decreasing effect of equity capital is largest, followed by the effect of the subjective rate of time preference. The effect of quasi-short-run profit is, however, almost zero. With respect to the effect on the reference rate on the actual cost, the effects of quasi-short-run profit and equity capital are equally large, and the decreasing effect of equity capital is extremely small. Comparing the reference rate on the cost frontier with the reference rate on the actual cost, the decreasing effect of the equity capital on the former is larger than on the latter, and the effect of quasi-short-run profit on the latter is larger than on the former, making the latter much higher than the former. Consequently, the former is much lower than the call rate, while the latter is higher.

7. In the 2008-2010 period, with respect to the effect on the reference rate on the cost frontier, the same results as in the 1996-2001 and 2002-2007 periods are observed. With respect to the effect on the reference rate on the actual cost, the decreasing effect of the quasi-short-run profit is largest, followed by the effect of the subjective rate of time preference. The effect of equity capital is, however, extremely small. Comparing the reference rate on the cost frontier with the reference rate on the actual cost, the effect of equity capital on the former is larger than on the latter, and the decreasing effect of quasi-short-run profit on the latter is larger than on the former, making the former much higher than

the latter. Consequently, the former is much higher than the call rate, while the latter is much lower.

8. In the 2011-2016 period, with respect to the effect on the reference rate on the cost frontier, the same results as in the 1996-2001, 2002-2007, and 2008-2010 periods are observed. With respect to the effect on the reference rate on the actual cost, the effect of quasi-short-run profit is largest, followed by the effects of equity capital and the subjective rate of time preference. Comparing the reference rate on the cost frontier with the reference rate on the actual cost, the effect of equity capital on the former is much larger than the effect of quasi-short-run profit on the latter; thus, the former is much higher than the latter. As compared with the call rate, these effects are relatively large; consequently, both reference rates are much higher than the call rate.

Finally, from Eqs. (3.1.3.2.6b), (3.1.3.2.7b), (4.7.2), and (4.7.3), and Tables 4.4.1 and 4.5.1, the factors that have a positive effect on both reference rates include the following: the static cost unneutral efficiency in the previous period, the long-term prime rate, the capital ratio of borrower firms, the loan per case, the proportion of loans for small and medium firms, the Herfindahl index of loan proportions classified by industry, the disposable income for workers' households (except farmers), the TOPIX, the interest rate of securities, and the interest rate of call money and borrowed money. In contrast, the factors that have a negative effect on both reference rates are as follows: the default loss rate for long-term loans, the proportion of loans for the real estate business, the proportion of loans secured by real estate, the proportion of loans without collateral and without warranty, the yield on government bonds, the postal savings interest rate, the interest rate due from banks and call loans, the interest rate of certificates of deposit and other liabilities, and the reserve requirement ratio for time deposits.

4.8 Dynamic Price Inefficiencies

Table 4.8.1 shows the estimates of the dynamic price inefficiencies (normalized by the marginal utility of quasi-short-run profits based on dynamic actual cost), $PIE_{i,j,t}$ ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) in Eq. (3.1.3.2.8a).

<<Insert Table 4.8.1 about here>>

Based on this table, we can make the following inferences:

1. For the entire period, the dynamic price inefficiencies of all financial goods are significant ($p \leq 0.1$), meaning that these inefficiencies exist. Comparing these inefficiencies with the absolute values of the dynamic actual marginal variable costs, the former is much larger than the latter.

2. The dynamic price inefficiencies of financial assets are positive, while those of liabilities are negative. Therefore, the former is short, while the latter is over. Thus, equity capital is short.

3. For each financial good, the dynamic price inefficiency of demand deposits is smallest, while that of securities is largest. Comparing (short-term and long-term) loans with (demand and time) deposits, the latter is smaller than the former.

4. Comparing by period, the dynamic price inefficiency in the 2008-2010 period (i.e., the Lehman collapse and Great East Japan Earthquake period) is largest, followed, in order, by the 1987-1989 and 2011-2016 periods (i.e., the bubble period and after the Great East Japan Earthquake period). It is smallest in the 1976-1986 period (i.e., before the bubble period), with the next smallest occurring in the 1996-2001 period (i.e., the financial crisis and big bang period).

In addition, from Tables 4.5.2 to 4.5.11, we can infer the following five points:

1. The factors having a negative effect on the dynamic price inefficiency of short-term loans include the Herfindahl index of short-term loans in the previous period, the short-term prime rate, the capital ratio of borrower firms, and the proportion of loans for real estate business. The factors having a positive effect include the static cost unneutral efficiency in the previous period and the Herfindahl index of loan proportions classified by industry.

2. The factors having a negative effect on the dynamic price inefficiency of long-term loans include the Herfindahl index of long-term loans in the previous period, the long-term prime rate, the capital ratio of borrower firms, the proportion of loans for real estate business, and the proportion of loans without collateral and without warranty. The factors having a positive effect are the static cost unneutral efficiency in the previous period and the proportion of loans for small and medium firms.

3. The factors that have a negative effect on the dynamic price inefficiency of demand deposits include the Herfindahl index of demand deposits in the previous period, the disposable income for workers' households (except farmers), the postal savings interest rate of ordinary savings, the TOPIX, and the reserve requirement ratio for demand deposits, while only the static cost unneutral efficiency in the previous period has a positive effect.

4. The factors that negatively affect the dynamic price inefficiency of time deposits are the Herfindahl index of time deposits in the previous period and the postal savings interest rate of postal savings certificates, while the static cost unneutral efficiency in the previous period, the disposable income for workers' households (except farmers), the yield on government bonds, and the TOPIX have a positive effect

5. For other financial goods, similar to the above financial goods, the Herfindahl indices in the previous period have a negative effect on the dynamic price inefficiencies of other financial goods, while the static

cost unneutral efficiency in the previous period and the interest rates of other financial goods have a positive effect.

4.9 GURPs on the Cost Frontier and the Actual Cost

From Homma (2018, Definition 12, p. 41) and Eqs. (3.1.3.2.12) and (3.1.3.2.18), the GURP on the cost frontier, denoted by $p_{j,i,t}^{GURF}$, is defined as

$$p_{j,i,t}^{GURF} = p_{j,i,t}^{SURF} + \eta_{j,i,t}^{BPF} + MRS_{e,i,t}^{BPF\pi} + \varpi_{j,i,t}^{BPF}, \quad j = SL, LL, DD, TD, \tag{4.9.1a}$$

$$p_{j,i,t}^{GURF} = p_{j,i,t}^{SURF} + MRS_{e,i,t}^{BPF\pi} + \varpi_{j,i,t}^{BPF}, \quad j = S, A, \tag{4.9.1b}$$

$$p_{j,i,t}^{GURF} = p_{j,i,t}^{SURF} + MRS_{e,i,t}^{BPF\pi}, \quad j = C, CL, CM, CD, \tag{4.9.1c}$$

where $p_{j,i,t}^{SURF}$ is the SURP on the cost frontier similarly defined by Homma (2009, 2012), $\eta_{j,i,t}^{BPF}$ expresses the market structure and conduct effect based on the cost frontier, $MRS_{e,i,t}^{BPF\pi}$ expresses the equity capital effect based on the cost frontier, and $\varpi_{j,i,t}^{BPF}$ expresses the risk-adjustment effect based on the cost frontier.[5]

Similarly, from Homma (2018, Definition 13, pp. 41-42) and Eqs. (3.1.3.2.12) and (3.1.3.2.18), the GURP on the actual cost, denoted by $p_{j,i,t}^{GURA}$, is defined as

$$p_{j,i,t}^{GURA} = p_{j,i,t}^{SURA} + \eta_{j,i,t}^{BPA} + MRS_{e,i,t}^{BPA\pi} + \varpi_{j,i,t}^{BPA}, \quad j = SL, LL, DD, \tag{4.9.2a}$$

$$p_{j,i,t}^{GURA} = p_{j,i,t}^{SURA} + MRS_{e,i,t}^{BPA\pi} + \varpi_{j,i,t}^{BPA}, \quad j = S, A, \tag{4.9.2b}$$

$$p_{j,i,t}^{GURA} = p_{j,i,t}^{SURA} + MRS_{e,i,t}^{BPA\pi}, \quad j = C, CL, CM, CD, \tag{4.9.2c}$$

where $p_{j,i,t}^{SURA}$ is the SURP on the actual cost similarly defined by Homma (2009, 2012), $\eta_{j,i,t}^{BPA}$ expresses the market structure and conduct effect based on the actual cost, $MRS_{e,i,t}^{BPA\pi}$ expresses the equity capital effect based on

[5] In accordance with the notation in the present section, the order of subscripts i and j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, Definition 12, p. 41) is omitted.

the actual cost, and $\varpi_{j,i,t}^{BPA}$ expresses the risk-adjustment effect based on the actual cost.[6]

From Homma (2009, pp. 13-14), the positive (or negative) signs of $MRS_{e,i,t}^{BPF\pi}$ and $MRS_{e,i,t}^{BPA\pi}$ indicate that the effect of reducing the risk of the burden of financial distress costs is greater (or less) than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects.

From Homma (2018, pp. 37-39), if the bank concerned is risk-averse, then the positive (or negative) signs of $\varpi_{j,i,t}^{BPF}$ and $\varpi_{j,i,t}^{BPA}$ indicate that the risks (variances) of quasi-short-run profits based on the dynamic frontier cost and dynamic actual cost in the next period decrease (or increase) due to an increase in the financial asset or liability in the current period. However, if the bank concerned is risk-neutral (i.e., $\gamma^F = \gamma^F - \gamma^{DA} = 1$), then this relation is not established. In this case, from Eqs. (3.1.3.2.14a), (3.1.3.2.14b), (3.1.3.2.14d), and (3.1.3.2.14e), the following equations are obtained:

$$\partial u_{i,t}^F \Big/ \partial \pi_{i,t}^{QSF} = 1 + \alpha_{\pi e}^F \cdot \left(q_{e,i,t} - 1\right), \tag{4.9.3a}$$

$$\partial u_{i,t+1}^F \Big/ \partial \pi_{i,t+1}^{QSF} = 1 + \alpha_{\pi e}^F \cdot \left(q_{e,i,t+1} - 1\right), \tag{4.9.3b}$$

$$\partial u_{i,t}^A \Big/ \partial \pi_{i,t}^{QSA} = 1 + \left(\alpha_{\pi e}^F + \alpha_{\pi e}^{DA}\right) \cdot \left(q_{e,i,t} - 1\right), \tag{4.9.3c}$$

$$\partial u_{i,t+1}^A \Big/ \partial \pi_{i,t+1}^{QSA} = 1 + \left(\alpha_{\pi e}^F + \alpha_{\pi e}^{DA}\right) \cdot \left(q_{e,i,t+1} - 1\right). \tag{4.9.3d}$$

Therefore, from Homma (2018, Theorems 1 and 2 and Definitions 12 and 13,

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[6] In accordance with the notation in the present section, the order of subscripts i and j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, Definition 13, pp. 41-42) is omitted.

pp. 34-42), $\varpi_{j,i,t}^{BPF}$ and $\varpi_{j,i,t}^{BPA}$ are expressed as follows:

$$\begin{aligned}
\varpi_{j,i,t}^{BPF} &= b_j \cdot p_{G,t} \cdot \varpi_{j,i,t}^{F} \\
&= b_j \cdot p_{G,t} \cdot \beta_{i,t} \cdot \frac{\operatorname{cov}\left(\zeta_{j,i,t+1}, \partial u_{i,t+1}^{F} \middle/ \partial \pi_{i,t+1}^{QSF} \,\middle|\, \mathbf{z}_{i,t}\right)}{\partial u_{i,t}^{F} \middle/ \partial \pi_{i,t}^{QSF}} \\
&= b_j \cdot p_{G,t} \cdot \beta_{i,t} \cdot \frac{\operatorname{cov}\left(\zeta_{j,i,t+1}, 1 + \alpha_{\pi e}^{F} \cdot (q_{e,i,t+1} - 1) \middle| \, \mathbf{z}_{i,t}\right)}{1 + \alpha_{\pi e}^{F} \cdot (q_{e,i,t} - 1)} \\
&= b_j \cdot p_{G,t} \cdot \beta_{i,t} \cdot \alpha_{\pi e}^{F} \cdot \frac{\operatorname{cov}\left(\zeta_{j,i,t+1}, q_{e,i,t+1} \middle| \, \mathbf{z}_{i,t}\right)}{1 + \alpha_{\pi e}^{F} \cdot (q_{e,i,t} - 1)}, \qquad (4.9.4a) \\
\varpi_{j,i,t}^{BPA} &= b_j \cdot p_{G,t} \cdot \varpi_{j,i,t}^{A} \\
&= b_j \cdot p_{G,t} \cdot \beta_{i,t} \cdot \frac{\operatorname{cov}\left(\zeta_{j,i,t+1}, \partial u_{i,t+1}^{A} \middle/ \partial \pi_{i,t+1}^{QSA} \,\middle|\, \mathbf{z}_{i,t}\right)}{\partial u_{i,t}^{A} \middle/ \partial \pi_{i,t}^{QSA}} \\
&= b_j \cdot p_{G,t} \cdot \beta_{i,t} \cdot \frac{\operatorname{cov}\left(\zeta_{j,i,t+1}, 1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot (q_{e,i,t+1} - 1) \middle| \, \mathbf{z}_{i,t}\right)}{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot (q_{e,i,t} - 1)} \\
&= b_j \cdot p_{G,t} \cdot \beta_{i,t} \cdot \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot \frac{\operatorname{cov}\left(\zeta_{j,i,t+1}, q_{e,i,t+1} \middle| \, \mathbf{z}_{i,t}\right)}{1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot (q_{e,i,t} - 1)}. \qquad (4.9.4b)
\end{aligned}$$

From these equations, even if the bank concerned is risk-neutral, if $\operatorname{cov}\left(\zeta_{j,i,t+1}, q_{e,i,t+1} \middle| \, \mathbf{z}_{i,t}\right) \neq 0$, then $\varpi_{j,i,t}^{BPF}$ and $\varpi_{j,i,t}^{BPA}$ are not zero. It is for empirical studies to explore whether this case actually occurs. From Tables 4.4.1 and 4.5.1, $\alpha_{\pi e}^{F} = -0.132753 \times 10^{-5}$ and $\alpha_{\pi e}^{DA} = 0.0400069 \times 10^{-5}$, so $\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA} = -0.092746 \times 10^{-5}$. Furthermore, the mean of $q_{e,i,t}$ is 1.98995×10^{5}, so $1 + \alpha_{\pi e}^{F} \cdot (q_{e,i,t} - 1)$, $1 + \left(\alpha_{\pi e}^{F} + \alpha_{\pi e}^{DA}\right) \cdot (q_{e,i,t} - 1) > 0$. Consequently, if the j-th financial good is a financial asset (i.e., $b_j = 1$), the signs of $\varpi_{j,i,t}^{BPF}$ and $\varpi_{j,i,t}^{BPA}$ are positive (or negative) if the sign of $\operatorname{cov}\left(\zeta_{j,i,t+1}, q_{e,i,t+1} \middle| \, \mathbf{z}_{i,t}\right)$ is negative (or positive). Similarly, if the j-th financial good is a liability (i.e., $b_j = -1$), the signs of $\varpi_{j,i,t}^{BPF}$ and $\varpi_{j,i,t}^{BPA}$ are positive (or negative) if the sign of $\operatorname{cov}\left(\zeta_{j,i,t+1}, q_{e,i,t+1} \middle| \, \mathbf{z}_{i,t}\right)$ is positive (or negative).

From Homma (2018, Remark 1, p. 43), the classification of financial goods into inputs and outputs based on the sign of each GURP on the cost frontier is consistent with the classification based on the sign of each dynamic frontier marginal variable cost. The sign of the dynamic frontier marginal variable cost is the same as the sign of the GURP on the cost frontier, indicating that a financial good is an output if positive and a fixed input if negative.

However, from Homma (2018, Remark 2, pp. 43-44), the classification of financial goods into inputs and outputs based on the sign of each GURP on the actual cost is not always consistent with the classification based on the sign of each dynamic actual marginal variable cost. The two classifications are consistent in the following two limited cases: 1) the sign of dynamic actual marginal variable cost is the same as the sign of price inefficiency normalized by the marginal utility of quasi-short-run profits based on dynamic actual cost, and 2) if the two signs are not equal, then the absolute value of dynamic actual marginal variable cost is greater than the absolute value of normalized price inefficiency.

From the above reasons, the classification of financial goods on the cost frontier into inputs and outputs is based on the sign of each GURP on the cost frontier, while on the actual cost it is based on the sign of each dynamic actual marginal variable cost.

Tables 4.9.1 and 4.9.2 show the estimates of the GURPs on the cost frontier and the actual cost over the entire period, respectively; Tables 4.9.3 and 4.9.4 show them in each period.

<<Insert Table 4.9.1 about here>>
<<Insert Table 4.9.2 about here>>
<<Insert Table 4.9.3 about here>>
<<Insert Table 4.9.4 about here>>

From Tables 4.9.1 and 4.9.2, the following four points can be inferred:

1. The sign of each GURP on the cost frontier is consistent with that of each dynamic actual marginal variable cost for all financial goods other than certificates of deposit and other liabilities ($j = CD$). For short-term and long-term loans ($j = SL, LL$), securities ($j = S$), and time deposits ($j = TD$), these signs are positive, so they are regarded as outputs. On the other hand, for cash ($j = C$), amount due from

banks and call loans ($j = CL$), other financial assets ($j = A$), demand deposits ($j = DD$), and call money and borrowed money ($j = CM$), the signs are negative, and thus they are regarded as fixed inputs. For certificates of deposit and other liabilities ($j = CD$), the sign of the GURP on the cost frontier is negative, meaning that this financial good is regarded as a fixed input on the cost frontier, while for the dynamic actual marginal variable cost the sign is positive, so this financial good is regarded as an output on the actual cost.

2. A comparison of the absolute value of the GURPs on the cost frontier with those on the actual cost shows that the latter is much larger than the former. From Homma (2018, Eq. (2.2.3.5), p. 40), this is due to the fact that the dynamic price inefficiencies are very large from a cost perspective, while from a revenue perspective this is due to the fact that the equity capital effects are very large.

3. For each effect in Eqs. (4.9.1a) to (4.9.1c), the equity capital effect and the risk-adjustment effect are, in terms of absolute value, large, while the market structure and conduct effect is very small. The signs of the equity capital effects of the financial assets are negative, while those of the liabilities are positive. For the financial assets (or the liabilities), this is because the effect of reducing the risk of the burden of financial distress costs is less (or greater) than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. In contrast, the signs of the risk-adjustment effects of the financial assets are positive, while those of the liabilities are negative. From Table 4.6.1, the banks on the cost frontier are risk-neutral, so, from Eqs. (4.9.4a) and (4.9.4b), these signs of the risk-adjustment effects mean that $\mathrm{cov}\left(\zeta_{j,i,t+1}, q_{e,i,t+1} \middle| \mathbf{z}_{i,t}\right)$ is significantly negative. In other words, the uncertainty factors, $\zeta_{j,i,t+1}$ ($j = SL, LL, S, A, DD, TD$), decrease due to an increase in equity capital, $q_{e,i,t+1}$. For other financial assets ($j = A$), the negative equity capital effect is, in terms of absolute value, significantly larger than the positive risk-adjustment effect, while for demand and time deposits

$(j = DD, TD)$, the negative risk-adjustment effect is, in terms of absolute value, significantly larger than the positive equity capital effect. However, for short-term and long-term loans $(j = SL, LL)$ and securities $(j = S)$, the absolute values of the equity capital effects are not significantly different from those of the risk-adjustment effects.

4. For each effect in Eqs. (4.9.2a) to (4.9.2c), similar to each effect in Eqs. (4.9.1a) to (4.9.1c), the equity capital effect and the risk-adjustment effect are, in terms of absolute value, large, while the market structure and conduct effect is very small. Contrary to the GURP on the cost frontier in Eqs. (4.9.1a) to (4.9.1c), the signs of the equity capital effects of the financial assets are positive, while those of the liabilities are negative. For the financial assets (or liabilities), this is because the effect of reducing the risk of the burden of financial distress costs is greater (or less) than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. On the other hand, the signs of the risk-adjustment effects of the financial assets are negative, while those of the liabilities are positive. Under the actual situation that cost and price inefficiencies exist, the risks (variances) of quasi-short-run profits based on dynamic actual cost in the next period increase due to an increase in financial assets in the current period, while they decrease due to an increase in liabilities in the current period. Therefore, they increase due to an increase in equity capital in the current period. For the financial assets (or the liabilities), the positive (or negative) equity capital effect is, in terms of absolute value, significantly larger than the negative (or positive) risk-adjustment effect.

From Tables 4.9.3 and 4.9.4, we can infer the following:

1. The periods in which the sign of the GURP of the short-term loans on the cost frontier is different from the sign for the entire period are the periods 1987-1989, 2008-2010, and 2011-2016: in each period, the sign is negative. In the 1987-1989 period (i.e., the bubble period), the reason

for this is that the signs of the SURP and the risk-adjustment effect are negative and their component ratios are large, although the sign of the equity capital effect is positive and its component ratio is large. The reason that the signs of the SURP are negative and its absolute value is large is that the reference rate becomes much higher due to the increase in equity capital. In the 2008-2010 period (i.e., the Lehman collapse and Great East Japan Earthquake period), the reason that the sign of the GURP of the short-term loans on the cost frontier is negative is that, although the equity capital effect increases, its sign is still negative and the positive risk-adjustment effect largely decreases. In the 2011-2016 period (i.e., after the Great East Japan Earthquake period), the reason is that, although the equity capital effect and the risk-adjustment effect are positive and their component ratios are large, the sign of the SURP is negative and its absolute value is larger than their sum. Similar to the 1987-1989 period, the reason for this is that the reference rate becomes much higher due to the increase in equity capital. These periods include abnormal situations, suggesting that, even if cost and price inefficiencies do not exist, the GURP of the short-term loans on the cost frontier is significantly affected by abnormal situations.

2. The signs of the GURPs of the long-term loans on the cost frontier in all periods are positive, similar to the sign of the GURP of these loans for the entire period. In contrast to the GURP of the short-term loans on the cost frontier, the GURP of the long-term loans on the cost frontier is stable. In the periods 1976-1986 (i.e., before the bubble period), 1987-1989, and 2011-2016, even if the sign of the SURP is negative, the sign of the GURP is positive. In the 1976-1986 period, the reason for this is that the positive risk-adjustment effect is, in terms of absolute value, larger than the sum of the negative SURP and equity capital effect. In the 1987-1989 period, the reason is that the positive equity capital effect is, in terms of absolute value, larger than the sum of the negative SURP and the risk-adjustment effect. In the 2011-2016 period, the reason is that the sum of the positive equity capital and

risk-adjustment effects is, in terms of absolute value, larger than the negative SURP. In these periods, either or both of the equity capital and risk-adjustment effects cancel out the negative SURP, indicating that these effects are very important for the GURP of the long-term loans on the cost frontier.

3. The signs of the GURPs of the securities on the cost frontier in all periods other than the 2008-2010 period are positive, similar to the sign of the GURP of securities for the entire period. So long as the situation is not abnormal, the GURP of the securities on the cost frontier is stable. In the 2008-2010 period, the sign of the risk-adjustment effect is negative and its absolute value is large, making the sign of the GURP also negative. In the 1987-1989 and 2011-2016 periods, even if the sign of the SURP is negative, the sign of the GURP is positive. The reason for this is similar to the long-term loans case, meaning the equity capital and risk-adjustment effects are also very important for the GURP of the securities on the cost frontier.

4. The signs of the GURPs of the other financial assets on the cost frontier in all periods other than the 1996-2001 period are negative, similar to the sign of the GURP of the other financial assets for the entire period. So long as the situation is not critical, the GURP of the other financial assets on the cost frontier is stable. Similar to the entire period, the periods in which the sign of the GURP is different from that of the SURP are the periods 1990-1995 (i.e., after the bubble period and before the financial crisis and big bang period), 2002-2007 (i.e., after the financial crisis and big bang period and before the Lehman collapse and Great East Japan Earthquake period), and 2008-2010. In each of these periods, the reason for this is that the sum of the equity capital and risk-adjustment effects is negative and its absolute value is larger than the positive SURP. Similar to the long-term loans and securities cases, the equity capital and risk-adjustment effects are also important for the GURP of the other financial assets on the cost frontier.

5. The periods in which the sign of the GURP of the demand deposits on the cost frontier is different from the sign for the entire period are the periods 1987-1989, 1990-1995, 2008-2010, and 2011-2016; in each case, the sign in the period is positive. In the 1987-1989 and 2011-2016 periods, the reason for this is that the sum of the negative equity capital and risk-adjustment effects is, in terms of absolute value, less than the positive SURP. In the 1990-1995 and 2008-2010 periods, the reason that the signs of the GURPs are positive is that the sum of the positive equity capital effect and SURP is, in terms of absolute value, larger than the negative risk-adjustment effects. For all periods, the sign of the GURP of the demand deposits on the cost frontier changes three times, indicating that it is unstable compared to the case of the long-term financial goods.

6. The periods in which the sign of the GURP of the time deposits on the cost frontier is different from the sign for the entire period are the periods 1987-1989, 1990-1995, and 1996-2001, where the signs are negative. In the 1987-1989 period, the reason for this is that the negative equity capital effect is, in terms of absolute value, larger than the sum of the positive SURP and risk-adjustment effect. In the 1990-1995 period, the reason that the sign of the GURP is negative is that the sum of the negative SURP and risk-adjustment effect is, in terms of absolute value, larger than the positive equity capital effect. In the 1996-2001 period, the reason that the sign is negative is that the sum of the negative SURP and equity capital effect is, in terms of absolute value, larger than the positive risk-adjustment effect. For all periods, the sign of the GURP of the time deposits on the cost frontier changes twice, indicating that it is unstable compared to the case of the long-term loans, although it is relatively stable compared to demand deposits.

7. The signs of the GURPs of the financial goods on the actual cost in all periods, which have a risk-adjustment effect, are the same as those for the entire period, indicating that they are stable compared to the GURPs on the cost frontier. From a cost perspective, the reason is

that the dynamic price inefficiencies are, in terms of absolute value, much larger than the dynamic actual marginal variable costs, and they are stable. From a revenue perspective, the reason that the GURPs on the actual cost are stable compared to the GURPs on the cost frontier is that the equity capital effect is, in terms of absolute value, largest, and it is stable. The reason that the dynamic price inefficiencies and equity capital effect are, in terms of absolute value, large is primarily the fact that the marginal utility of the quasi-short-run profit based on the dynamic actual cost, which is denominator here, is very small, as the degree of relative risk-aversion of banks on the actual cost is high. The GURPs on the actual cost are affected by risk attitude. As compared to the stable equity capital effect, the risk-adjustment effect is unstable, indicating that the cost and price inefficiencies are destabilizing.

4.10 EGLIs on the Cost Frontier and the Actual Cost

As shown in Tables 4.9.1 and 4.9.2, based on the signs of the GURPs on the cost frontier and the dynamic actual marginal variable costs, short-term and long-term loans ($j = SL, LL$), securities ($j = S$), and time deposits ($j = TD$) are considered to be outputs, whereas cash ($j = C$), the amount due from banks and call loans ($j = CL$), other financial assets ($j = A$), demand deposits ($j = DD$), and call money and borrowed money ($j = CM$) are considered fixed inputs. Certificates of deposit and other liabilities ($j = CD$) are considered to be a fixed input on the cost frontier, whereas they are considered to be an output on the actual cost. We narrow our focus to the imperfect output market, which is more important from the perspective of industrial organization, and consider the markets for short-term and long-term loans ($j = SL, LL$) and time deposits ($j = TD$).

From Homma (2018, Definition 14, p. 46), the EGLI on the cost frontier, denoted by $EGLI^{F}_{j,i,t}$, is defined as

$$EGLI^{F}_{j,i,t} = \frac{p^{SURF}_{j,i,t} - MC^{DFV}_{j,i,t}}{p^{SURF}_{j,i,t}} = -\frac{\eta^{BPF}_{j,i,t} + MRS^{BPF\pi}_{e,i,t} + \varpi^{BPF}_{j,i,t}}{p^{SURF}_{j,i,t}}, \quad j = SL, LL, TD, \quad (4.10.1)$$

where $MC^{DFV}_{j,i,t}$ is the dynamic frontier marginal variable cost in Eq. (3.1.3.2.16e) and all others are as per the GURP on the cost frontier in Eq. (4.9.1a).[7]

Similarly, on the basis of Homma (2018, Definition 15, pp. 46-47), the EGLI on the actual cost, denoted by $EGLI^{A}_{j,i,t}$, is defined as

$$EGLI^{A}_{j,i,t} = \frac{p^{SURA}_{j,i,t} - MC^{DAV}_{j,i,t}}{p^{SURA}_{j,i,t}} = \frac{PIE_{j,i,t} - \left(\eta^{BPA}_{j,i,t} + MRS^{BPA\pi}_{e,i,t} + \varpi^{BPA}_{j,i,t}\right)}{p^{SURA}_{j,i,t}}, \quad j = SL, LL, \quad (4.10.2a)$$

$$EGLI^{A}_{j,i,t} = \frac{p_{G,t} \cdot r^{FA}_{i,t} \big/ \left(1 + r^{FA}_{i,t}\right) - MC^{DAV}_{j,i,t}}{p_{G,t} \cdot r^{FA}_{i,t} \big/ \left(1 + r^{FA}_{i,t}\right)} = \frac{PIE_{j,i,t} - \left\{\eta^{BPA}_{j,i,t} + MRS^{BPA\pi}_{e,i,t} + \varpi^{BPA}_{j,i,t} + p_{G,t} \cdot h^{R}_{j,i,t} \big/ \left(1 + r^{FA}_{i,t}\right)\right\}}{p_{G,t} \cdot r^{FA}_{i,t} \big/ \left(1 + r^{FA}_{i,t}\right)}, \quad j = TD, \quad (4.10.2b)$$

where $MC^{DAV}_{j,i,t}$ is the dynamic actual marginal variable cost in Eq. (3.1.3.2.16a), $PIE_{j,i,t}$ is the dynamic price inefficiency (normalized by the marginal utility of quasi-short-run profits based on dynamic actual cost) in Eq. (3.1.3.2.8a), $p_{G,t}$ is the general price index, $h^{R}_{j,i,t}$ is the certain or predictable component of the stochastic dynamic endogenous holding-cost rate, $r^{FA}_{i,t}$ is the reference rate on the actual cost, and all others are as per the GURP on the actual cost in Eq. (4.9.2a).[8]

[7] In accordance with the notation in the present section, the order of subscripts i and j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, Definition 14, p. 46) is omitted.

[8] In accordance with the notation in the present section, the order of subscripts i and

The reason that the EGLI of the time deposits on the actual cost (i.e., $EGLI^{A}_{TD,i,t}$) is defined as Eq. (4.10.2b) is that the sign of the dynamic actual marginal variable cost of the time deposits is positive (i.e., $MC^{DAV}_{TD,i,t} > 0$) and the sign of the SURP of the time deposits on the actual cost is negative (i.e., $p^{SURA}_{TD,i,t} = p_{G,t} \cdot \left(r^{FA}_{i,t} - h^{R}_{TD,i,t}\right) / \left(1 + r^{FA}_{i,t}\right) < 0$); thus, $p_{G,t} \cdot r^{FA}_{i,t} / \left(1 + r^{FA}_{i,t}\right)$ is regarded as the price of the time deposits that are considered to be an output.

Table 4.10.1 shows the estimates of the EGLIs on the cost frontier and the actual cost for the entire period. Table 4.10.2 shows the estimates of the EGLIs of the long-term loans on the actual cost in each period. The reason that Table 4.10.2 gives these values is that only the EGLIs of the long-term loans on the actual cost show signs of the SURPs that are consistent with those of the dynamic marginal variable costs in all periods.

<<Insert Table 4.10.1 about here>>
<<Insert Table 4.10.2 about here>>

From Table 4.10.1, we can infer the following:

1. Although there are no examples of studies comparing EGLIs on the cost frontier and the actual cost, all EGLIs are at least larger than 0.6, indicating that the markets for short-term and long-term loans and time deposits in the Japanese regional banking industry are uncompetitive.

2. For each component ratio in the EGLI on the cost frontier, the component ratios of the equity capital effects are positive and largest for short-term and long-term loans, indicating that the equity capital effects are crucial factors increasing the EGLIs (i.e., decreasing the degree of competition) of the short-term and long-term loans on the cost frontier. The positive equity capital effects in the EGLIs on the cost frontier mean negative equity capital effects in the GURPs on the cost frontier, making this the leading cause of increasing the EGLIs (i.e., decreasing the degree of competition) of the short-term and long-term

j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, Definition 15, pp. 46-47) is omitted.

loans on the cost frontier, resulting in a state in which the effect of reducing the risk of the burden of financial distress costs is less than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. On the other hand, it is the risk-adjustment effects that result in component ratios that are negative and, in terms of absolute value, largest; thus, they are the crucial factors that decrease the EGLIs (i.e., increase the degree of competition) of the short-term and long-term loans on the cost frontier. The negative risk-adjustment effects in the EGLIs on the cost frontier mean positive risk-adjustment effects in the GURPs on the cost frontier, making this the leading cause of decreasing the EGLIs of the short-term and long-term loans on the cost frontier (i.e., increasing the degree of competition of the short-term and long-term loans on the cost frontier), resulting in a state in which the uncertainty factors, $\zeta_{j,i,t+1}$ ($j = SL, LL$), decrease due to an increase in equity capital. For time deposits, the component ratio of the equity capital effect is negative and, in terms of absolute value, large, making this the leading cause of decreasing the EGLI (i.e., increasing the degree of competition) of the time deposits on the cost frontier, resulting in a state in which the effect of reducing the risk of the burden of financial distress costs is greater than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. In contrast, the component ratio of the risk-adjustment effect is positive and largest, making this the leading cause of increasing the EGLI (i.e., decreasing the degree of competition) of the time deposits on the cost frontier, resulting in a state in which the uncertainty factor, $\zeta_{TD,i,t+1}$, decreases due to an increase in equity capital. Compared to the component ratios of the equity capital and risk-adjustment effects, the component ratio of the market structure and conduct effect, which has a prominent role in conventional industrial organization, is, in terms of absolute value, very small.

3. In contrast to the EGLI on the cost frontier, for each component ra-

tio in the EGLI on the actual cost, the component ratios of the risk-adjustment effects are positive, and largest, for short-term and long-term loans, making the risk-adjustment effects the crucial factors increasing the EGLIs of the short-term and long-term loans on the actual cost (i.e., decrease the degree of competition of the short-term and long-term loans on the actual cost). This is the leading cause of increasing their EGLIs (i.e., decreasing the degree of competition) on the actual cost, resulting in a state in which the risks (variances) of quasi-short-run profits based on dynamic actual cost in the next period increase due to an increase in the short-term or long-term loans in the current period. The component ratios of the dynamic price inefficiencies are positive and second largest to those of the risk-adjustment effects for short-term and long-term loans, making the dynamic price inefficiencies the second most crucial factors that increase their EGLIs (i.e., decrease the degrees of competition) on the actual cost. The positive price inefficiencies mean that these financial goods are short, indicating that this shortage is the second leading cause of increasing their EGLIs (i.e., decreasing the degrees of competition) on the actual cost. In contrast to the EGLI on the cost frontier, it is the equity capital effects where the component ratios are negative and, in terms of absolute value, largest, making them the crucial factors that decrease the EGLIs (i.e., increase the degrees of competition) of the short-term and long-term loans on the actual cost. This is the leading cause of decreasing their EGLIs (i.e., increasing the degrees of competition) on the actual cost, resulting in a state in which the effect of reducing the risk of the burden of financial distress costs is greater than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. With respect to time deposits, in contrast to the case of short-term and long-term loans, it is the equity capital effect where the component ratio is positive and largest, meaning that this is the crucial factor that increases the EGLI (i.e., decreases the degree of competition) of time deposits on the actual cost. This is the leading cause of increasing the EGLI (i.e., decreasing the degree of competition) of time deposits on the actual cost, resulting in a state in which the effect of reducing the risk of the burden of financial distress costs is less than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. On the other hand, it is the risk-adjustment effect where the component ratio is negative and, in terms of absolute value, largest, that makes it the most crucial factor in decreasing the EGLI (i.e., increases the degree of competition) of the time deposits on the actual cost. This is the leading cause of decreasing the EGLI (i.e., increasing the degree of competition) on the actual cost that the risks (variances) of quasi-short-run profits based on dynamic actual cost in the next period decrease due to an increase in the time deposits in the current period. It is this dynamic price inefficiency that makes the component ratio also negative and, in terms of absolute value, second to the component ratio of the risk-adjustment effect and thus the second crucial factor in decreasing their EGLI (i.e., increasing the degree of competition) on the actual cost. The negative price inefficiency means that the time deposits are over, making this surplus the second leading cause of decreasing their EGLIs (i.e., increasing the degrees of competition) on the actual cost. Similar to the EGLI on the cost frontier, the component ratio of the market structure and conduct effect, which has a prominent role in conventional industrial organization, is, in terms of absolute value, very small compared to the component ratios of the equity capital and risk-adjustment effects.

4. Comparing the EGLI on the cost frontier with the EGLI on the actual cost, the former is smaller than the latter for short-term and long-term loans; consequently, the cost and price inefficiencies increase their EGLI (i.e., decrease the degree of competition). In particular, the EGLI of the short-term loans largely increases, while the increase in the EGLI of the long-term loans is very small. The reason for this is that the degree to which the sum of the component ratios of the positive dynamic price inefficiency and risk-adjustment effect is larger than the absolute value of the equity capital effect is greater in the case of short-term loans,

although the component ratio of the equity capital effect in the EGLI of the short-term loans on the actual cost is negative and, in terms of absolute value, larger than for the long-term loans. With respect to time deposits, a rigorous comparison between the EGLI on the cost frontier and the EGLI on the actual cost is impossible, as the output price of the time deposits on the cost frontier is different from that on the actual cost.

Finally, from Table 4.10.2, the EGLI of the long-term loans on the actual cost, which is the degree of competition of a representative bank operating with average efficiency, indicates an upward trend for the entire period (i.e., the degree of competition of these banks on the actual cost shows a downward trend over the entire period). The reason for this is that the degree to which the component ratio of the positive dynamic price inefficiency is larger than the sum of the component ratios of the negative equity capital and risk-adjustment effects gradually increases over the entire period, other than the 1976-1986 period (i.e., the period before the bubble). Thus, dynamic price inefficiency gradually becomes important. What is needed is industrial organization policy that aims not only at the decrease of the EGLI on the cost frontier, which mainly implies the truth of competition, but also at the decrease of the EGLI on the actual cost, which mainly implies the actuality of competition. In the 1976-1986 period, the reason that the EGLI of the long-term loans on the actual cost is smallest is that the degree to which the component ratio of the positive dynamic price inefficiency and risk-adjustment effect is larger than the negative equity capital effect is small.

4.11 Tests of the Efficient Structure and Quiet-Life Hypotheses

From Homma (2018, p. 59), the efficient structure hypothesis is a composite that suggests three stages of causal relations—from firm efficiency to firm growth (i.e., the first stage), then to market structure (i.e., the second stage), and finally to market performance (i.e., the third stage). There is no scope for improving on Demsetz (1973) vis-à-vis the first stage causality from firm efficiency to firm growth. As noted by Homma et al. (2014), this first stage causality is the fundamental feature of the efficient structure hypothesis; consequently, this paper also regards this causality as the efficient structure hypothesis. Specifically, on the basis of Homma (2018, Definition 17, p. 59), under the assumption that the planned optimal financial good equals the actual optimal financial good (i.e., $q^{p}_{j,i,t} = q_{j,i,t}$), if the optimal financial good (e.g., the optimal loan) in the current period increases because of improved dynamic cost efficiency in the previous period (i.e., $\partial q_{j,i,t} / \partial EF^{D}_{i,t-1} > 0$), then the efficient structure hypothesis is accepted.[9] From Homma (2018, Proposition 5, p. 60), $\partial q_{j,i,t} / \partial EF^{D}_{i,t-1}$ is expressed as follows:

$$\frac{\partial q_{j,i,t}}{\partial EF^{D}_{i,t-1}} = \left[\left[\frac{\partial p^{GURF}_{j,i,t}}{\partial EF^{D}_{i,t-1}} - \left\{EF^{D}_{i,t} + \left(\frac{\partial \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t}}\right)^{-1}\right\} \cdot \frac{\partial MC^{DAV}_{j,i,t}}{\partial EF^{D}_{i,t-1}}\right] \cdot \left(\frac{\partial \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t}}\right)^{2} \right.$$
$$\left. + MC^{DAV}_{j,i,t} \cdot \frac{\partial^{2} \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t-1} \partial EF^{D}_{i,t}}\right] \Big/ \left[\left[\frac{\partial p^{GURF}_{j,i,t}}{\partial q_{j,i,t}} - \left\{EF^{D}_{i,t} + \left(\frac{\partial \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t}}\right)^{-1}\right\} \cdot \frac{\partial MC^{DAV}_{j,i,t}}{\partial q_{j,i,t}}\right] \right.$$
$$\left. \cdot \left(\frac{\partial \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t}}\right)^{2} + MC^{DAV}_{j,i,t} \cdot \frac{\partial^{2} \ln C^{DAV}_{i,t}}{\partial q_{j,i,t} \partial EF^{D}_{i,t}}\right], \quad (4.11.1)$$

where $EF^{D}_{i,t-1}$ and $EF^{D}_{i,t}$ are defined as Eq. (3.1.2.3), $p^{GURF}_{j,i,t}$ is defined as Eq. (4.9.1), $C^{DAV}_{i,t}$ is expressed as Eq. (3.1.2.1.1), $MC^{DAV}_{j,i,t}$ is expressed as Eq. (3.1.3.2.16a), and $\partial p^{GURF}_{j,i,t} / \partial X$ ($X = EF^{D}_{i,t-1}$ or $q_{j,i,t}$) is expressed as

$$\frac{\partial p^{GURF}_{j,i,t}}{\partial X} = \frac{\partial p^{SURF}_{j,i,t}}{\partial X} + \frac{\partial \eta^{BPF}_{j,i,t}}{\partial X} + \frac{\partial MRS^{BPF\pi}_{e,i,t}}{\partial X} + \frac{\partial \varpi^{BPF}_{j,i,t}}{\partial X}. \quad (4.11.2)$$

From Homma (2018, p. 68), the quiet-life hypothesis concerns the relationship between market concentration and firm efficiency. Similar to Homma et al. (2014), this is regarded as the relationship between the Herfindahl index and dynamic cost efficiency. Specifically, on the basis of Homma (2018, Definition 18, p. 68), if dynamic cost efficiency in the current period de-

[9]In accordance with the notation in the present section, the order of subscripts i and j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, Section 3, pp. 57-70) is omitted.

creases because of an increase in the Herfindahl index in the previous period (i.e., $\partial EF_{i,t}^{D}/\partial HI_{L,t-1} < 0$), then the quiet-life hypothesis is accepted. From Homma (2018, Proposition 7, p. 69), $\partial EF_{i,t}^{D}/\partial HI_{L,t-1}$ is expressed as

$$\frac{\partial EF_{i,t}^{D}}{\partial HI_{L,t-1}} = \left[\left[\frac{\partial p_{LL,i,t}^{GURF}}{\partial HI_{L,t-1}} - \left\{EF_{i,t}^{D} + \left(\frac{\partial \ln C_{i,t}^{DAV}}{\partial EF_{i,t}^{D}}\right)^{-1}\right\} \cdot \frac{\partial MC_{LL,i,t}^{DAV}}{\partial HI_{L,t-1}}\right] \cdot \left(\frac{\partial \ln C_{i,t}^{DAV}}{\partial EF_{i,t}^{D}}\right)^{2} + MC_{LL,i,t}^{DAV} \cdot \frac{\partial^{2} \ln C_{i,t}^{DAV}}{\partial HI_{L,t-1}\partial EF_{i,t}^{D}}\right] \Bigg/ \left\{MC_{LL,i,t}^{DAV} \cdot \left(\frac{\partial \ln C_{i,t}^{DAV}}{\partial EF_{i,t}^{D}}\right)^{2}\right\}, \quad (4.11.3)$$

where $HI_{L,t-1}$ is the Herfindahl index of loans (i.e., the sum of the short-term and long-term loans) in the previous period, $\partial p_{LL,i,t}^{GURF}/\partial HI_{L,t-1}$ is expressed as

$$\frac{\partial p_{LL,i,t}^{GURF}}{\partial HI_{L,t-1}} = \frac{\partial p_{LL,i,t}^{SURF}}{\partial HI_{L,t-1}} + \frac{\partial \eta_{LL,i,t}^{BPF}}{\partial HI_{L,t-1}} + \frac{\partial MRS_{e,i,t}^{BPF\pi}}{\partial HI_{L,t-1}} + \frac{\partial \varpi_{LL,i,t}^{BPF}}{\partial HI_{L,t-1}}, \quad (4.11.4)$$

and all others are as per Eq. (4.11.1).

Table 4.11.1 shows the estimates of Eq. (4.11.1) over the entire period; Table 4.11.2 shows the estimates of Eq. (4.11.3) in each period.

<<Insert Table 4.11.1 about here>>
<<Insert Table 4.11.2 about here>>

From Table 4.11.1, $\partial q_{j,i,t}/\partial EF_{i,t-1}^{D}$ for all financial assets other than other financial assets (i.e., $j = SL, LL, S, C, CL$) are not significant or are significantly negative ($p = 0.068$), and thus the efficient structure hypothesis is not accepted for the Japanese regional banking industry. Although $\partial q_{j,i,t}/\partial EF_{i,t-1}^{D}$ for other financial assets (i.e., $j = A$) is significantly positive, these other financial assets are regarded as a fixed input in Tables 4.9.1 and 4.9.2; thus, we will not refer to this factor further. However, from Table 4.11.2, the values of $\partial EF_{i,t}^{D}/\partial HI_{L,t-1}$ for all periods are significantly negative ($p < 0.1$), so the quiet-life hypothesis is accepted for the Japanese regional banking industry. According to Homma (2018, pp. 76-77), it is not always possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis; thus, the relation between the quiet-life hypothesis and the EGLI on the cost frontier needs to be empirically clarified.

4.12 Quiet-Life Hypothesis and the EGLI on the Cost Frontier

The relation between the quiet-life hypothesis and the EGLI on the cost frontier is theoretically clarified in Homma (2018, Propositions 13 and 14, pp. 81-82).[10] From Homma (2018, Proposition 13, pp. 81-82), the EGLI on the cost frontier decreases with the Herfindahl index in the previous period (i.e., the degree of competition on the cost frontier increases with it, $\partial EGLI^{F}_{LL,i,t}/\partial HI_{L,t-1} < 0$) if and only if the quiet-life hypothesis is accepted (i.e., $\partial EF^{D}_{i,t}/\partial HI_{L,t-1} < 0$). Thus, the EGLI on the cost frontier increases with dynamic cost efficiency in the "current" period (i.e., $\partial EGLI^{F}_{LL,i,t}/\partial EF^{D}_{i,t} > 0$) under the following assumptions: (A1) the j-th financial good (i.e., long-term loans) is an output (i.e., $p^{SURF}_{LL,i,t} > 0$ and $MC^{DFV}_{LL,i,t} > 0$) and the sign of $MC^{DAV}_{LL,i,t}$ is the same as the sign of $MC^{DFV}_{LL,i,t}$ (i.e., $MC^{DAV}_{LL,i,t} > 0$); and (A2) the following inequality holds:

$$\frac{MC^{DFV}_{LL,i,t}}{p^{SURF}_{LL,i,t}} \cdot \frac{\partial p^{SURF}_{LL,i,t}}{\partial HI_{L,t-1}} < \frac{\partial p^{GURF}_{LL,i,t}}{\partial HI_{L,t-1}} < MH_{LL,i,t},$$

where $MH_{LL,i,t}$ is expressed as

$$\begin{aligned} MH_{LL,i,t} \;=\; & \left\{ EF^{D}_{i,t} + \left(\frac{\partial \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t}} \right)^{-1} \right\} \cdot \frac{\partial MC^{DAV}_{LL,i,t}}{\partial HI_{L,t-1}} \\ & - MC^{DAV}_{LL,i,t} \cdot \frac{\partial^2 \ln C^{DAV}_{i,t}}{\partial HI_{L,t-1} \partial EF^{D}_{i,t}} \Bigg/ \left(\frac{\partial \ln C^{DAV}_{i,t}}{\partial EF^{D}_{i,t}} \right)^{2} \qquad (4.12.1) \end{aligned}$$

and all others are as per Eq. (4.11.3).

[10] In accordance with the notation in the present section, hereafter the order of subscripts i and j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, Propositions 13 and 14, pp. 81-82) is omitted.

Similarly, from Homma (2018, Proposition 14, p. 82), the EGLI on the cost frontier increases with the Herfindahl index in the previous period (i.e., the degree of competition on the cost frontier decreases, $\partial EGLI^{F}_{LL,i,t} / \partial HI_{L,t-1} > 0$) if and only if the quiet-life hypothesis is accepted (i.e., $\partial EF^{D}_{i,t} / \partial HI_{L,t-1} < 0$). The EGLI on the cost frontier decreases with dynamic cost efficiency in the "current" period (i.e., $\partial EGLI^{F}_{LL,i,t} / \partial EF^{D}_{i,t} < 0$) under the following assumptions: (A3) assumption (A1) holds; and (A4) the following inequality holds:

$$\frac{\partial p^{GURF}_{LL,i,t}}{\partial HI_{L,t-1}} < \min\left(MH_{LL,i,t}, \frac{MC^{DFV}_{LL,i,t}}{p^{SURF}_{LL,i,t}} \cdot \frac{\partial p^{SURF}_{LL,i,t}}{\partial HI_{L,t-1}} \right),$$

where $MH_{LL,i,t}$ is expressed as Eq. (4.12.1) and all others are as per Eq. (4.11.3).

Table 4.12.1 shows the relation between the quiet-life hypothesis and the EGLI on the cost frontier.

<<Insert Table 4.12.1 about here>>

From this table, the above assumptions (A3) and (A4) hold, so the EGLI on the cost frontier increases with the Herfindahl index in the previous period (i.e., the degree of competition on the cost frontier decreases, $\partial EGLI^{F}_{LL,i,t} / \partial HI_{L,t-1} > 0$) if and only if the quiet-life hypothesis is accepted (i.e., $\partial EF^{D}_{i,t} / \partial HI_{L,t-1} < 0$). Consequently, it is possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis in the Japanese regional banking industry.

4.13 Intertemporal Regular Linkages

Homma (2018, pp. 85-101) theoretically clarified the relations between the efficient structure and quiet-life hypotheses and the intertemporal regular linkages (i.e., cyclical linkages, monotonic trending linkages, and terminal up-and-down volatile linkages) of single-period dynamic cost efficiencies, single-period optimal planned financial goods, single-period Herfindahl indices, and single-period EGLIs on the cost frontier. As these linkages serve to allow long-term forecasts and long-term dynamic analyses, they are critical from the perspective of industrial organization. In this subsection, these linkages in the Japanese regional banking industry are empirically clarified.[11]

4.13.1 Intertemporal Regular Linkage of Single-Period Dynamic Cost Efficiencies

The intertemporal regular linkage of single-period dynamic cost efficiencies is defined in Homma (2018, Definition 20, p. 85). The relations between this linkage and the efficient structure and quiet-life hypotheses are clarified in Homma (2018, Propositions 15 to 18, pp. 85-89).

Table 4.13.1 shows this linkage.

<<Insert Table 4.13.1 about here>>

From the table, the assumptions (A0), (B1), and (B2) in Homma (2018, Proposition 16, pp. 86-87) hold, as the average loans are not large and only the quiet-life hypothesis is accepted (i.e., the efficient structure hypothesis is not accepted), meaning that this linkage (i.e., the cyclical linkage) exists in all periods. To add detail, the estimates of $\partial EF^D_{i,t-1+2T} \big/ \partial EF^D_{i,t-1}$ decrease with T and become almost zero at $T = 14$. The estimates of $\partial EF^D_{i,t-2+2T} \big/ \partial EF^D_{i,t-3+2T}$ are also extremely small (the estimates are from 3.9034×10^{-8} to 5.3065×10^{-7}). As explained below, this indicates that the linkage leads to convergence and is fixed at the value in the initial period (i.e., 0.2939). This value is second smallest in all periods; thus, this linkage fixes the single-period dynamic cost efficiencies at a small value. This is one reason for the structural inefficiency mentioned in Subsections 4.1 and 4.2. Consequently, this linkage is judged to be undesirable to Japanese regional banks.

The above is explained as follows: First, $\partial EF^D_{i,t-2+2T} \big/ \partial EF^D_{i,t-3+2T}$ and

[11] In accordance with the notation in the present section, hereafter the order of subscripts i and j is reversed. Furthermore, for the purpose of simplification, the symbol "*" in Homma (2018, pp. 32-83) is omitted.

$\partial EF^D_{i,t-1+2T} \,/ \partial EF^D_{i,t-1}$ can be approximately expressed as

$$\frac{\partial EF^D_{i,t-2+2T}}{\partial EF^D_{i,t-3+2T}} \approx \frac{\triangle EF^D_{i,t-2+2T}}{\triangle EF^D_{i,t-3+2T}} = \frac{EF^D_{i,t-2+2T} - EF^D_{i,t-3+2T}}{EF^D_{i,t-3+2T} - EF^D_{i,t-4+2T}}, \tag{4.13.1.1a}$$

$$\frac{\partial EF^D_{i,t-1+2T}}{\partial EF^D_{i,t-1}} \approx \frac{\triangle EF^D_{i,t-1+2T}}{\triangle EF^D_{i,t-1}} = \frac{EF^D_{i,t-1+2T} - EF^D_{i,t-2+2T}}{EF^D_{i,t-1} - EF^D_{i,t-2}}. \tag{4.13.1.1b}$$

Transforming Eq. (4.13.1.1a) with respect to $EF^D_{i,t-2+2T}$ and then rearranging gives

$$EF^D_{i,t-2+2T} \approx EF^D_{i,t-3+2T} + \frac{\partial EF^D_{i,t-2+2T}}{\partial EF^D_{i,t-3+2T}} \cdot \left(EF^D_{i,t-3+2T} - EF^D_{i,t-4+2T}\right). \tag{4.13.1.2}$$

Next, considering this equation from the t period gives

$$EF^D_{i,t-2+2T} = EF^D_{i,t}, \quad (\text{for } T = 1), \tag{4.13.1.3a}$$

$$EF^D_{i,t-2+2T} \approx EF^D_{i,t-3+2T} + \frac{\partial EF^D_{i,t-2+2T}}{\partial EF^D_{i,t-3+2T}} \cdot \left(EF^D_{i,t-3+2T} - EF^D_{i,t-4+2T}\right), \quad (\text{for } T \geq 2). \tag{4.13.1.3b}$$

Transforming Eq. (4.13.1.1b) with respect to $EF^D_{i,t-1+2T}$ and then rearranging gives

$$EF^D_{i,t-1+2T} \approx EF^D_{i,t-2+2T} + \frac{\partial EF^D_{i,t-1+2T}}{\partial EF^D_{i,t-1}} \cdot \left(EF^D_{i,t-1} - EF^D_{i,t-2}\right), \quad (\text{for } T \geq 1). \tag{4.13.1.4}$$

As mentioned above, the estimates of $\partial EF^D_{i,t-1+2T} \,/ \partial EF^D_{i,t-1}$ decrease with T, becoming almost zero at $T = 14$. Furthermore, the estimates of $\partial EF^D_{i,t-2+2T}$ $/ \partial EF^D_{i,t-3+2T}$ are also extremely small. Therefore, Equations (4.13.1.3b) and

(4.13.1.4) can be approximately expressed as

$$EF^D_{i,t-2+2T} \approx EF^D_{i,t-3+2T}, \quad (\text{for } T \geq 2), \tag{4.13.1.5a}$$
$$EF^D_{i,t-1+2T} \approx EF^D_{i,t-2+2T}, \quad (\text{for } T \geq 1). \tag{4.13.1.5b}$$

From these equations and Eq. (4.13.1.3a), Eq. (4.13.1.5b) is approximately expressed as

$$EF^D_{i,t-1+2T} \approx EF^D_{i,t}, \quad (\text{for } T = 1), \tag{4.13.1.6a}$$
$$EF^D_{i,t-1+2T} \approx EF^D_{i,t-2+2T} \approx EF^D_{i,t-3+2T}, \ (\text{for } T \geq 2). \tag{4.13.1.6b}$$

From Eq. (4.13.1.6a), for $T = 1$, $EF^D_{i,t-1+2T} = EF^D_{i,t+1} \approx EF^D_{i,t}$. From Eq. (4.13.1.6b), for $T = 2$, $EF^D_{i,t+3} \approx EF^D_{i,t+2} \approx EF^D_{i,t+1}$. Therefore, $EF^D_{i,t+3} \approx EF^D_{i,t+2} \approx EF^D_{i,t+1} \approx EF^D_{i,t}$. Similarly, for $T \geq 3$, $EF^D_{i,t-1+2T} \approx \cdots \approx EF^D_{i,t+5} \approx EF^D_{i,t+4} \approx EF^D_{i,t+3} \approx EF^D_{i,t+2} \approx EF^D_{i,t+1} \approx EF^D_{i,t}$. Consequently, for all T, $EF^D_{i,t-1+2T} \approx EF^D_{i,t}$.

4.13.2 Intertemporal Regular Linkage of Single-Period Optimal Financial Goods

The intertemporal regular linkage of single-period optimal financial goods is defined in Homma (2018, Definition 21, pp. 89-90). The relations between this linkage and the efficient structure and quiet-life hypotheses are clarified in Homma (2018, Propositions 19 to 22, pp. 89-92).

Table 4.13.2 shows this linkage.

<<Insert Table 4.13.2 about here>>

From the table, assumptions (E0), (B1), and (D2) in Homma (2018, Proposition 20, pp. 91-92) hold for a similar reason to that for assumptions (B1) and (B2) in the intertemporal regular linkage of single-period dynamic cost efficiencies, indicating that this linkage (i.e., the cyclical linkage) exists in all periods. In more detail, the estimates of $\partial q_{LL,i,t+2T} / \partial q_{LL,i,t}$ decrease with T and become almost zero at $T = 14$. The estimates of $\partial q_{LL,i,t-1+2T} / \partial q_{LL,i,t-2+2T}$ are also extremely small (the estimates range from

6.5236×10^{-8} to 4.7888×10^{-7}). Similar to the intertemporal regular linkage of single-period dynamic cost efficiencies, this means that this linkage leads to convergence and is fixed at the value in the initial period (i.e., 150449.1692). This value is the smallest in all periods, indicating that this linkage fixes single-period optimal financial goods (i.e., long-term loans) at the smallest value. Consequently, this linkage is judged to be undesirable to Japanese regional banks.

4.13.3 Intertemporal Regular Linkage of Single-Period Herfindahl Indices

The intertemporal regular linkage of single-period Herfindahl indices is defined in Homma (2018, Definition 22, p. 93). The relations between this linkage and the efficient structure and quiet-life hypotheses are clarified in Homma (2018, Propositions 23 to 26, pp. 93-96).

Table 4.13.3 shows this linkage.

<<Insert Table 4.13.3 about here>>

From the table, assumptions (H0), (F1), and (D2) in Homma (2018, Proposition 24, pp. 94-95) hold for a similar reason to that for assumptions (B1) and (B2) in the intertemporal regular linkage of single-period dynamic cost efficiencies, indicating that this linkage (i.e., the cyclical linkage) exists in all periods, similar to the single-period dynamic cost efficiencies and single-period optimal financial goods. To add detail, the estimates of $\partial HI_{L,t+2T} / \partial HI_{L,t}$ decrease with T and become almost zero at $T = 14$. Furthermore, the estimates of $\partial HI_{L,t-1+2T} / \partial HI_{L,t-2+2T}$ are also extremely small (i.e., the estimates range from 5.6891×10^{-8} to 4.8465×10^{-7}). Similar to the intertemporal regular linkages of single-period dynamic cost efficiencies and single-period optimal financial goods, this means that this linkage leads to convergence and is fixed at the value in the initial period (i.e., 0.5157). This value is sixth smallest in all periods, indicating that the linkage fixes the Herfindahl indices of loans at a small value. Consequently, this linkage is judged to be desirable to Japanese regional banks, in contrast to the intertemporal regular linkages of single-period dynamic cost efficiencies and single-period optimal financial goods.

4.13.4 Intertemporal Regular Linkage of Single-Period EGLIs on the Cost Frontier

The intertemporal regular linkage of single-period EGLIs on the cost frontier is defined in Homma (2018, Definition 23, pp. 96-97). The relations between this linkage and the efficient structure and quiet-life hypotheses are clarified in Homma (2018, Propositions 27 to 30, pp. 96-100).

Table 4.13.4 shows the linkage of the single-period EGLIs of long-term loans on the cost frontier on the basis of the intertemporal regular linkage of single-period dynamic cost efficiencies.

<<Insert Table 4.13.4 about here>>

From this table, assumptions (SA1) and (SA2) in Homma (2018, Proposition 28, pp. 98-99) hold for a similar reason to that for assumptions (B1) and (B2) in the intertemporal regular linkage of single-period dynamic cost efficiencies, meaning that this linkage (i.e., the cyclical linkage) exists in periods 1977-1981, 1989-2001, and 2005-2009. In these periods, the estimates of $\partial EGLI^{F}_{LL,i,t+2T} / \partial EGLI^{F}_{LL,i,t}$ decrease dramatically with T. The estimates of $\partial EGLI^{F}_{LL,i,t-1+2T} / \partial EGLI^{F}_{LL,i,t-2+2T}$ are also extremely small. Similar to the intertemporal regular linkages of single-period dynamic cost efficiencies, single-period optimal financial goods, and single-period Herfindahl indices, this means that this linkage leads to convergence and is fixed at the values in the initial periods (i.e., 0.8113, 0.9129, and 0.9694). Since these values are much larger than the smallest value in all periods (i.e., 0.2849), this linkage fixes single-period EGLIs on the cost frontier at large values (i.e., the single-period degrees of competition on the cost frontier are fixed at small values). Consequently, this linkage is judged to be undesirable to Japanese regional banks, similar to the intertemporal regular linkages of single-period dynamic cost efficiencies and single-period optimal financial goods.

5 Conclusions

Based on the GURM constructed by Homma (2009, 2012, 2018), this paper explored the empirical implications of the quiet-life hypothesis in the Japanese regional banking industry by empirically clarifying a number of research topics that are crucial for the industrial organization of banking, including static and dynamic cost unneutral efficiencies, the degrees of relative risk-aversions of banks on the cost frontier and the actual cost, reference rates on the cost frontier and the actual cost, the dynamic price inefficiency of each financial good, the GURPs on the cost frontier and the actual cost, the EGLIs on the cost frontier and the actual cost, tests of the efficient structure and quiet-life hypotheses, the relation between the quiet-life hypothesis and the EGLI on the cost frontier, and the intertemporal regular linkages of single-period dynamic cost efficiencies, single-period optimal financial goods, single-period Herfindahl indices, and single-period EGLIs on the cost frontier. The study's major results, along with conclusions, are summarized below:

1. The quiet-life hypothesis is accepted, but the efficient structure hypothesis is not accepted in the Japanese regional banking industry. Furthermore, the EGLI on the cost frontier increases (i.e., the degree of competition on the cost frontier decreases) with the Herfindahl index in the previous period if and only if the quiet-life hypothesis is accepted, meaning that it is possible to justify anti-monopoly and anti-concentration policies using support for the quiet-life hypothesis in the Japanese regional banking industry.

2. The intertemporal regular linkages (i.e., the cyclical linkages) of single-period dynamic cost efficiencies, single-period optimal financial goods, single-period Herfindahl indices, and single-period EGLIs on the cost frontier exist in the Japanese regional banking industry, as the average loans are not large and only the quiet-life hypothesis is accepted (i.e., the efficient structure hypothesis is not accepted). However, this linkage of the single-period EGLIs of long-term loans on the cost frontier on the basis of the linkage of single-period dynamic cost efficiencies leads

to convergence and is fixed at the very large values in the initial periods. Consequently, this linkage is judged to be undesirable to Japanese regional banks, similar to the linkages of single-period dynamic cost efficiencies and single-period optimal financial goods.

Other major results include the following:

3. Similar to the static cost unneutral efficiency, the mean of the dynamic cost unneutral efficiency is 0.311, indicating that there is substantial inefficiency in the Japanese regional banking industry. Furthermore, contrary to the static cost unneutral efficiency, the dynamic cost unneutral efficiency shows a rising trend over 41 years. However, the improvement in the dynamic cost unneutral efficiency is very small (i.e., less than 5%) over this period. Therefore, even if we regard the economic behavior of regional banks as intertemporally dynamic, structural inefficiency is still observed. Under the present conditions, it is very difficult to drastically improve the dynamic cost unneutral efficiency of Japanese regional banks.

4. The estimates of the degree of relative risk-aversion of banks on the cost frontier are very small and not significant, meaning that these banks are risk-neutral in all periods. However, the estimates of the degree of relative risk-aversion of banks on the actual cost are significantly positive in the periods other than 1976-1986 (i.e., the period before the bubble), indicating that these banks are risk-averse in these periods.

5. The effect of equity capital on the reference rate on the cost frontier is larger than its effect on the reference rate on the actual cost, meaning that the reference rate on the cost frontier is higher than the reference rate on the actual cost. Furthermore, although the subjective rate of time preference is lower than the call rate, the reference rate on the cost frontier is higher than the call rate because of the effect of equity capital. The effect of equity capital on the reference rate on the actual cost is, however, small; thus, the reference rate on the actual cost is lower than the call rate.

6. For the entire period, the dynamic price inefficiencies of all financial goods are significant ($p \leq 0.1$), meaning that these inefficiencies exist. In comparing these inefficiencies with the absolute values of the dynamic actual marginal variable costs, the former is much larger than the latter. Furthermore, the dynamic price inefficiencies of the financial assets are positive, while those of the liabilities are negative. Therefore, the former is short, while the latter is over, indicating equity capital is short.

7. For each effect in the GURP on the actual cost, similar to each effect in the GURP on the cost frontier, the equity capital effect and the risk-adjustment effect are, in terms of absolute value, large, while the market structure and conduct effect is very small. Contrary to the GURP on the cost frontier, the signs of the equity capital effects of the financial assets are positive, while the signs of the liabilities are negative. For the financial assets (or liabilities), this is because the effect of reducing the risk of the burden of financial distress costs is greater (or less) than the effect of increasing the opportunity, transaction, and agency costs of equity capital, and diminishing earnings prospects. On the other hand, the signs of the risk-adjustment effects of the financial assets are negative, while those of the liabilities are positive. In the actual situation in which cost and price inefficiencies exist, the risks (variances) of quasi-short-run profits based on the dynamic actual cost in the next period increase due to an increase in financial assets in the current period, while they decrease due to an increase in liabilities in the current period. Therefore, they increase due to an increase in equity capital in the current period. For the financial assets (or liabilities), the positive (or negative) equity capital effect is, in terms of absolute value, significantly larger than the negative (or positive) risk-adjustment effect.

8. Although there are no examples of studies comparing the EGLIs on the cost frontier and the actual cost, all EGLIs are at least larger than 0.6, indicating that the markets for short-term and long-term loans and time

deposits in the Japanese regional banking industry are uncompetitive. Furthermore, comparing the EGLI on the cost frontier with the EGLI on the actual cost, the former is smaller than the latter for short-term and long-term loans, so the cost and price inefficiencies increase their EGLI (i.e., decrease the degree of competition). Notably, the EGLI of short-term loans increases substantially, while the increase of the EGLI of long-term loans is very small. The reason for this is that the degree to which the sum of the component ratios of the positive dynamic price inefficiency and risk-adjustment effect is larger than the absolute value of the equity capital effect for the long-term loan is greater than for short-term loans, although the component ratio of the equity capital effect in the EGLI of short-term loans on the actual cost is negative and, in terms of absolute value, larger than that of long-term loans. With respect to time deposits, a rigorous comparison of the EGLI on the cost frontier and the EGLI on the actual cost is impossible, as the output price of time deposits on the cost frontier is different from that on the actual cost.

9. The intertemporal regular linkage (i.e., the cyclical linkage) of single-period dynamic cost efficiencies exists in the Japanese regional banking industry because the average loans are not large and only the quiet-life hypothesis is accepted (i.e., the efficient structure hypothesis is not accepted). However, this linkage leads to convergence and is fixed at the small value in the initial period. This is one reason for the structural inefficiency. Consequently, this linkage is judged to be undesirable for Japanese regional banks.

6 Appendix: Endogenous and Exogenous State Variables and Components of Stochastic Dynamic Endogenous Holding-Revenue Rates and Holding-Cost Rates

As stated in Subsection 3.1.1.2, the real balance of financial goods $q_{j,i,t}$ ($j \in \{SL, LL, S, C, CL, A, DD, TD, CM, CD\}$) consists of short-term loans ($j = SL$), long-term loans ($j = LL$), securities ($j = S$), cash ($j = C$), amount due from banks and call loans ($j = CL$), other financial assets ($j = A$), demand deposits ($j = DD$), time deposits ($j = TD$), call money and borrowed money ($j = CM$), and certificates of deposit and other liabilities ($j = CD$). Thus, these financial goods become the endogenous state variables. The data for these financial goods used here, as well as the creation of the data and the sources of the data, are mostly the same as in Homma (2012, pp. 22-24, p. 92). The differences between this paper and Homma (2012, pp. 22-24, p. 92) are as follows: First, as stated below, the general price index ($p_{G,t+1}$) is the GDP deflator for the finance and insurance sector in this paper, whereas it is the GDP deflator for all sectors in Homma (2012, pp. 22-24, p. 92). Second, certificates of deposit and other liabilities are a financial good (i.e., an output or a fixed input) in this paper, whereas they are a variable input in Homma (2012, pp. 22-24, p. 92).

According to Homma (2018, pp. 25-33), the exogenous state variable vector ($\mathbf{z}_{i,t}$ ($= \mathbf{z}^{\pi}_{i,t}$)) comprises the vector of exogenous variables ($\mathbf{z}^{DH}_{i,t-1}$), which have an impact on the certain or predictable components of the SDEHRR and SDEHCR, the vector ($\boldsymbol{\zeta}_{i,t}$) comprising the uncertain or unpredictable components of the SDEHRR and SDEHCR, the general price index ($p_{G,t}$), the input price vector ($\mathbf{p}_{i,t}$), the vector ($\mathbf{z}^{Q}_{i,t}$) affecting the quality of financial goods, the vector of Herfindahl indices ($\mathbf{HI}_{t-1}$), the static cost efficiency ($EF^{S}_{i,t-1}$), and the variable ($\tau_{i,t}$), which expresses exogenous technical progress. Among these components, $p_{G,t}$ uses the GDP deflator for the finance and insurance sector as stated above. Furthermore, $\mathbf{p}_{i,t}$ is mostly the same as in Homma (2012, pp. 63-71), other than the certificates of deposit and other liabilities, and $\mathbf{z}^{Q}_{i,t}$ is mostly the same as $\mathbf{z}^{RQ}_{L,i,t}$ and $\mathbf{z}^{RQ}_{D,i,t}$ in Homma (2012, pp. 113-114, p. 121). In addition, $\mathbf{HI}_{t-1}$ is regarded as the Herfindahl index of the sum of the short-term and long-term loans ($HI_{L,t-1}$), and $EF^{S}_{i,t-1}$ was previously explained in Subsection 3.1.1.3. With respect to the data for $\tau_{i,t}$, time trend data are created, and the normalized version of these data is used. The specifications of the components of the SDEHRR and SDEHCR-related $\mathbf{z}^{DH}_{i,t-1}$ and $\boldsymbol{\zeta}_{i,t}$, and their data creation, are mostly the same as Homma (2012, pp. 72-87, pp. 111-122). The differences between this paper and Homma (2012, pp. 72-87, pp. 111-122) are as follows: First, $\mathbf{z}^{DH}_{i,t-1}$ in this paper differs from $\mathbf{z}^{H}_{i,t-1}$ in Homma (2012, pp. 72-87, pp. 111-122) in its inclusion of $\mathbf{HI}_{t-2}$ and $EF^{S}_{i,t-2}$. Second, this paper adds the Herfindahl index of each financial good in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6a), (6.2.3.1.6b), (6.2.3.1.7a), (6.2.3.1.7b), and (6.2.3.2.3); pp. 73-87, pp. 111-122). The specifications of the other components of the SDEHRR and SDEHCR and their data creation are also mostly the same as in Homma (2012, pp. 72-87, pp. 111-122).

Tables 6.1 to 6.9 show the results for the estimations of the modified equations that add the Herfindahl index of each financial good in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6a), (6.2.3.1.6b), (6.2.3.1.7a), (6.2.3.1.7b), and (6.2.3.2.3); pp. 73-87, pp. 111-122).

<<Insert Table 6.1 about here>>
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Table 2.1. Theoretical Concepts Used in This Paper

Theoretical Concept	Source (Homma (2018))
[1] Static Efficient Production Technology Represented by $\phi_i^S\left(\mathbf{q}_{i,t},\mathbf{x}_{i,t},\mathbf{z}_{i,t}^Q,\tau_{i,t}\right)=0$ Given by Eq. (2.1.1.1)	Definition 1, pp. 6-9
[2] Static Frontier Variable Cost Function Denoted by $C_i^{SFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^Q,\tau_{i,t}\right)$ Given by Eq. (2.1.2)	Definition 2, pp. 9-10
[3] Static Actual Variable Cost Function Denoted by $C_i^{SAV}\left(\mathbf{a}_{i,t}^{SIE},\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^Q,\tau_{i,t}\right)$ Given by Eq. (2.1.3.1)	Definition 3, pp. 10-11
[4] Static Cost Efficiency Denoted by $EF_{i,t}^S$ Given by Eq. (2.1.4)	Definition 4, p. 12
[5] Dynamic Efficient Production Technology Represented by $\phi_i^D\left(\mathbf{q}_{i,t},\mathbf{x}_{i,t},\mathbf{z}_{i,t}^Q,b_1\cdot\mathbf{HI}_{t-1},b_1\cdot EF_{i,t-1}^S,\tau_{i,t}\right)=0$ Given by Eq. (2.1.6.1)	Definition 5, pp. 14-17
[6] Dynamic Frontier Variable Cost Function Denoted by $C_i^{DFV}\left(\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^Q,b_1\cdot\mathbf{HI}_{t-1},b_1\cdot EF_{i,t-1}^S,\tau_{i,t}\right)$ Given by Eq. (2.1.7)	Definition 6, pp. 17-18
[7] Dynamic Actual Variable Cost Function Denoted by $C_i^{DAV}\left(\mathbf{a}_{i,t}^{DIE},\mathbf{p}_{i,t},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^Q,b_1\cdot\mathbf{HI}_{t-1},b_1\cdot EF_{i,t-1}^S,\tau_{i,t}\right)$ Given by Eq. (2.1.8.1)	Definition 7, pp. 18-20
[8] Dynamic Cost Efficiency Denoted by $EF_{i,t}^D$	Definition 8, p. 20

Given by Eq. (2.1.9)	
[9] Quasi-Short-Run Profit Based on Dynamic Frontier Cost Denoted by $\pi_i^{QSF}\left(\mathbf{q}_{i,t-1},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{\pi}\right)$ Given by Eqs. (2.2.1.1) and (2.2.1.2)	Definition 9, pp. 25-26
[10] Quasi-Short-Run Profit Based on Dynamic Actual Cost Denoted by $\pi_i^{QSA}\left(\mathbf{a}_{i,t}^{DIE},\mathbf{q}_{i,t-1},\mathbf{q}_{i,t},\mathbf{z}_{i,t}^{\pi}\right)$ Given by Eqs. (2.2.1.3) and (2.2.1.4)	Definition 10, pp. 26-28
[11] Dynamic-Uncertainty Behavior of Financial Firms Formulated as Eqs. (2.2.2.1)-(2.2.2.5)	pp. 28-31
[12] Stochastic Euler Equations Expressed as Eqs. (2.2.2.6) and (2.2.2.8)	pp. 31-33
[13] Risk Corrections Expressed as Eqs. (2.2.3.1)-(2.2.3.5)	Theorems 1 and 2 and Corollaries 1 and 2, pp. 33-41
[14] Generalized User-Revenue Price on the Cost Frontier Denoted by $p_{i,j,t}^{GURF}$ Defined as Eq. (2.2.3.6)	Definition 12, p. 41
[15] Generalized User-Revenue Price on the Actual Cost Denoted by $p_{i,j,t}^{GURA}$ Defined as Eq. (2.2.3.7)	Definition 13, p. 41
[16] Classification of Financial Goods Based on Eqs. (2.2.3.9) and (2.2.3.10)	Remarks 1 and 2, pp. 43-44
[17] Discrepancy Between the SURP and the Dynamic Marginal Variable Cost Expressed as Eqs. (2.2.4.1) and (2.2.4.2)	Remarks 4 and 5, pp. 45-46
[18] Extended Generalized-Lerner Index on the Cost Frontier Denoted by $EGLI_{i,j,t}^{F}$ Defined as Eq. (2.2.4.3)	Definition 14, p. 46
[19] Extended Generalized-Lerner Index on the Actual Cost	Definition 15, pp. 46-47

Denoted by $EGLI_{i,j,t}^{A}$ Defined as Eq. (2.2.4.4)	
[20] Equity Capital Effect on the EGLI Derived as Proposition 2	Proposition 2, pp. 48-49
[21] Risk-Adjustment Effect on the EGLI Derived as Proposition 3	Proposition 3, pp. 49-50
[22] Acceptance of the Efficient Structure Hypothesis Defined as Definition 17	Definition 17, p. 59
[23] Mathematical Formulation of the Efficient Structure Hypothesis Expressed as Eqs. (3.1.1) and (3.1.2)	Proposition 5, pp. 60-66
[24] Acceptance of the Quiet-Life Hypothesis Defined as Definition 18	Definition 18, p. 68
[25] Mathematical Formulation of the Quiet-Life Hypothesis Expressed as Eqs. (3.2.1) and (3.2.2)	Proposition 7, p. 69
[26] Relation between the Efficient Structure Hypothesis and the EGLI on the Cost Frontier Derived as Propositions 11 and 12	Propositions 11 and 12, pp. 77-81
[27] Relation between the Quiet-Life Hypothesis and the EGLI on the Cost Frontier Derived as Propositions 13 and 14	Propositions 13 and 14, pp. 81-84
[28] Intertemporal Regular Linkages of Single-Period Dynamic Cost Efficiencies Defined as Definition 20 Derived as Propositions 15-18	Definition 20 and Propositions 15-18, pp. 85-89
[29] Intertemporal Regular Linkages of Single-Period Optimal Planned Financial Goods Defined as Definition 21 Derived as Propositions 19-22	Definition 21 and Propositions 19-22, pp. 89-92
[30] Intertemporal Regular Linkages of Single-Period Herfindahl Indices Defined as Definition 22 Derived as Propositions 23-26	Definition 22 and Propositions 23-26, pp. 93-96

[31] Intertemporal Regular Linkages of Single-Period EGLIs on the Cost Frontier Defined as Definition 23 Derived as Propositions 27-30	Definition 23 and Propositions 27-30, pp. 96-101

Table 4.1.1 Estimation Results for the Static Variable Cost Function (1)

Parameter	Estimate	t-statistic	p-value
a_{SL}	-0.066216	-0.847734	0.397
$a^{Z}_{SL,1}$	-0.269549	-0.864420	0.387
$a^{Z}_{SL,2}$	0.569746	4.58150	0.000
$a^{Z}_{SL,3}$	-7.74149	-8.97650	0.000
$a^{Z}_{SL,4}$	-0.00430464	-6.00390	0.000
$a^{Z}_{SL,5}$	-0.040755	-0.637239	0.524
$a^{Z}_{SL,6}$	-0.025460	-0.164186	0.870
$a^{Z}_{SL,7}$	-0.184825	-6.57774	0.000
$a^{Z}_{SL,8}$	-0.152645	-5.69405	0.000
$a^{Z}_{SL,9}$	-0.185363	-6.54275	0.000
$a^{Z}_{SL,10}$	-0.144301	-2.31177	0.021
$a^{Z}_{SL,11}$	-0.170097	-4.84907	0.000
$a^{Z}_{SL,12}$	0.301600	5.97710	0.000
$a^{Z}_{SL,13}$	0.231513	5.07295	0.000
a_{LL}	-0.196390	-1.99072	0.047
$a^{Z}_{LL,14}$	0.050022	0.113568	0.910

$a^{Z}_{LL,2}$	-0.806271	-5.27222	0.000
$a^{Z}_{LL,3}$	11.3197	8.70477	0.000
$a^{Z}_{LL,4}$	0.00265785	3.16072	0.002
$a^{Z}_{LL,5}$	0.060059	1.10198	0.270
$a^{Z}_{LL,6}$	-0.069343	-0.360588	0.718
$a^{Z}_{LL,15}$	-0.030694	-1.04792	0.295
$a^{Z}_{LL,16}$	-0.216558	-7.34459	0.000
$a^{Z}_{LL,17}$	0.148570	1.26892	0.204
$a^{Z}_{LL,10}$	-0.120933	-2.13107	0.033
$a^{Z}_{LL,11}$	-0.102698	-2.35385	0.019
$a^{Z}_{LL,12}$	-0.041089	-0.510831	0.609
$a^{Z}_{LL,13}$	0.332514	5.39133	0.000
a_{DD}	-0.179495	-2.88004	0.004
$a^{Z}_{DD,18}$	2.53931	4.07347	0.000
$a^{Z}_{DD,19}$	0.536633	0.740560	0.459
$a^{Z}_{DD,20}$	0.0000612298	7.19731	0.000
$a^{Z}_{DD,16}$	-0.301328	-6.01961	0.000

$a^{Z}_{DD,21}$	-0.031724	-0.335210	0.737
$a^{Z}_{DD,9}$	-0.029689	-0.394256	0.693
$a^{Z}_{DD,12}$	0.067141	1.00222	0.316
$a^{Z}_{DD,13}$	-0.067862	-0.899974	0.368
a_{TD}	0.599851	6.15920	0.000
$a^{Z}_{TD,18}$	-4.55314	-6.00817	0.000
$a^{Z}_{TD,22}$	0.830797	1.15776	0.247
$a^{Z}_{TD,20}$	-0.0000421276	-4.02884	0.000
$a^{Z}_{TD,17}$	-0.416352	-4.53007	0.000
$a^{Z}_{TD,12}$	-0.292924	-3.18021	0.001
$a^{Z}_{TD,13}$	-0.182645	-1.72082	0.085
a_{S}	-0.080789	-1.76039	0.078
$a^{Z}_{S,23}$	0.242795	6.06297	0.000
$a^{Z}_{S,7}$	0.040737	1.57877	0.114
$a^{Z}_{S,16}$	0.195341	6.79893	0.000
$a^{Z}_{S,9}$	-0.053351	-1.76623	0.077
$a^{Z}_{S,10}$	-0.010958	-0.256818	0.797

$a_{S,11}^{Z}$	-0.020409	-0.786811	0.431
$a_{S,12}^{Z}$	0.012762	0.281142	0.779
$a_{S,13}^{Z}$	0.099125	1.60407	0.109
a_{C}	0.065713	2.02683	0.043
$a_{C,12}^{Z}$	0.173777	5.11559	0.000
$a_{C,13}^{Z}$	-0.043241	-1.15954	0.246
a_{CL}	-0.095425	-6.70009	0.000
$a_{CL,24}^{Z}$	-0.058432	-4.70534	0.000
$a_{CL,21}^{Z}$	0.047192	2.27331	0.023
$a_{CL,12}^{Z}$	0.046303	3.38425	0.001
$a_{CL,13}^{Z}$	0.075740	4.23825	0.000
a_{A}	0.021982	1.38715	0.165
$a_{A,23}^{Z}$	-0.105241	-6.14359	0.000
$a_{A,7}^{Z}$	-0.052196	-5.28714	0.000
$a_{A,25}^{Z}$	-0.013175	-1.46948	0.142
$a_{A,12}^{Z}$	0.042045	3.49502	0.000
$a_{A,13}^{Z}$	-0.048181	-2.74594	0.006

a_{CM}	0.00879126	1.89271	0.058
$a^{Z}_{CM,7}$	0.00424175	1.41029	0.158
$a^{Z}_{CM,16}$	-0.00539907	-1.59224	0.111
$a^{Z}_{CM,21}$	0.00318783	1.13484	0.256
$a^{Z}_{CM,17}$	0.032313	3.18863	0.001
$a^{Z}_{CM,9}$	-0.015274	-2.60840	0.009
$a^{Z}_{CM,10}$	0.021210	1.29105	0.197
$a^{Z}_{CM,11}$	0.00149218	0.826799	0.408
$a^{Z}_{CM,12}$	-0.00812527	-3.06708	0.002
$a^{Z}_{CM,13}$	-0.000794310	-0.188331	0.851
a_{CD}	-0.026136	-2.49070	0.013
$a^{Z}_{CD,21}$	0.076220	5.57422	0.000
$a^{Z}_{CD,12}$	0.045703	5.84057	0.000
$a^{Z}_{CD,13}$	0.022314	1.74926	0.080
a_{L}	0.465611	81.5003	0.000
$a^{Z}_{L,14}$	-1.94639	-12.1201	0.000
$a^{Z}_{L,2}$	0.130444	8.62043	0.000

$a_{L,3}^{Z}$	-0.328959	-8.48363	0.000
$a_{L,4}^{Z}$	0.0000500068	0.808888	0.419
$a_{L,5}^{Z}$	-0.036466	-10.7595	0.000
$a_{L,6}^{Z}$	-0.070779	-8.04448	0.000
$a_{L,26}^{Z}$	0.078440	13.0867	0.000
$a_{L,15}^{Z}$	0.011781	3.73989	0.000
$a_{L,27}^{Z}$	0.00288033	1.09322	0.274
$a_{L,18}^{Z}$	0.020083	0.165699	0.868
$a_{L,22}^{Z}$	1.84008	17.5111	0.000
$a_{L,20}^{Z}$	0.00000889181	10.7240	0.000
$a_{L,23}^{Z}$	0.00762292	3.52892	0.000
$a_{L,7}^{Z}$	0.00685699	4.00264	0.000
$a_{L,16}^{Z}$	0.018494	10.6113	0.000
$a_{L,24}^{Z}$	0.012728	6.46645	0.000
$a_{L,21}^{Z}$	0.013168	6.58383	0.000
$a_{L,25}^{Z}$	0.015125	8.11204	0.000
$a_{L,8}^{Z}$	0.017726	9.28188	0.000

$a^Z_{L,17}$	0.010353	5.40454	0.000
$a^Z_{L,9}$	0.015665	7.95542	0.000
$a^Z_{L,10}$	0.024792	13.3333	0.000
$a^Z_{L,11}$	0.00201326	1.20784	0.227
$a^Z_{L,12}$	0.014703	18.0732	0.000
$a^Z_{L,13}$	-0.00908485	-9.46810	0.000
a^B_L	0.000000139326	2.78928	0.005
a_K	0.026286	14.4245	0.000
$a^Z_{K,14}$	0.813718	16.3493	0.000
$a^Z_{K,2}$	-0.100696	-18.1649	0.000
$a^Z_{K,3}$	-0.072205	-4.83364	0.000
$a^Z_{K,4}$	-0.0000848023	-4.00418	0.000
$a^Z_{K,5}$	0.00913486	8.59836	0.000
$a^Z_{K,6}$	-0.011343	-4.46500	0.000
$a^Z_{K,26}$	-0.030135	-17.1420	0.000
$a^Z_{K,15}$	0.000255168	0.339425	0.734
$a^Z_{K,27}$	-0.00762696	-9.77731	0.000

$a^{Z}_{K,18}$	-0.310525	-7.40256	0.000
$a^{Z}_{K,22}$	0.468809	12.7521	0.000
$a^{Z}_{K,20}$	0.00000612644	23.3185	0.000
$a^{Z}_{K,23}$	-0.00285125	-4.61497	0.000
$a^{Z}_{K,7}$	-0.00361315	-8.13486	0.000
$a^{Z}_{K,16}$	-0.00478219	-10.2834	0.000
$a^{Z}_{K,24}$	-0.00345988	-6.54999	0.000
$a^{Z}_{K,21}$	-0.00526147	-9.83077	0.000
$a^{Z}_{K,25}$	-0.00266363	-5.43087	0.000
$a^{Z}_{K,8}$	-0.00224179	-4.47863	0.000
$a^{Z}_{K,17}$	0.00244669	4.46577	0.000
$a^{Z}_{K,9}$	-0.000530782	-0.949721	0.342
$a^{Z}_{K,10}$	-0.00168423	-3.17051	0.002
$a^{Z}_{K,11}$	0.00250338	5.44716	0.000
$a^{Z}_{K,12}$	-0.000271598	-1.13089	0.258
$a^{Z}_{K,13}$	0.000422820	1.39083	0.164
a^{B}_{K}	-0.00000284155	-2.59662	0.009

a_V	0.365819	40.9197	0.000
$a^Z_{V,14}$	2.19861	8.63851	0.000
$a^Z_{V,2}$	-0.099770	-4.26076	0.000
$a^Z_{V,3}$	0.587747	10.0519	0.000
$a^Z_{V,4}$	0.00000936843	0.097482	0.922
$a^Z_{V,5}$	0.047489	9.18499	0.000
$a^Z_{V,6}$	0.122139	8.99219	0.000
$a^Z_{V,26}$	-0.091344	-9.79160	0.000
$a^Z_{V,15}$	-0.018647	-3.80149	0.000
$a^Z_{V,27}$	0.00336613	0.832583	0.405
$a^Z_{V,18}$	0.288706	1.53502	0.125
$a^Z_{V,22}$	-3.35456	-19.6651	0.000
$a^Z_{V,20}$	-0.0000201896	-15.4290	0.000
$a^Z_{V,23}$	-0.00895662	-2.63364	0.008
$a^Z_{V,7}$	-0.00697616	-2.55288	0.011
$a^Z_{V,16}$	-0.023930	-8.61416	0.000
$a^Z_{V,24}$	-0.016295	-5.25496	0.000

$a_{V,21}^{Z}$	-0.015126	-4.74927	0.000
$a_{V,25}^{Z}$	-0.020857	-6.99234	0.000
$a_{V,8}^{Z}$	-0.025350	-8.33185	0.000
$a_{V,17}^{Z}$	-0.018678	-6.17605	0.000
$a_{V,9}^{Z}$	-0.023898	-7.63861	0.000
$a_{V,10}^{Z}$	-0.036951	-12.4439	0.000
$a_{V,11}^{Z}$	-0.00572175	-2.13139	0.033
$a_{V,12}^{Z}$	-0.022663	-18.5470	0.000
$a_{V,13}^{Z}$	0.013741	9.44380	0.000
b_{SLSL}^{QQ}	-0.052677	-1.09659	0.273
b_{SLLL}^{QQ}	-0.154689	-1.82196	0.068
b_{SLDD}^{QQ}	-0.182664	-2.64117	0.008
b_{SLTD}^{QQ}	0.118259	1.28701	0.198
b_{SLS}^{QQ}	0.109666	3.01781	0.003
b_{SLC}^{QQ}	0.014144	0.408419	0.683
b_{SLCL}^{QQ}	0.069564	3.19897	0.001
b_{SLA}^{QQ}	0.010098	0.592139	0.554

b_{SLCM}^{QQ}	-0.00639988	-2.05673	0.040
b_{SLCD}^{QQ}	-0.00300617	-0.319063	0.750
b_{LLLL}^{QQ}	0.377046	2.47792	0.013
b_{LLDD}^{QQ}	-0.361557	-4.26442	0.000
b_{LLTD}^{QQ}	0.016999	0.095417	0.924
b_{LLS}^{QQ}	0.041256	0.591692	0.554
b_{LLC}^{QQ}	-0.067180	-1.25383	0.210
b_{LLCL}^{QQ}	0.015715	0.570930	0.568
b_{LLA}^{QQ}	-0.059816	-2.97243	0.003
b_{LLCM}^{QQ}	0.011488	1.98768	0.047
b_{LLCD}^{QQ}	-0.012947	-1.19133	0.234
b_{DDDD}^{QQ}	0.042329	0.659968	0.509
b_{DDTD}^{QQ}	0.175921	1.84642	0.065
b_{DDS}^{QQ}	-0.00174850	-0.050611	0.960
b_{DDC}^{QQ}	0.349253	8.72299	0.000
b_{DDCL}^{QQ}	-0.079620	-3.33704	0.001
b_{DDA}^{QQ}	0.068621	3.71159	0.000

b^{QQ}_{DDCM}	-0.013299	-3.29676	0.001
b^{QQ}_{DDCD}	-0.00355730	-0.432579	0.665
b^{QQ}_{TDTD}	-0.102783	-0.436384	0.663
b^{QQ}_{TDS}	-0.320626	-5.60770	0.000
b^{QQ}_{TDC}	0.177220	2.50363	0.012
b^{QQ}_{TDCL}	-0.137705	-3.69691	0.000
b^{QQ}_{TDA}	0.031098	1.16614	0.244
b^{QQ}_{TDCM}	0.00982662	1.69188	0.091
b^{QQ}_{TDCD}	0.027140	1.73579	0.083
b^{QQ}_{SS}	-0.00282189	-0.997410	0.319
b^{QQ}_{SC}	-0.092455	-3.30815	0.001
b^{QQ}_{SCL}	0.127110	6.33939	0.000
b^{QQ}_{SA}	-0.00127490	-0.122089	0.903
b^{QQ}_{SCM}	0.000992523	1.21046	0.226
b^{QQ}_{SCD}	0.00772131	1.59413	0.111
b^{QQ}_{CC}	-0.280853	-8.34414	0.000
b^{QQ}_{CCL}	0.018289	1.36173	0.173

b_{CA}^{QQ}	-0.021257	-2.24807	0.025
b_{CCM}^{QQ}	0.00664656	2.74394	0.006
b_{CCD}^{QQ}	0.00436546	1.16566	0.244
b_{CLCL}^{QQ}	-0.038922	-4.51447	0.000
b_{CLA}^{QQ}	0.00260025	0.395380	0.693
b_{CLCM}^{QQ}	0.000232716	0.164240	0.870
b_{CLCD}^{QQ}	-0.012518	-3.25520	0.001
b_{AA}^{QQ}	0.000195627	0.053260	0.958
b_{ACM}^{QQ}	-0.00316116	-3.23898	0.001
b_{ACD}^{QQ}	0.00119278	0.565178	0.572
b_{CMCM}^{QQ}	0.00112193	3.04675	0.002
b_{CMCD}^{QQ}	-0.00191958	-4.79606	0.000
b_{CDCD}^{QQ}	0.00574286	4.29348	0.000
b_{LL}^{PP}	0.176916	178.466	0.000
b_{LK}^{PP}	-0.00697449	-24.1753	0.000
b_{LV}^{PP}	-0.095456	-40.0888	0.000
b_{KK}^{PP}	0.00513515	42.4851	0.000

b_{KV}^{PP}	0.00726881	14.9032	0.000
b_{VV}^{PP}	0.088187	35.5484	0.000
b_{LL}^{B}	$-0.154093 \times 10^{-13}$	-0.112851	0.910
b_{LK}^{B}	0.179141×10^{-6}	2.90810	0.004
b_{KK}^{B}	0.623060×10^{-10}	2.75272	0.006
b_{SLL}^{QP}	-0.00101838	-0.778451	0.436
b_{SLK}^{QP}	0.00306635	9.69072	0.000
b_{SLV}^{QP}	-0.00157121	-0.798586	0.425
b_{LLL}^{QP}	-0.047203	-27.3383	0.000
b_{LLK}^{QP}	-0.00680957	-12.0455	0.000
b_{LLV}^{QP}	0.080677	30.7482	0.000
b_{DDL}^{QP}	-0.00436649	-2.65623	0.008
b_{DDK}^{QP}	-0.00210325	-4.50320	0.000
b_{DDV}^{QP}	0.00898148	3.57329	0.000
b_{TDL}^{QP}	0.030367	14.1981	0.000
b_{TDK}^{QP}	0.013317	23.2963	0.000
b_{TDV}^{QP}	-0.061111	-19.0033	0.000

b_{SL}^{QP}	-0.000485226	-0.601367	0.548
b_{SK}^{QP}	0.000889330	5.48431	0.000
b_{SV}^{QP}	-0.000159417	-0.124105	0.901
b_{CL}^{QP}	0.00747509	11.4623	0.000
b_{CK}^{QP}	-0.00136884	-5.63703	0.000
b_{CV}^{QP}	-0.010254	-10.5445	0.000
b_{CLL}^{QP}	0.00289726	6.30252	0.000
b_{CLK}^{QP}	0.00185801	14.0623	0.000
b_{CLV}^{QP}	-0.00643604	-9.12661	0.000
b_{AL}^{QP}	-0.00217770	-4.70350	0.000
b_{AK}^{QP}	-0.00230740	-15.9054	0.000
b_{AV}^{QP}	0.00577636	8.18255	0.000
b_{CML}^{QP}	-0.000514735	-5.78139	0.000
b_{CMK}^{QP}	0.0000273818	1.30504	0.192
b_{CMV}^{QP}	0.000775004	5.37457	0.000
b_{CDL}^{QP}	0.00223646	20.2966	0.000
b_{CDK}^{QP}	0.0000397092	0.850256	0.395

b_{CDV}^{QP}	-0.00353084	-20.4632	0.000
b_{SLT}^{QT}	-0.00186255	-0.472929	0.636
b_{LLT}^{QT}	-0.024610	-4.55758	0.000
b_{DDT}^{QT}	0.029609	5.82113	0.000
b_{TDT}^{QT}	0.023694	3.11970	0.002
b_{ST}^{QT}	-0.00529425	-1.37377	0.170
b_{CT}^{QT}	-0.012020	-4.55914	0.000
b_{CLT}^{QT}	0.00332698	2.26682	0.023
b_{AT}^{QT}	-0.00129790	-1.12819	0.259
b_{CMT}^{QT}	-0.000205179	-0.897953	0.369
b_{CDT}^{QT}	-0.00149982	-2.44734	0.014
b_{LT}^{PT}	-0.00319700	-19.8305	0.000
b_{KT}^{PT}	0.00133996	18.9201	0.000
b_{VT}^{PT}	0.00360776	14.4307	0.000
R-squared	Variable Cost Function		0.990316
	Share of Labor		0.502177
	Share of Physical Capital		0.849422
Number of Observations	4821		

Order of MA for the Error Term	3
Test for Overidentification [p-value]	1124.33 [0.483]
Value Function	0.233216

Note: 1. Tables 4.1.1 and 4.1.2 show the results for the simultaneous GMM estimation of the static variable cost function in Eq. (3.1.1.2.1a) with the static cost share equations in Eq. (3.1.1.2.2). Table 4.1.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies in Eq. (3.1.1.2.1b), while Table 4.1.2 shows the estimates of these coefficients.

2. The details of Eq. (3.1.1.2.1c) are as follows:

$$a_{SL}\left(\mathbf{z}_{SL,i,t}^{Q}\right) = a_{SL} + \sum_{h=1}^{13} a_{SL,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{LL}\left(\mathbf{z}_{LL,i,t}^{Q}\right) = a_{LL} + \sum_{h\in\{2-6,10-17\}} a_{LL,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{DD}\left(\mathbf{z}_{DD,i,t}^{Q}\right) = a_{DD} + \sum_{h\in\{9,12,13,16,18-21\}} a_{DD,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{TD}\left(\mathbf{z}_{TD,i,t}^{Q}\right) = a_{TD} + \sum_{h\in\{12,13,17,18,20,22\}} a_{TD,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{S}\left(\mathbf{z}_{S,i,t}^{Q}\right) = a_{S} + \sum_{h\in\{7,9-13,16,23\}} a_{S,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{C}\left(\mathbf{z}_{C,i,t}^{Q}\right) = a_{C} + \sum_{h\in\{12,13\}} a_{C,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{CL}\left(\mathbf{z}_{CL,i,t}^{Q}\right) = a_{CL} + \sum_{h\in\{12,13,21,24\}} a_{CL,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{A}\left(\mathbf{z}_{A,i,t}^{Q}\right) = a_{A} + \sum_{h\in\{7,12,13,16,23,25\}} a_{A,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{CM}\left(\mathbf{z}_{CM,i,t}^{Q}\right) = a_{CM} + \sum_{h\in\{7,9-13,16,17,21\}} a_{CM,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{CD}\left(\mathbf{z}_{CD,i,t}^{Q}\right) = a_{CD} + \sum_{h\in\{12,13,21\}} a_{CD,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{j}\left(\mathbf{z}_{j,i,t}^{Q}\right) = a_{j} + \sum_{h\in\{2-18,20-27\}} a_{j,h}^{Z} \cdot z_{h,i,t}^{Q} , \quad j \in \{L, K, V\} ,$$

where $z_{h,i,t}^{Q}$ ($h = 1, \ldots, 27$) are the short-term prime rate ($h = 1$), the capital ratio of borrower firms ($h=2$), the loan loss provision rate ($h=3$), the loan per case ($h=4$), the proportion of loans for small and medium firms ($h=5$), the Herfindahl index of loan proportions classified by industry ($h=6$), the regional dummy in the Tohoku area, which takes a value of unity if the bank concerned operates in the Tohoku area ($h=7$), the regional dummy in the Kinki area ($h=8$), the regional dummy in the Chugoku area ($h=9$), the regional dummy in the Sikoku area ($h=10$), the regional dummy in the Kyusyu area ($h=11$), the bank dummy in the second-tier regional banks, which takes a value of unity if the bank concerned is the member bank of the Second Association of Regional Banks ($h=12$), the bank dummy in the large banks, which takes a value of unity if the total financial asset of the bank concerned is larger than that of the average bank ($h=13$), the long-term prime rate ($h=14$), the proportion of loans secured by real estate ($h=15$), the regional dummy in the Kanto area ($h=16$), the regional dummy in the Sanin area ($h=17$), the yield on government bonds ($h=18$), the postal savings interest rate of ordinary savings ($h=19$), the TOPIX ($h=20$), the regional dummy in the Hokuriku area ($h=21$), the postal savings interest rate of postal savings certificates ($h=22$), the regional dummy in the Hokkaido area ($h=23$), the regional dummy in the Koshinetsu area ($h=24$), the regional dummy in the Tokai area ($h=25$), the proportion of loans for real estate business ($h=26$), and the proportion of loans without collateral and without warranty ($h=27$).

3. The conditional heteroskedasticity of the error term is explicitly controlled. Furthermore, autocorrelation is corrected when it is found. When including the moving average of the error term in the estimate of the covariance matrix of the orthogonality conditions, we use Bartlett's spectral density kernel proposed by Newey and West (1987) in order to guarantee that the estimate of the covariance matrix is a positive definite matrix.
4. The endogeneity of some variables is taken into account by using different instrumental variables for each equation. For these instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and its square, the products of these dummies and its cube, and the logarithms of the financial goods in the previous period and the factor prices in the current period for all equations, the endogenous quality variables in the previous period, and the exogenous quality variables in the current period for all static cost share equations, the products of these quality variables and the logarithms of the factor prices in the current period, and the products of regional dummies and their logarithms for the

static variable cost function and each static cost share equation, the products of the logarithms of the financial goods in the previous period and their quality variables, the products of the logarithms of their financial goods and the regional dummies, the products of two logarithms of their financial goods, the products of the logarithms of their financial goods and factor prices, the products of the logarithms of their financial goods and the normalized time trend, the products of two logarithms of their factor prices, the products of the logarithms of their factor prices and the normalized time trend, and other control dummies for the static variable cost function.

5. The estimates of parameters related to the current goods price ($p^*_{V,i,t}$) are calculated from the condition of linear homogeneity with respect to factor prices.
6. The number of the samples that violate the concavity conditions for factor prices is 2456 out of 4821 (the number of all samples), meaning that these samples account for 51 percent of all the samples. How to decrease these samples is a task for the future.

Table 4.1.2 Estimation Results for the Static Variable Cost Function (2): $a_i\left(\tau_t^*\right)$

Parameter	Estimate	t-statistic	p-value
Yachiyo Bank (The present Kiraboshi Bank) (i=1)			
a_1	9.96356	202.231	0.000
a_{1T}	-0.00526458	-0.641420	0.521
a_{1TT}	0.00143251	3.41901	0.001
Hokkaido Bank (i=2)			
a_2	10.2639	300.331	0.000
a_{2T}	-0.023094	-5.64369	0.000
a_{2TT}	0.0000684312	0.383869	0.701
a_{2TTT}	0.0000555944	5.49672	0.000
Aomori Bank (i=3)			
a_3	10.0791	415.996	0.000
a_{3T}	-0.00677500	-1.96167	0.050
a_{3TT}	-0.000614175	-4.37060	0.000
a_{3TTT}	0.0000162395	2.37089	0.018
Seiwa Bank (i=4)			
Seiwa Bank and Michinoku Bank (i=5)			
a_5	9.91569	329.970	0.000

a_{5T}	-0.027141	-6.60947	0.000
a_{5TT}	-0.000212129	-1.43204	0.152
a_{5TTT}	0.0000775778	6.89049	0.000
Akita Bank (*i*=6)			
a_6	10.1444	326.317	0.000
a_{6T}	-0.000418649	-0.103401	0.918
a_{6TT}	-0.000674003	-4.58082	0.000
a_{6TTT}	0.00000514880	0.676109	0.499
Ugo Bank (*i*=7)			
a_7	9.35105	134.709	0.000
a_{7T}	-0.010133	-1.67859	0.093
Hokuto Bank (*i*=8)			
a_8	9.90237	225.845	0.000
a_{8T}	-0.048300	-7.14359	0.000
a_{8TT}	0.00108252	4.05583	0.000
Shonai Bank (*i*=9)			
a_9	9.28031	143.113	0.000
a_{9T}	-0.012355	-3.03993	0.002

a_{9TT}	0.000286994	1.67645	0.094
a_{9TTT}	0.0000381170	4.42171	0.000
Yamagata Bank (*i*=10)			
a_{10}	9.91825	280.717	0.000
a_{10T}	-0.00149482	-0.401233	0.688
a_{10TT}	-0.000190834	-1.40554	0.160
a_{10TTT}	0.0000116254	1.77826	0.075
Bank of Iwate (*i*=11)			
a_{11}	10.0801	278.542	0.000
a_{11T}	0.00435416	1.15036	0.250
a_{11TT}	-0.000312264	-2.25953	0.024
a_{11TTT}	-0.00000186823	-0.277954	0.781
Tohoku Bank (*i*=12)			
a_{12}	9.11257	124.747	0.000
a_{12T}	-0.010671	-2.37998	0.017
a_{12TT}	0.000168102	1.17084	0.242
a_{12TTT}	-0.0000152320	-1.75595	0.079
77 Bank (*i*=13)			

a_{13}	10.7706	326.236	0.000
a_{13T}	-0.00806930	-1.87545	0.061
a_{13TT}	-0.000449692	-3.07443	0.002
a_{13TTT}	0.0000239369	3.80545	0.000
Toho Bank (i=14)			
a_{14}	10.3505	538.990	0.000
a_{14T}	-0.00869740	-2.19536	0.028
a_{14TT}	-0.000393887	-2.61222	0.009
a_{14TTT}	0.0000570794	7.03506	0.000
Gunma Bank (i=15)			
a_{15}	10.7691	243.020	0.000
a_{15T}	0.022400	5.20881	0.000
a_{15TT}	0.000270677	1.70652	0.088
a_{15TTT}	0.0000233087	2.86079	0.004
Ashikaga Bank (i=16)			
a_{16}	10.9161	196.942	0.000
a_{16T}	0.010469	2.37439	0.018
a_{16TT}	-0.000187543	-1.09260	0.275

a_{16TTT}	0.0000312545	3.26138	0.001
Joyo Bank (i=17)			
a_{17}	11.1271	173.504	0.000
a_{17T}	0.012650	2.85317	0.004
a_{17TT}	-0.000128485	-0.827923	0.408
a_{17TTT}	0.0000265568	3.26030	0.001
Kanto Bank (i=18)			
a_{18}	9.34024	150.700	0.000
a_{18T}	0.00613546	0.989867	0.322
a_{18TT}	0.000117794	0.304641	0.761
Kanto Tsukuba Bank (i=19)			
a_{19}	9.65756	177.532	0.000
Tsukuba Bank (i=20)			
a_{20}	10.3460	158.147	0.000
Musashino Bank (i=21)			
a_{21}	10.1565	438.097	0.000
a_{21T}	0.035989	6.79220	0.000
a_{21TT}	-0.0000824707	-0.501102	0.616
a_{21TTT}	0.00000974839	0.943228	0.346

Chiba Bank (i=22)			
a_{22}	11.2785	145.856	0.000
a_{22T}	0.015245	2.66202	0.008
a_{22TT}	0.0000291784	0.176063	0.860
a_{22TTT}	0.0000679844	7.80967	0.000
Chiba Kogyo Bank (i=23)			
a_{23}	9.88517	344.061	0.000
a_{23T}	0.010790	2.61614	0.009
a_{23TT}	-0.000707411	-3.81199	0.000
a_{23TTT}	0.0000491459	4.39731	0.000
Tokyo Tomin Bank (i=24)			
a_{24}	9.99108	289.428	0.000
a_{24T}	0.00616984	1.24124	0.215
a_{24TT}	-0.0000682049	-0.288087	0.773
a_{24TTT}	0.0000387549	3.30618	0.001
Bank of Yokohama (i=25)			
a_{25}	11.6151	127.009	0.000
a_{25T}	0.012902	2.12209	0.034

a_{25TT}	0.000382616	2.37212	0.018
a_{25TTT}	0.0000503604	5.22541	0.000
Daishi Bank (*i*=26)			
a_{26}	10.3742	348.457	0.000
a_{26T}	-0.00166379	-0.474368	0.635
a_{26TT}	0.000171813	1.28771	0.198
a_{26TTT}	0.0000276352	3.66290	0.000
Hokuetsu Bank (*i*=27)			
a_{27}	9.89886	264.611	0.000
a_{27T}	0.00278647	0.788458	0.430
a_{27TT}	-0.000126946	-0.800725	0.423
a_{27TTT}	0.0000107735	1.42239	0.155
Yamanashi Chuo Bank (*i*=28)			
a_{28}	10.1344	422.296	0.000
a_{28T}	0.012869	3.15840	0.002
a_{28TT}	-0.000334718	-2.16852	0.030
a_{28TTT}	-0.0000121351	-1.54791	0.122
Hachijuni Bank (*i*=29)			

a_{29}	10.7595	252.920	0.000
a_{29T}	-0.00727303	-1.91840	0.055
a_{29TT}	-0.000297248	-2.01387	0.044
a_{29TTT}	0.0000402860	4.44528	0.000
Hokuriku Bank (*i*=30)			
a_{30}	10.5263	143.262	0.000
a_{30T}	-0.00920207	-1.68922	0.091
a_{30TT}	0.000525455	3.16151	0.002
a_{30TTT}	-0.00000749293	-0.511165	0.609
Bank of Toyama (*i*=31)			
a_{31}	9.23041	36.5521	0.000
a_{31T}	0.020247	3.20969	0.001
a_{31TT}	0.00103077	3.80877	0.000
a_{31TTT}	-0.000130089	-8.00408	0.000
Hokkoku Bank (*i*=32)			
a_{32}	10.3230	341.655	0.000
a_{32T}	0.013243	2.39827	0.016
a_{32TT}	-0.000152975	-0.877905	0.380

a_{32TTT}	-0.0000619405	-4.45098	0.000
Fukui Bank (i=33)			
a_{33}	10.0873	247.822	0.000
a_{33T}	-0.00653242	-1.25283	0.210
a_{33TT}	0.000181907	1.06025	0.289
a_{33TTT}	-0.00000624911	-0.573875	0.566
Shizuoka Bank (i=34)			
a_{34}	10.9199	205.303	0.000
a_{34T}	-0.00586314	-1.45634	0.145
a_{34TT}	-0.0000344612	-0.221118	0.825
a_{34TTT}	0.0000100770	1.43746	0.151
Suruga Bank (i=35)			
a_{35}	10.1807	414.012	0.000
a_{35T}	-0.010665	-2.31073	0.021
a_{35TT}	0.000126616	0.766524	0.443
a_{35TTT}	0.00000602080	0.595744	0.551
Shimizu Bank (i=36)			
a_{36}	9.54964	213.870	0.000

a_{36T}	-0.00184323	-0.470252	0.638
a_{36TT}	0.000286358	1.76582	0.077
a_{36TTT}	-0.0000143954	-1.88753	0.059
Ogaki Kyoritsu Bank (*i*=37)			
a_{37}	10.2861	385.051	0.000
a_{37T}	0.010154	2.65258	0.008
a_{37TT}	-0.0000260522	-0.164877	0.869
a_{37TTT}	0.00000418993	0.577019	0.564
Juroku Bank (*i*=38)			
a_{38}	10.3335	345.948	0.000
a_{38T}	-0.00275882	-0.659027	0.510
a_{38TT}	0.000319827	2.18210	0.029
a_{38TTT}	0.0000326021	3.91673	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
a_{39}	10.5240	141.510	0.000
Mie Bank (*i*=40)			
a_{40}	9.56148	202.084	0.000
a_{40T}	0.00581544	1.45733	0.145

a_{40TT}	0.000375145	2.34967	0.019
a_{40TTT}	0.00000646261	0.796256	0.426
Hyakugo Bank (i=41)			
a_{41}	10.3398	333.267	0.000
a_{41T}	0.00439978	1.29989	0.194
a_{41TT}	-0.000194852	-1.40638	0.160
a_{41TTT}	0.00000342139	0.570437	0.568
Shiga Bank (i=42)			
a_{42}	10.4890	395.894	0.000
a_{42T}	-0.00269146	-0.788310	0.431
a_{42TT}	-0.000344738	-2.49619	0.013
a_{42TTT}	0.00000767547	1.17749	0.239
Bank of Kyoto (i=43)			
a_{43}	10.5778	334.682	0.000
a_{43T}	0.00364627	0.879037	0.379
a_{43TT}	0.000215228	1.39929	0.162
a_{43TTT}	0.0000314315	4.19094	0.000
Osaka Bank (i=44)			

a_{44}	10.0912	331.693	0.000
a_{44T}	-0.020746	-3.72658	0.000
a_{44TT}	-0.00241199	-4.43708	0.000
Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			
a_{45}	10.4574	186.799	0.000
Senshu Bank (*i*=46)			
a_{46}	9.66587	242.372	0.000
a_{46T}	-0.010690	-2.06436	0.039
a_{46TT}	-0.000315415	-0.881549	0.378
a_{46TTT}	0.0000393240	1.83265	0.067
Ikeda Bank (*i*=47)			
a_{47}	9.78865	239.840	0.000
a_{47T}	-0.012711	-2.42818	0.015
a_{47TT}	0.000107359	0.326884	0.744
a_{47TTT}	0.000117638	5.61050	0.000
Senshu Ikeda Bank (*i*=48)			
a_{48}	10.4094	142.342	0.000
Nanto Bank (*i*=49)			
a_{49}	10.5634	321.457	0.000

a_{49T}	0.000471875	0.123150	0.902
a_{49TT}	-0.000664754	-4.63510	0.000
a_{49TTT}	0.0000197522	2.75212	0.006
Kiyo Bank (*i*=50)			
a_{50}	10.3483	368.980	0.000
a_{50T}	-0.014476	-3.66198	0.000
a_{50TT}	-0.000653906	-2.31665	0.021
a_{50TTT}	0.0000436642	2.86375	0.004
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
a_{51}	10.2435	147.233	0.000
a_{51T}	0.00440866	0.854849	0.393
Tajima Bank (*i*=52)			
a_{52}	9.24107	129.848	0.000
a_{52T}	-0.013889	-3.04316	0.002
a_{52TT}	-0.000352411	-2.21163	0.027
a_{52TTT}	0.0000203722	2.17741	0.029
Tottori Bank (*i*=53)			
a_{53}	9.32165	93.8781	0.000

a_{53T}	-0.014056	-2.11962	0.034
a_{53TT}	-0.0000189014	-0.110325	0.912
a_{53TTT}	0.0000136014	1.39555	0.163
San-in Godo Bank (*i*=54)			
a_{54}	10.4368	136.141	0.000
a_{54T}	0.021511	2.74500	0.006
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			
a_{55}	10.5511	295.338	0.000
a_{55T}	-0.010091	-1.62727	0.104
a_{55TT}	-0.000155228	-0.601575	0.547
Chugoku Bank (*i*=56)			
a_{56}	10.8218	235.435	0.000
a_{56T}	0.010787	1.67104	0.095
a_{56TT}	0.000176573	0.974332	0.330
a_{56TTT}	0.00000452775	0.457556	0.647
Hiroshima Bank (*i*=57)			
a_{57}	11.0004	202.245	0.000
a_{57T}	-0.00598330	-1.21250	0.225

a_{57TT}	-0.000271204	-1.61317	0.107
a_{57TTT}	0.0000443713	5.00351	0.000
Yamaguchi Bank (*i*=58)			
a_{58}	10.6812	262.657	0.000
a_{58T}	-0.000996227	-0.222755	0.824
a_{58TT}	-0.000968242	-6.17165	0.000
a_{58TTT}	-0.00000764299	-1.08138	0.280
Awa Bank (*i*=59)			
a_{59}	10.0312	344.075	0.000
a_{59T}	0.00817748	1.60981	0.107
a_{59TT}	-0.000549759	-3.56651	0.000
a_{59TTT}	0.00000486336	0.662852	0.507
Hyakujushi Bank (*i*=60)			
a_{60}	10.3664	185.397	0.000
a_{60T}	0.00632375	1.35467	0.176
a_{60TT}	-0.000340232	-2.08701	0.037
a_{60TTT}	0.0000226105	3.28932	0.001
Iyo Bank (*i*=61)			

a_{61}	10.7317	150.583	0.000
a_{61T}	0.035215	5.14959	0.000
Iyo Bank (merged with the Toho Sogo Bank) (*i*=62)			
a_{62}	10.5670	227.494	0.000
a_{62T}	0.00998014	1.64672	0.100
a_{62TT}	0.000342760	1.14066	0.254
Shikoku Bank (*i*=63)			
a_{63}	10.2484	242.971	0.000
a_{63T}	-0.00662037	-1.53985	0.124
a_{63TT}	-0.000857181	-4.86744	0.000
a_{63TTT}	0.0000187273	2.63661	0.008
Bank of Fukuoka (*i*=64)			
a_{64}	11.0497	209.133	0.000
a_{64T}	-0.00287703	-0.530933	0.595
a_{64TT}	0.000323958	1.91542	0.055
a_{64TTT}	0.0000552470	5.18730	0.000
Chikuho Bank (*i*=65)			
a_{65}	8.78222	93.6991	0.000

a_{65T}	-0.00636566	-1.35697	0.175
a_{65TT}	0.000229416	1.20602	0.228
a_{65TTT}	0.0000256164	2.68817	0.007
Bank of Saga (*i*=66)			
a_{66}	9.91589	316.201	0.000
a_{66T}	0.012478	3.35850	0.001
a_{66TT}	-0.000521322	-3.63127	0.000
a_{66TTT}	-0.0000111058	-1.56002	0.119
Eighteenth Bank (*i*=67)			
a_{67}	10.1390	467.224	0.000
a_{67T}	0.00953107	2.45685	0.014
a_{67TT}	-0.000528268	-3.70273	0.000
a_{67TTT}	-0.0000116874	-1.48891	0.137
Shinwa Bank (*i*=68)			
a_{68}	10.0656	326.216	0.000
a_{68T}	0.00579403	1.96650	0.049
a_{68TT}	-0.000127453	-0.583978	0.559
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			

a_{69}	10.6242	111.364	0.000
a_{69T}	-0.040513	-5.47911	0.000
Higo Bank (*i*=70)			
a_{70}	10.4435	423.340	0.000
a_{70T}	0.00493275	1.43524	0.151
a_{70TT}	-0.000742493	-5.40757	0.000
a_{70TTT}	0.0000379835	5.11772	0.000
Oita Bank (*i*=71)			
a_{71}	10.1984	392.554	0.000
a_{71T}	0.00167925	0.392501	0.695
a_{71TT}	-0.000405866	-2.81469	0.005
a_{71TTT}	0.0000155418	2.45672	0.014
Miyazaki Bank (*i*=72)			
a_{72}	9.89597	335.755	0.000
a_{72T}	0.018335	4.78862	0.000
a_{72TT}	0.0000443408	0.327367	0.743
a_{72TTT}	0.00000396133	0.551187	0.582
Kagoshima Bank (*i*=73)			

a_{73}	10.3913	570.916	0.000
a_{73T}	0.015139	3.94751	0.000
a_{73TT}	-0.000447673	-3.33858	0.001
a_{73TTT}	0.00000402849	0.544676	0.586
Bank of Ryukyu (i=74)			
a_{74}	10.0001	257.856	0.000
a_{74T}	-0.00368722	-0.874712	0.382
a_{74TT}	-0.000153921	-0.960313	0.337
a_{74TTT}	0.0000126903	1.16999	0.242
Bank of Okinawa (i=75)			
a_{75}	9.99371	231.352	0.000
a_{75T}	-0.00888146	-1.95980	0.050
a_{75TT}	-0.000647925	-3.48505	0.000
a_{75TTT}	0.0000384202	3.36165	0.001
North Pacific Bank (i=76)			
a_{76}	10.1041	331.123	0.000
a_{76T}	-0.00360604	-0.652236	0.514
a_{76TT}	0.00155431	6.74039	0.000

North Pacific Bank (merged with the Sapporo Bank) (*i*=77)			
a_{77}	10.3498	109.966	0.000
Sapporo Bank (*i*=78)			
a_{78}	10.0600	184.042	0.000
a_{78T}	-0.019564	-4.87904	0.000
a_{78TT}	0.000932762	3.27419	0.001
Syokusan Bank (*i*=79)			
a_{79}	9.76159	155.137	0.000
a_{79T}	-0.000440781	-0.096006	0.924
a_{79TT}	0.000473356	2.17013	0.030
a_{79TTT}	-0.0000533327	-3.96579	0.000
Kirayaka Bank (*i*=80)			
a_{80}	9.92591	72.2948	0.000
a_{80T}	0.000680363	0.098746	0.921
Kita-Nippon Bank (*i*=81)			
a_{81}	9.90978	199.346	0.000
a_{81T}	-0.00504479	-1.31624	0.188
a_{81TT}	0.000108487	0.669819	0.503
a_{81TTT}	-0.0000179112	-2.11353	0.035

Tokuyo City Bank (*i*=82)			
a_{82}	9.70460	161.851	0.000
a_{82T}	-0.033728	-4.24887	0.000
a_{82TT}	-0.000396054	-0.942183	0.346
Sendai Bank (*i*=83)			
a_{83}	9.87530	146.046	0.000
a_{83T}	-0.00554786	-1.15550	0.248
a_{83TT}	0.000134769	0.843942	0.399
a_{83TTT}	-0.00000754950	-0.786261	0.432
Fukushima Bank (*i*=84)			
a_{84}	9.83917	150.374	0.000
a_{84T}	-0.00163059	-0.370129	0.711
a_{84TT}	0.000102617	0.700076	0.484
a_{84TTT}	-0.0000487945	-4.54398	0.000
Daito Bank (*i*=85)			
a_{85}	9.81792	144.861	0.000
a_{85T}	0.00120231	0.290542	0.771
a_{85TT}	0.000187500	1.17590	0.240

a_{85TTT}	-0.0000333552	-3.90386	0.000
Towa Bank (*i*=86)			
a_{86}	10.0849	202.538	0.000
a_{86T}	0.028617	6.11904	0.000
a_{86TT}	0.000188287	1.14735	0.251
a_{86TTT}	-0.0000455242	-4.94098	0.000
Tochigi Bank (*i*=87)			
a_{87}	9.97226	218.535	0.000
a_{87T}	0.049030	9.12079	0.000
a_{87TT}	0.000668018	4.21726	0.000
a_{87TTT}	-0.0000722820	-7.65368	0.000
Keiyo Bank (*i*=88)			
a_{88}	10.2205	263.407	0.000
a_{88T}	0.055369	10.4022	0.000
a_{88TT}	0.000883275	5.39435	0.000
a_{88TTT}	-0.0000454090	-4.70808	0.000
Taiheiyo Bank (*i*=89)			
a_{89}	9.18937	74.3790	0.000

a_{89T}	0.011617	0.756947	0.449
a_{89TT}	0.00170087	2.36619	0.018
Higashi-Nippon Bank (*i*=90)			
a_{90}	9.88478	220.270	0.000
a_{90T}	0.022507	4.66099	0.000
a_{90TT}	0.000896737	6.47999	0.000
a_{90TTT}	-0.0000208161	-2.20326	0.028
Tokyo Sowa Bank (*i*=91)			
a_{91}	10.0222	183.861	0.000
a_{91T}	-0.015996	-1.54792	0.122
a_{91TT}	-0.000674657	-1.20412	0.229
Heiwa Sogo Bank (*i*=92)			
a_{92}	9.49042	77.6749	0.000
a_{92T}	-0.043973	-5.11889	0.000
Kanagawa Bank (*i*=93)			
a_{93}	9.13177	85.7680	0.000
a_{93T}	0.011799	1.82173	0.068
a_{93TT}	0.00159038	7.92463	0.000

a_{93TTT}	-0.0000621539	-4.56854	0.000
Niigata Chuo Bank (*i*=94)			
a_{94}	9.88959	169.546	0.000
a_{94T}	0.00368490	0.493320	0.622
a_{94TT}	0.00143485	3.23099	0.001
Taiko Bank (*i*=95)			
a_{95}	9.92329	205.161	0.000
a_{95T}	0.019069	4.78684	0.000
a_{95TT}	0.000716804	4.97780	0.000
a_{95TTT}	-0.0000630038	-9.01175	0.000
Nagano Bank (*i*=96)			
a_{96}	9.91173	169.887	0.000
a_{96T}	0.00784727	1.65252	0.098
a_{96TT}	0.000586500	4.00860	0.000
a_{96TTT}	-0.0000455544	-4.60057	0.000
First Bank of Toyama (*i*=97)			
a_{97}	10.0461	71.7448	0.000
a_{97T}	0.025741	4.87551	0.000

a_{97TT}	0.00124973	7.34815	0.000
a_{97TTT}	-0.000107098	-7.22238	0.000
Fukuho Bank (*i*=98)			
a_{98}	10.0393	47.6936	0.000
a_{98T}	0.023619	3.91413	0.000
a_{98TT}	0.00306729	9.46052	0.000
a_{98TTT}	-0.000174671	-7.81274	0.000
Shizuokachuo Bank (*i*=99)			
a_{99}	9.64032	130.602	0.000
a_{99T}	0.00898142	1.76451	0.078
a_{99TT}	0.000851604	4.96866	0.000
a_{99TTT}	-0.0000459006	-5.18109	0.000
Gifu Bank (*i*=100)			
a_{100}	9.88303	175.871	0.000
a_{100T}	-0.00511517	-1.17830	0.239
a_{100TT}	0.000974493	5.37174	0.000
a_{100TTT}	-0.0000122192	-1.28347	0.199
Aichi Bank (*i*=101)			

a_{101}	10.1631	338.647	0.000
a_{101T}	0.020001	4.41202	0.000
a_{101TT}	0.000325918	2.25157	0.024
a_{101TTT}	-0.0000569028	-6.16291	0.000
Bank of Nagoya (i=102)			
a_{102}	10.1938	373.250	0.000
a_{102T}	0.017233	4.15855	0.000
a_{102TT}	0.000428935	2.66422	0.008
a_{102TTT}	-0.0000549937	-6.95481	0.000
Chukyo Bank (i=103)			
a_{103}	10.1002	286.574	0.000
a_{103T}	0.00313506	0.719568	0.472
a_{103TT}	0.000619554	3.99448	0.000
a_{103TTT}	-0.0000366565	-3.86930	0.000
Daisan Bank (i=104)			
a_{104}	10.0903	291.128	0.000
a_{104T}	0.021481	5.96458	0.000
a_{104TT}	0.000700584	5.21163	0.000

a_{104TTT}	-0.0000571111	-8.32583	0.000
Biwako Bank (i=105)			
a_{105}	9.88752	229.391	0.000
a_{105T}	-0.017124	-3.08318	0.002
a_{105TT}	0.000168095	0.736386	0.461
a_{105TTT}	0.00000412672	0.260741	0.794
Bank of Kinki (i=106)			
a_{106}	10.2619	296.860	0.000
a_{106T}	0.011192	1.97739	0.048
a_{106TT}	0.00106479	3.20549	0.001
Fukutoku Bank (i=107)			
a_{107}	10.1143	226.046	0.000
a_{107T}	-0.000474788	-0.076059	0.939
a_{107TT}	0.000750189	1.69991	0.089
Kansai Bank (i=108)			
a_{108}	9.79007	193.746	0.000
a_{108T}	0.00209442	0.368368	0.713
a_{108TT}	0.00107047	3.15547	0.002
Kansai Urban Banking Corporation (i=109)			

a_{109}	10.2551	119.961	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (i=110)			
a_{110}	10.5638	83.7337	0.000
Taisho Bank (i=111)			
a_{111}	9.42416	101.179	0.000
a_{111T}	-0.017012	-2.88060	0.004
a_{111TT}	0.000868151	3.58824	0.000
a_{111TTT}	-0.0000260359	-1.93423	0.053
Hanwa Bank (i=112)			
a_{112}	9.81509	79.7291	0.000
a_{112T}	0.042966	1.61715	0.106
a_{112TT}	0.00390389	3.34153	0.001
Hyogo Bank (i=113)			
a_{113}	10.0268	125.192	0.000
a_{113T}	-0.032541	-2.83821	0.005
a_{113TT}	-0.000852189	-1.70400	0.088
Hanshin Bank (i=114)			
a_{114}	9.81398	183.465	0.000

a_{114T}	-0.012265	-2.24527	0.025
a_{114TT}	0.000168531	0.451050	0.652
Minato Bank (*i*=115)			
a_{115}	10.4789	229.738	0.000
a_{115T}	0.00619389	1.46048	0.144
Shimane Bank (*i*=116)			
a_{116}	9.63967	74.0679	0.000
a_{116T}	0.00558909	0.951576	0.341
a_{116TT}	0.000612666	3.72660	0.000
a_{116TTT}	-0.0000514937	-4.87939	0.000
Tomato Bank (*i*=117)			
a_{117}	9.57497	97.5141	0.000
a_{117T}	0.010181	1.69908	0.089
a_{117TT}	0.000656489	4.01955	0.000
a_{117TTT}	-0.0000206194	-2.70271	0.007
Setouchi Bank (*i*=118)			
a_{118}	9.56212	98.7659	0.000
a_{118T}	-0.00163219	-0.314733	0.753

a_{118TT}	-0.0000280986	-0.095911	0.924
Hiroshima Sogo Bank (*i*=119)			
a_{119}	10.0173	227.925	0.000
a_{119T}	0.00180266	0.314999	0.753
a_{119TT}	0.000253906	0.806180	0.420
Momiji Bank (*i*=120)			
a_{120}	10.8520	124.843	0.000
a_{120T}	-0.044505	-5.64458	0.000
Saikyo Bank (*i*=121)			
a_{121}	9.50856	97.0302	0.000
a_{121T}	0.00343636	0.638929	0.523
a_{121TT}	0.000543294	3.81056	0.000
a_{121TTT}	-0.00000379310	-0.553427	0.580
Tokushima Bank (*i*=122)			
a_{122}	9.78316	141.728	0.000
a_{122T}	0.014187	3.03985	0.002
a_{122TT}	0.000366487	2.34673	0.019
a_{122TTT}	-0.0000452914	-6.10453	0.000
Kagawa Bank (*i*=123)			

a_{123}	9.85519	187.915	0.000
a_{123T}	0.021015	4.25854	0.000
a_{123TT}	0.000385525	2.08900	0.037
a_{123TTT}	-0.0000452764	-5.46875	0.000
Ehime Bank (i=124)			
a_{124}	9.94308	224.602	0.000
a_{124T}	0.024104	5.01461	0.000
a_{124TT}	0.000487590	3.11686	0.002
a_{124TTT}	-0.0000438233	-4.28760	0.000
Bank of Kochi (i=125)			
a_{125}	9.94921	168.396	0.000
a_{125T}	0.00291811	0.655472	0.512
a_{125TT}	0.000268273	1.64087	0.101
a_{125TTT}	-0.0000337452	-4.81918	0.000
Nishi-Nippon Sogo Bank (i=126)			
a_{126}	10.1874	113.610	0.000
Nishi-Nippon Bank (i=127)			
a_{127}	10.4123	236.858	0.000

a_{127T}	0.021429	3.93949	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128)			
a_{128}	10.9142	235.467	0.000
a_{128T}	0.00962173	1.44825	0.148
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129)			
Fukuoka City Bank (*i*=130)			
a_{130}	10.1555	248.762	0.000
a_{130T}	0.018879	4.17090	0.000
a_{130TT}	0.000424681	1.91481	0.056
Fukuoka Chuo Bank (*i*=131)			
a_{131}	9.35418	118.468	0.000
a_{131T}	0.019595	3.57494	0.000
a_{131TT}	0.000529085	3.43116	0.001
a_{131TTT}	-0.0000576376	-5.62777	0.000
Saga Kyoei Bank (*i*=132)			
a_{132}	9.35202	96.2482	0.000
a_{132T}	0.025531	4.25879	0.000
a_{132TT}	0.000601105	2.77724	0.005

a_{132TTT}	-0.0000712108	-5.52676	0.000
Bank of Nagasaki (*i*=133)			
a_{133}	9.39579	112.866	0.000
a_{133T}	0.00241395	0.423334	0.672
a_{133TT}	0.000506807	1.87218	0.061
a_{133TTT}	0.0000143088	0.949654	0.342
Kyushu Bank (*i*=134)			
a_{134}	9.68836	180.318	0.000
a_{134T}	0.00642706	1.49084	0.136
a_{134TT}	0.00102195	3.90928	0.000
Kumamoto Bank (*i*=135)			
a_{135}	9.29435	157.664	0.000
a_{135T}	-0.015559	-2.10012	0.036
Kumamoto Family Bank (*i*=136)			
a_{136}	9.97818	209.743	0.000
a_{136T}	-0.00968011	-1.40377	0.160
a_{136TT}	0.000362224	1.15493	0.248
Higo Family Bank (*i*=137)			
a_{137}	9.45640	102.695	0.000

a_{137T}	-0.036065	-4.36749	0.000
Howa Bank (*i*=138)			
a_{138}	9.56718	136.919	0.000
a_{138T}	0.00501801	1.10728	0.268
a_{138TT}	0.000315751	2.01206	0.044
a_{138TTT}	-0.0000436851	-5.71389	0.000
Miyazaki Taiyo Bank (*i*=139)			
a_{139}	9.58731	139.722	0.000
a_{139T}	0.016132	3.63707	0.000
a_{139TT}	0.000211603	1.40300	0.161
a_{139TTT}	-0.0000450162	-6.45652	0.000
Minami-Nippon Bank (*i*=140)			
a_{140}	9.76313	153.673	0.000
a_{140T}	-0.000266590	-0.063495	0.949
a_{140TT}	0.000450267	3.23225	0.001
a_{140TTT}	-0.0000390770	-4.85325	0.000
Okinawa Kaiho Bank (*i*=141)			
a_{141}	9.97439	139.362	0.000

a_{141T}	0.00679863	1.42446	0.154
a_{141TT}	0.000590125	3.53971	0.000
a_{141TTT}	-0.0000282400	-2.96290	0.003
Tokyo Star Bank (*i*=142)			
a_{142}	8.95411	55.4897	0.000
a_{142T}	0.113633	10.1578	0.000
Saitama Resona Bank (*i*=143)			
a_{143}	10.1490	55.9763	0.000
a_{143T}	0.101606	8.70392	0.000

Note: 1. Tables 4.1.1 and 4.1.2 show the results for the simultaneous GMM estimation of the static variable cost function in Eq. (3.1.1.2.1a) with the static cost share equations in Eq. (3.1.1.2.2). Table 4.1.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies in Eq. (3.1.1.2.1b), while Table 4.1.2 shows the estimates of these coefficients.

2. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.

3. The Seiwa Bank (*i*=4) is added to the Michinoku Bank (*i*=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129) is added to the Nishi-Nippon City Bank (*i*=128).

Table 4.1.3 Estimation Results for Eq. (3.2.1.1) Composing Eq. (3.1.1.1.2)

Parameter	Estimate	*t*-statistic	*p*-value
Yachiyo Bank (The present Kiraboshi Bank) (*i*=1)			
$a_{1,K}^{SIE}$	-4.93732	-25.6274	0.000
$a_{1,K,5}^{SIEZ}$	-0.050225	-0.262947	0.793
$a_{1,K}^{SIET}$	0.00363439	1.75336	0.080
Hokkaido Bank (*i*=2)			
$a_{2,K}^{SIE}$	-4.88481	-178.061	0.000
$a_{2,K,4}^{SIEZ}$	0.00174160	5.26168	0.000
$a_{2,K,5}^{SIEZ}$	-0.084438	-2.21671	0.027
$a_{2,K}^{SIET}$	-0.00123427	-4.45172	0.000
Aomori Bank (*i*=3)			
$a_{3,K}^{SIE}$	-5.18092	-121.245	0.000
$a_{3,K,4}^{SIEZ}$	0.00234208	3.47614	0.001
$a_{3,K,5}^{SIEZ}$	0.277261	4.73168	0.000
$a_{3,K}^{SIET}$	0.000513646	1.53952	0.124
Seiwa Bank (*i*=4)			
Seiwa Bank and Michinoku Bank (*i*=5)			
$a_{5,K}^{SIE}$	-5.04266	-33.7888	0.000

$a_{5,K,4}^{SIEZ}$	0.00255266	1.48617	0.137
$a_{5,K,5}^{SIEZ}$	0.039988	0.211743	0.832
$a_{5,K}^{SIET}$	-0.00158002	-1.88806	0.059
Akita Bank (i=6)			
$a_{6,K}^{SIE}$	-5.26284	-117.526	0.000
$a_{6,K,4}^{SIEZ}$	0.00530056	4.80132	0.000
$a_{6,K,5}^{SIEZ}$	0.315959	6.28696	0.000
$a_{6,K}^{SIET}$	0.000636156	2.43000	0.015
Ugo Bank (i=7)			
$a_{7,K}^{SIE}$	-5.10157	-5064.24	0.000
$a_{7,K}^{SIET}$	-0.00191738	-20.5754	0.000
Hokuto Bank (i=8)			
$a_{8,K}^{SIE}$	-4.95620	-336.577	0.000
$a_{8,K,5}^{SIEZ}$	-0.038230	-2.46039	0.014
$a_{8,K}^{SIET}$	-0.00670421	-21.4518	0.000
Shonai Bank (i=9)			
$a_{9,K}^{SIE}$	-4.96056	-273.902	0.000
$a_{9,K,4}^{SIEZ}$	-0.00435192	-4.05401	0.000

$a_{9,K,5}^{SIEZ}$	-0.137101	-8.24794	0.000
$a_{9,K}^{SIET}$	0.000577073	2.53503	0.011
Yamagata Bank (*i*=10)			
$a_{10,K}^{SIE}$	-5.07372	-239.039	0.000
$a_{10,K,4}^{SIEZ}$	0.00186817	2.61415	0.009
$a_{10,K,5}^{SIEZ}$	0.089540	3.13017	0.002
$a_{10,K}^{SIET}$	0.000369696	3.52198	0.000
Bank of Iwate (*i*=11)			
$a_{11,K}^{SIE}$	-5.10831	-243.447	0.000
$a_{11,K,4}^{SIEZ}$	0.0000738387	0.148294	0.882
$a_{11,K,5}^{SIEZ}$	0.231747	8.32337	0.000
$a_{11,K}^{SIET}$	0.00120297	6.18557	0.000
Tohoku Bank (*i*=12)			
$a_{12,K}^{SIE}$	-5.00981	-105.271	0.000
$a_{12,K,4}^{SIEZ}$	-0.00622415	-4.72887	0.000
$a_{12,K,5}^{SIEZ}$	-0.085993	-1.90691	0.057
$a_{12,K}^{SIET}$	-0.00203147	-16.4533	0.000
77 Bank (*i*=13)			

$a_{13,K}^{SIE}$	-5.06378	-271.530	0.000
$a_{13,K,4}^{SIEZ}$	-0.0000344723	-0.090035	0.928
$a_{13,K,5}^{SIEZ}$	0.370486	14.2746	0.000
$a_{13,K}^{SIET}$	0.000147232	1.35526	0.175
Toho Bank (*i*=14)			
$a_{14,K}^{SIE}$	-5.05191	-95.6778	0.000
$a_{14,K,4}^{SIEZ}$	0.000945060	0.564819	0.572
$a_{14,K,5}^{SIEZ}$	0.186203	3.55611	0.000
$a_{14,K}^{SIET}$	0.00177660	5.19534	0.000
Gunma Bank (*i*=15)			
$a_{15,K}^{SIE}$	-4.88986	-31.9933	0.000
$a_{15,K,4}^{SIEZ}$	-0.00218012	-1.63672	0.102
$a_{15,K,5}^{SIEZ}$	0.168534	0.825569	0.409
$a_{15,K}^{SIET}$	0.00568192	4.19599	0.000
Ashikaga Bank (*i*=16)			
$a_{16,K}^{SIE}$	-4.89125	-356.869	0.000
$a_{16,K,4}^{SIEZ}$	0.000372618	2.47295	0.013
$a_{16,K,5}^{SIEZ}$	0.122984	6.72304	0.000

$a_{16,K}^{SIET}$	0.00356660	24.1753	0.000
Joyo Bank (i=17)			
$a_{17,K}^{SIE}$	-4.89937	-429.664	0.000
$a_{17,K,4}^{SIEZ}$	0.000647105	5.14853	0.000
$a_{17,K,5}^{SIEZ}$	0.223717	13.4872	0.000
$a_{17,K}^{SIET}$	0.00327375	41.4366	0.000
Kanto Bank (i=18)			
$a_{18,K}^{SIE}$	-5.12876	-194.627	0.000
$a_{18,K,5}^{SIEZ}$	0.040542	1.29852	0.194
$a_{18,K}^{SIET}$	0.00130635	6.84991	0.000
Kanto Tsukuba Bank (i=19)			
$a_{19,K}^{SIE}$	-5.03394	-7882.33	0.000
Tsukuba Bank (i=20)			
$a_{20,K}^{SIE}$	-4.91284	-7154.54	0.000
Musashino Bank (i=21)			
$a_{21,K}^{SIE}$	-5.02452	-460.106	0.000
$a_{21,K,4}^{SIEZ}$	-0.00121910	-5.84179	0.000
$a_{21,K,5}^{SIEZ}$	0.129892	7.89537	0.000
$a_{21,K}^{SIET}$	0.00761750	137.164	0.000

Chiba Bank (i=22)			
$a^{SIE}_{22,K}$	-4.48924	-58.1432	0.000
$a^{SIEZ}_{22,K,4}$	-0.00275428	-1.60016	0.110
$a^{SIEZ}_{22,K,5}$	-0.262312	-2.99926	0.003
$a^{SIET}_{22,K}$	0.00966515	9.83616	0.000
Chiba Kogyo Bank (i=23)			
$a^{SIE}_{23,K}$	-5.32015	-67.1865	0.000
$a^{SIEZ}_{23,K,4}$	-0.000728051	-0.736831	0.461
$a^{SIEZ}_{23,K,5}$	0.398765	4.47645	0.000
$a^{SIET}_{23,K}$	0.00290968	10.2529	0.000
Tokyo Tomin Bank (i=24)			
$a^{SIE}_{24,K}$	-4.94367	-181.177	0.000
$a^{SIEZ}_{24,K,4}$	-0.00167023	-2.01372	0.044
$a^{SIEZ}_{24,K,5}$	0.012214	0.358257	0.720
$a^{SIET}_{24,K}$	0.00377661	9.07298	0.000
Bank of Yokohama (i=25)			
$a^{SIE}_{25,K}$	-4.41654	-90.4982	0.000
$a^{SIEZ}_{25,K,4}$	-0.00117391	-2.07637	0.038

$a^{SIEZ}_{25,K,5}$	-0.303008	-5.01443	0.000
$a^{SIET}_{25,K}$	0.00971857	10.6164	0.000
Daishi Bank (i=26)			
$a^{SIE}_{26,K}$	-4.96258	-204.264	0.000
$a^{SIEZ}_{26,K,4}$	0.000519381	2.50813	0.012
$a^{SIEZ}_{26,K,5}$	0.089411	2.63581	0.008
$a^{SIET}_{26,K}$	0.00132415	9.75464	0.000
Hokuetsu Bank (i=27)			
$a^{SIE}_{27,K}$	-5.08279	-515.953	0.000
$a^{SIEZ}_{27,K,4}$	0.00000961415	0.025993	0.979
$a^{SIEZ}_{27,K,5}$	0.114135	7.71020	0.000
$a^{SIET}_{27,K}$	0.00133335	11.1684	0.000
Yamanashi Chuo Bank (i=28)			
$a^{SIE}_{28,K}$	-5.16849	-194.008	0.000
$a^{SIEZ}_{28,K,4}$	0.00102607	1.58189	0.114
$a^{SIEZ}_{28,K,5}$	0.288595	9.48957	0.000
$a^{SIET}_{28,K}$	0.00210152	9.93730	0.000
Hachijuni Bank (i=29)			

$a_{29,K}^{SIE}$	-4.94373	-156.056	0.000
$a_{29,K,4}^{SIEZ}$	0.00148590	7.11963	0.000
$a_{29,K,5}^{SIEZ}$	0.138794	3.03867	0.002
$a_{29,K}^{SIET}$	0.000779171	4.01649	0.000
Hokuriku Bank (*i*=30)			
$a_{30,K}^{SIE}$	-4.68839	-106.261	0.000
$a_{30,K,4}^{SIEZ}$	-0.00150984	-6.85665	0.000
$a_{30,K,5}^{SIEZ}$	-0.198590	-3.21351	0.001
$a_{30,K}^{SIET}$	-0.00177386	-13.4234	0.000
Bank of Toyama (*i*=31)			
$a_{31,K}^{SIE}$	-4.43406	-16.7920	0.000
$a_{31,K,4}^{SIEZ}$	-0.00843701	-1.29915	0.194
$a_{31,K,5}^{SIEZ}$	-0.692830	-2.48386	0.013
$a_{31,K}^{SIET}$	-0.00452331	-2.57834	0.010
Hokkoku Bank (*i*=32)			
$a_{32,K}^{SIE}$	-4.83121	-96.4661	0.000
$a_{32,K,4}^{SIEZ}$	-0.00225577	-3.94208	0.000
$a_{32,K,5}^{SIEZ}$	-0.058239	-0.827333	0.408

$a_{32,K}^{SIET}$	-0.000316127	-0.807731	0.419
Fukui Bank (*i*=33)			
$a_{33,K}^{SIE}$	-4.96406	-308.642	0.000
$a_{33,K,4}^{SIEZ}$	-0.00120320	-4.27810	0.000
$a_{33,K,5}^{SIEZ}$	0.053073	2.41277	0.016
$a_{33,K}^{SIET}$	-0.00121272	-12.5477	0.000
Shizuoka Bank (*i*=34)			
$a_{34,K}^{SIE}$	-4.86712	-173.131	0.000
$a_{34,K,4}^{SIEZ}$	-0.000643831	-3.11824	0.002
$a_{34,K,5}^{SIEZ}$	0.123927	2.92594	0.003
$a_{34,K}^{SIET}$	-0.000703954	-3.66170	0.000
Suruga Bank (*i*=35)			
$a_{35,K}^{SIE}$	-4.94320	-318.526	0.000
$a_{35,K,4}^{SIEZ}$	-0.0000522042	-0.354740	0.723
$a_{35,K,5}^{SIEZ}$	0.012354	0.655943	0.512
$a_{35,K}^{SIET}$	-0.00170966	-9.68281	0.000
Shimizu Bank (*i*=36)			
$a_{36,K}^{SIE}$	-4.84714	-152.852	0.000

$a_{36,K,4}^{SIEZ}$	-0.00105805	-3.63070	0.000
$a_{36,K,5}^{SIEZ}$	-0.233973	-6.73545	0.000
$a_{36,K}^{SIET}$	-0.000267508	-1.17995	0.238
Ogaki Kyoritsu Bank (*i*=37)			
$a_{37,K}^{SIE}$	-4.97564	-331.567	0.000
$a_{37,K,4}^{SIEZ}$	-0.00140770	-5.51242	0.000
$a_{37,K,5}^{SIEZ}$	0.105505	5.31050	0.000
$a_{37,K}^{SIET}$	0.00234492	24.2217	0.000
Juroku Bank (*i*=38)			
$a_{38,K}^{SIE}$	-4.86849	-823.316	0.000
$a_{38,K,4}^{SIEZ}$	0.000171222	3.39141	0.001
$a_{38,K,5}^{SIEZ}$	-0.047311	-6.64805	0.000
$a_{38,K}^{SIET}$	0.00110338	28.9521	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
$a_{39,K}^{SIE}$	-4.87495	-5720.37	0.000
Mie Bank (*i*=40)			
$a_{40,K}^{SIE}$	-4.97658	-93.7047	0.000
$a_{40,K,4}^{SIEZ}$	-0.000690571	-1.51464	0.130

$a^{SIEZ}_{40,K,5}$	-0.084302	-1.30918	0.190
$a^{SIET}_{40,K}$	0.00206521	10.2718	0.000
Hyakugo Bank (*i*=41)			
$a^{SIE}_{41,K}$	-5.04508	-258.499	0.000
$a^{SIEZ}_{41,K,4}$	0.000436116	1.30836	0.191
$a^{SIEZ}_{41,K,5}$	0.189334	8.31486	0.000
$a^{SIET}_{41,K}$	0.000907093	6.62865	0.000
Shiga Bank (*i*=42)			
$a^{SIE}_{42,K}$	-5.05639	-446.274	0.000
$a^{SIEZ}_{42,K,4}$	-0.0000244721	-0.060476	0.952
$a^{SIEZ}_{42,K,5}$	0.231598	12.4691	0.000
$a^{SIET}_{42,K}$	-0.000315971	-3.62480	0.000
Bank of Kyoto (*i*=43)			
$a^{SIE}_{43,K}$	-4.71056	-174.510	0.000
$a^{SIEZ}_{43,K,4}$	-0.00183608	-3.49954	0.000
$a^{SIEZ}_{43,K,5}$	-0.149172	-5.05995	0.000
$a^{SIET}_{43,K}$	0.00285823	16.8228	0.000
Osaka Bank (*i*=44)			

$a_{44,K}^{SIE}$	-4.94160	-36.2694	0.000
$a_{44,K,5}^{SIEZ}$	-0.00803496	-0.053530	0.957
$a_{44,K}^{SIET}$	0.00374704	1.62588	0.104
Kinki Osaka Bank (The present Kansai Mirai Bank) (i=45)			
$a_{45,K}^{SIE}$	-4.87780	-3056.58	0.000
Senshu Bank (i=46)			
$a_{46,K}^{SIE}$	-5.16440	-128.937	0.000
$a_{46,K,4}^{SIEZ}$	0.00174044	7.75145	0.000
$a_{46,K,5}^{SIEZ}$	0.127128	2.71398	0.007
$a_{46,K}^{SIET}$	-0.000169997	-0.331925	0.740
Ikeda Bank (i=47)			
$a_{47,K}^{SIE}$	-5.30940	-144.437	0.000
$a_{47,K,4}^{SIEZ}$	0.00419259	5.97379	0.000
$a_{47,K,5}^{SIEZ}$	0.272323	7.41945	0.000
$a_{47,K}^{SIET}$	-0.000120290	-0.275523	0.783
Senshu Ikeda Bank (i=48)			
$a_{48,K}^{SIE}$	-4.90036	-12657.7	0.000
Nanto Bank (i=49)			
$a_{49,K}^{SIE}$	-5.38113	-113.036	0.000

$a_{49,K,4}^{SIEZ}$	0.00279401	3.92501	0.000
$a_{49,K,5}^{SIEZ}$	0.672232	11.5501	0.000
$a_{49,K}^{SIET}$	0.000918933	5.63550	0.000
Kiyo Bank (*i*=50)			
$a_{50,K}^{SIE}$	-5.24673	-87.2705	0.000
$a_{50,K,4}^{SIEZ}$	0.00415229	9.95468	0.000
$a_{50,K,5}^{SIEZ}$	0.382088	4.89417	0.000
$a_{50,K}^{SIET}$	-0.00108153	-2.10744	0.035
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
$a_{51,K}^{SIE}$	-4.91841	-881.483	0.000
$a_{51,K}^{SIET}$	0.000186769	0.543739	0.587
Tajima Bank (*i*=52)			
$a_{52,K}^{SIE}$	-5.32552	-156.110	0.000
$a_{52,K,4}^{SIEZ}$	-0.000830016	-1.41566	0.157
$a_{52,K,5}^{SIEZ}$	0.252958	6.55722	0.000
$a_{52,K}^{SIET}$	-0.00119758	-7.71408	0.000
Tottori Bank (*i*=53)			
$a_{53,K}^{SIE}$	-5.14339	-1099.02	0.000

$a_{53,K,4}^{SIEZ}$	-0.000567634	-3.94994	0.000
$a_{53,K,5}^{SIEZ}$	0.064155	11.4892	0.000
$a_{53,K}^{SIET}$	-0.00154005	-53.2374	0.000
San-in Godo Bank (*i*=54)			
$a_{54,K}^{SIE}$	-4.89367	-5122.47	0.000
$a_{54,K}^{SIET}$	0.00411158	47.9819	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			
$a_{55,K}^{SIE}$	-4.97275	-338.856	0.000
$a_{55,K,5}^{SIEZ}$	0.168511	7.91559	0.000
$a_{55,K}^{SIET}$	-0.00276944	-17.9516	0.000
Chugoku Bank (*i*=56)			
$a_{56,K}^{SIE}$	-4.86325	-176.548	0.000
$a_{56,K,4}^{SIEZ}$	-0.000195160	-0.706145	0.480
$a_{56,K,5}^{SIEZ}$	0.088414	2.62430	0.009
$a_{56,K}^{SIET}$	0.00266828	46.5388	0.000
Hiroshima Bank (*i*=57)			
$a_{57,K}^{SIE}$	-4.92469	-113.840	0.000
$a_{57,K,4}^{SIEZ}$	0.00169817	7.04620	0.000

$a^{SIEZ}_{57,K,5}$	0.168290	2.85535	0.004
$a^{SIET}_{57,K}$	0.000771483	2.66156	0.008
Yamaguchi Bank (*i*=58)			
$a^{SIE}_{58,K}$	-5.15016	-177.748	0.000
$a^{SIEZ}_{58,K,4}$	0.00247625	4.09653	0.000
$a^{SIEZ}_{58,K,5}$	0.382942	6.45026	0.000
$a^{SIET}_{58,K}$	-0.000508237	-1.45129	0.147
Awa Bank (*i*=59)			
$a^{SIE}_{59,K}$	-5.33234	-128.492	0.000
$a^{SIEZ}_{59,K,4}$	0.00158277	3.75653	0.000
$a^{SIEZ}_{59,K,5}$	0.407271	7.45273	0.000
$a^{SIET}_{59,K}$	-0.000762477	-2.21159	0.027
Hyakujushi Bank (*i*=60)			
$a^{SIE}_{60,K}$	-5.11794	-346.333	0.000
$a^{SIEZ}_{60,K,4}$	0.000988108	6.32878	0.000
$a^{SIEZ}_{60,K,5}$	0.279167	12.7741	0.000
$a^{SIET}_{60,K}$	0.00152290	14.8303	0.000
Iyo Bank (*i*=61)			

$a_{61,K}^{SIE}$	-4.83380	-4586.38	0.000
$a_{61,K}^{SIET}$	0.00697251	88.1775	0.000
Iyo Bank (merged with the Toho Sogo Bank) (*i*=62)			
$a_{62,K}^{SIE}$	-4.90116	-453.212	0.000
$a_{62,K,5}^{SIEZ}$	0.054254	4.09334	0.000
$a_{62,K}^{SIET}$	0.00292494	62.3738	0.000
Shikoku Bank (*i*=63)			
$a_{63,K}^{SIE}$	-5.33974	-109.725	0.000
$a_{63,K,4}^{SIEZ}$	0.000382051	0.171457	0.864
$a_{63,K,5}^{SIEZ}$	0.518287	6.77278	0.000
$a_{63,K}^{SIET}$	-0.000271312	-0.958357	0.338
Bank of Fukuoka (*i*=64)			
$a_{64,K}^{SIE}$	-4.38900	-53.2284	0.000
$a_{64,K,4}^{SIEZ}$	-0.00193163	-2.09623	0.036
$a_{64,K,5}^{SIEZ}$	-0.526873	-4.74790	0.000
$a_{64,K}^{SIET}$	0.00512066	6.83662	0.000
Chikuho Bank (*i*=65)			
$a_{65,K}^{SIE}$	-5.17569	-1047.61	0.000
Bank of Saga (*i*=66)			

$a_{66,K}^{SIE}$	-5.34142	-119.561	0.000
$a_{66,K,4}^{SIEZ}$	0.00557186	6.63584	0.000
$a_{66,K,5}^{SIEZ}$	0.366739	5.27387	0.000
$a_{66,K}^{SIET}$	-0.000586158	-2.48876	0.013
Eighteenth Bank (*i*=67)			
$a_{67,K}^{SIE}$	-5.24681	-285.186	0.000
$a_{67,K,4}^{SIEZ}$	0.000916678	2.83447	0.005
$a_{67,K,5}^{SIEZ}$	0.385286	15.2412	0.000
$a_{67,K}^{SIET}$	0.000882670	8.54529	0.000
Shinwa Bank (*i*=68)			
$a_{68,K}^{SIE}$	-4.95890	-212.779	0.000
$a_{68,K,5}^{SIEZ}$	0.00210911	0.073447	0.941
$a_{68,K}^{SIET}$	0.00204652	27.0210	0.000
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
$a_{69,K}^{SIE}$	-4.83110	-967.716	0.000
$a_{69,K}^{SIET}$	-0.00928298	-22.9239	0.000
Higo Bank (*i*=70)			
$a_{70,K}^{SIE}$	-5.19746	-87.1211	0.000

$a^{SIEZ}_{70,K,4}$	-0.00190508	-1.35524	0.175
$a^{SIEZ}_{70,K,5}$	0.474914	5.22538	0.000
$a^{SIET}_{70,K}$	0.00303061	8.41390	0.000
Oita Bank (*i*=71)			
$a^{SIE}_{71,K}$	-5.12831	-108.497	0.000
$a^{SIEZ}_{71,K,4}$	-0.000709095	-1.58231	0.114
$a^{SIEZ}_{71,K,5}$	0.282818	4.04933	0.000
$a^{SIET}_{71,K}$	0.00149497	4.87721	0.000
Miyazaki Bank (*i*=72)			
$a^{SIE}_{72,K}$	-5.10505	-269.342	0.000
$a^{SIEZ}_{72,K,4}$	0.000119685	0.644302	0.519
$a^{SIEZ}_{72,K,5}$	0.147968	5.86161	0.000
$a^{SIET}_{72,K}$	0.00407020	87.7542	0.000
Kagoshima Bank (*i*=73)			
$a^{SIE}_{73,K}$	-4.62379	-235.874	0.000
$a^{SIEZ}_{73,K,4}$	-0.00151965	-5.92004	0.000
$a^{SIEZ}_{73,K,5}$	-0.400875	-15.8287	0.000
$a^{SIET}_{73,K}$	0.00310438	59.0417	0.000

Bank of Ryukyu (*i*=74)			
$a^{SIE}_{74,K}$	-5.04079	-705.404	0.000
$a^{SIEZ}_{74,K,4}$	-0.000759475	-4.28272	0.000
$a^{SIEZ}_{74,K,5}$	0.081372	10.8593	0.000
$a^{SIET}_{74,K}$	0.0000827615	0.835197	0.404
Bank of Okinawa (*i*=75)			
$a^{SIE}_{75,K}$	-5.26930	-224.783	0.000
$a^{SIEZ}_{75,K,4}$	0.000172731	0.421246	0.674
$a^{SIEZ}_{75,K,5}$	0.306629	12.0955	0.000
$a^{SIET}_{75,K}$	0.000347772	1.99191	0.046
North Pacific Bank (*i*=76)			
$a^{SIE}_{76,K}$	-4.65949	-88.7502	0.000
$a^{SIEZ}_{76,K,5}$	-0.356901	-5.16325	0.000
$a^{SIET}_{76,K}$	-0.00502272	-10.8924	0.000
North Pacific Bank (merged with the Sapporo Bank) (*i*=77)			
$a^{SIE}_{77,K}$	-4.90999	-2879.59	0.000
Sapporo Bank (*i*=78)			
$a^{SIE}_{78,K}$	-5.27381	-122.906	0.000
$a^{SIEZ}_{78,K,5}$	0.389600	7.05991	0.000

$a^{SIET}_{78,K}$	-0.00586792	-18.0632	0.000
Syokusan Bank (i=79)			
$a^{SIE}_{79,K}$	-5.48895	-110.970	0.000
$a^{SIEZ}_{79,K,4}$	0.020338	7.47336	0.000
$a^{SIEZ}_{79,K,5}$	0.387666	9.68809	0.000
$a^{SIET}_{79,K}$	-0.00396296	-11.9700	0.000
Kirayaka Bank (i=80)			
$a^{SIE}_{80,K}$	-4.98790	-830.058	0.000
$a^{SIET}_{80,K}$	-0.000124148	-0.346057	0.729
Kita-Nippon Bank (i=81)			
$a^{SIE}_{81,K}$	-4.92789	-116.500	0.000
$a^{SIEZ}_{81,K,4}$	-0.00288626	-6.65664	0.000
$a^{SIEZ}_{81,K,5}$	-0.034666	-0.731868	0.464
$a^{SIET}_{81,K}$	-0.00186673	-5.83552	0.000
Tokuyo City Bank (i=82)			
$a^{SIE}_{82,K}$	-5.02453	-641.233	0.000
$a^{SIEZ}_{82,K,5}$	-0.00113819	-0.121146	0.904
$a^{SIET}_{82,K}$	-0.00467629	-175.340	0.000
Sendai Bank (i=83)			

$a_{83,K}^{SIE}$	-5.01054	-411.422	0.000
$a_{83,K,4}^{SIEZ}$	-0.00271844	-5.91934	0.000
$a_{83,K,5}^{SIEZ}$	0.048541	3.51346	0.000
$a_{83,K}^{SIET}$	-0.00100987	-7.58214	0.000
Fukushima Bank (i=84)			
$a_{84,K}^{SIE}$	-4.83818	-89.3062	0.000
$a_{84,K,4}^{SIEZ}$	-0.00750091	-8.24169	0.000
$a_{84,K,5}^{SIEZ}$	-0.118998	-1.96151	0.050
$a_{84,K}^{SIET}$	-0.00328537	-15.4018	0.000
Daito Bank (i=85)			
$a_{85,K}^{SIE}$	-5.02780	-135.594	0.000
$a_{85,K,4}^{SIEZ}$	-0.00392130	-3.71809	0.000
$a_{85,K,5}^{SIEZ}$	0.077951	1.99006	0.047
$a_{85,K}^{SIET}$	-0.00112130	-5.64242	0.000
Towa Bank (i=86)			
$a_{86,K}^{SIE}$	-5.15279	-52.1890	0.000
$a_{86,K,4}^{SIEZ}$	0.00464570	4.58962	0.000
$a_{86,K,5}^{SIEZ}$	0.170614	1.60009	0.110

$a_{86,K}^{SIET}$	0.00212398	11.4855	0.000
Tochigi Bank (*i*=87)			
$a_{87,K}^{SIE}$	-5.31330	-42.5074	0.000
$a_{87,K,4}^{SIEZ}$	0.00273637	3.65999	0.000
$a_{87,K,5}^{SIEZ}$	0.355111	2.58947	0.010
$a_{87,K}^{SIET}$	0.00778852	6.86862	0.000
Keiyo Bank (*i*=88)			
$a_{88,K}^{SIE}$	-4.84677	-34.8566	0.000
$a_{88,K,4}^{SIEZ}$	-0.000992361	-2.07641	0.038
$a_{88,K,5}^{SIEZ}$	-0.055790	-0.352170	0.725
$a_{88,K}^{SIET}$	0.00963801	23.0406	0.000
Taiheiyo Bank (*i*=89)			
$a_{89,K}^{SIE}$	-4.91197	-153.466	0.000
$a_{89,K,5}^{SIEZ}$	-0.244990	-7.72826	0.000
$a_{89,K}^{SIET}$	-0.00201461	-4.94215	0.000
Higashi-Nippon Bank (*i*=90)			
$a_{90,K}^{SIE}$	-4.95327	-62.1308	0.000
$a_{90,K,4}^{SIEZ}$	0.00212811	3.06459	0.002

$a_{90,K,5}^{SIEZ}$	-0.074186	-0.903557	0.366
$a_{90,K}^{SIET}$	0.00353475	6.17645	0.000
Tokyo Sowa Bank (*i*=91)			
$a_{91,K}^{SIE}$	-5.04064	-216.035	0.000
$a_{91,K,5}^{SIEZ}$	0.084253	3.27340	0.001
$a_{91,K}^{SIET}$	-0.00119355	-5.77409	0.000
Heiwa Sogo Bank (*i*=92)			
$a_{92,K}^{SIE}$	-5.09207	-2618.79	0.000
$a_{92,K}^{SIET}$	-0.00953798	-74.3976	0.000
Kanagawa Bank (*i*=93)			
$a_{93,K}^{SIE}$	-5.66424	-17.4226	0.000
$a_{93,K,4}^{SIEZ}$	0.00101256	0.346697	0.729
$a_{93,K,5}^{SIEZ}$	0.585016	1.72598	0.084
$a_{93,K}^{SIET}$	0.000348310	0.305391	0.760
Niigata Chuo Bank (*i*=94)			
$a_{94,K}^{SIE}$	-4.74159	-94.4147	0.000
$a_{94,K,5}^{SIEZ}$	-0.270947	-5.12075	0.000
$a_{94,K}^{SIET}$	-0.00228200	-4.99777	0.000
Taiko Bank (*i*=95)			

$a_{95,K}^{SIE}$	-4.97656	-108.542	0.000
$a_{95,K,4}^{SIEZ}$	-0.00375613	-2.00713	0.045
$a_{95,K,5}^{SIEZ}$	0.056128	1.49065	0.136
$a_{95,K}^{SIET}$	0.00107962	3.16610	0.002
Nagano Bank (*i*=96)			
$a_{96,K}^{SIE}$	-5.10698	-83.1373	0.000
$a_{96,K,4}^{SIEZ}$	0.00343657	1.81761	0.069
$a_{96,K,5}^{SIEZ}$	0.108919	1.61393	0.107
$a_{96,K}^{SIET}$	-0.000434224	-1.20101	0.230
First Bank of Toyama (*i*=97)			
$a_{97,K}^{SIE}$	-5.15961	-34.9134	0.000
$a_{97,K,4}^{SIEZ}$	0.00639663	2.37612	0.017
$a_{97,K,5}^{SIEZ}$	0.183279	1.32457	0.185
$a_{97,K}^{SIET}$	-0.000995785	-2.05705	0.040
Fukuho Bank (*i*=98)			
$a_{98,K}^{SIE}$	-2.03988	-4.50010	0.000
$a_{98,K,4}^{SIEZ}$	-0.033561	-6.50192	0.000
$a_{98,K,5}^{SIEZ}$	-2.84203	-5.03389	0.000

$a_{98,K}^{SIET}$	-0.00581105	-2.72724	0.006
Shizuokachuo Bank (*i*=99)			
$a_{99,K}^{SIE}$	-5.78630	-21.8284	0.000
$a_{99,K,4}^{SIEZ}$	0.00000505135	0.00623312	0.995
$a_{99,K,5}^{SIEZ}$	0.862151	2.90873	0.004
$a_{99,K}^{SIET}$	-0.00113030	-1.36253	0.173
Gifu Bank (*i*=100)			
$a_{100,K}^{SIE}$	-5.05543	-142.856	0.000
$a_{100,K,4}^{SIEZ}$	0.013028	7.85581	0.000
$a_{100,K,5}^{SIEZ}$	-0.056828	-1.57975	0.114
$a_{100,K}^{SIET}$	-0.00583452	-11.4450	0.000
Aichi Bank (*i*=101)			
$a_{101,K}^{SIE}$	-4.45907	-41.0678	0.000
$a_{101,K,4}^{SIEZ}$	-0.00546066	-4.61967	0.000
$a_{101,K,5}^{SIEZ}$	-0.452817	-3.77935	0.000
$a_{101,K}^{SIET}$	0.00359028	8.03536	0.000
Bank of Nagoya (*i*=102)			
$a_{102,K}^{SIE}$	-5.08897	-154.724	0.000

$a^{SIEZ}_{102,K,4}$	0.000768839	0.819428	0.413
$a^{SIEZ}_{102,K,5}$	0.181252	4.15330	0.000
$a^{SIET}_{102,K}$	0.000335667	0.566301	0.571
Chukyo Bank (*i*=103)			
$a^{SIE}_{103,K}$	-4.91357	-62.3845	0.000
$a^{SIEZ}_{103,K,4}$	0.000908434	1.02569	0.305
$a^{SIEZ}_{103,K,5}$	-0.040890	-0.416589	0.677
$a^{SIET}_{103,K}$	-0.00135626	-3.51350	0.000
Daisan Bank (*i*=104)			
$a^{SIE}_{104,K}$	-4.99344	-86.2918	0.000
$a^{SIEZ}_{104,K,4}$	0.00190627	2.92946	0.003
$a^{SIEZ}_{104,K,5}$	0.042473	0.649968	0.516
$a^{SIET}_{104,K}$	0.00117529	3.67918	0.000
Biwako Bank (*i*=105)			
$a^{SIE}_{105,K}$	-4.91863	-776.668	0.000
$a^{SIEZ}_{105,K,4}$	-0.000556601	-11.7772	0.000
$a^{SIEZ}_{105,K,5}$	-0.068569	-9.47951	0.000
$a^{SIET}_{105,K}$	-0.00243296	-36.5452	0.000

Bank of Kinki (i=106)			
$a^{SIE}_{106,K}$	-4.73933	-63.3179	0.000
$a^{SIEZ}_{106,K,5}$	-0.206966	-2.52669	0.012
$a^{SIET}_{106,K}$	0.00000998423	0.013728	0.989
Fukutoku Bank (i=107)			
$a^{SIE}_{107,K}$	-5.09025	-243.346	0.000
$a^{SIEZ}_{107,K,5}$	0.163823	6.59186	0.000
$a^{SIET}_{107,K}$	-0.00330201	-11.6064	0.000
Kansai Bank (i=108)			
$a^{SIE}_{108,K}$	-4.61491	-128.075	0.000
$a^{SIEZ}_{108,K,5}$	-0.427574	-10.9115	0.000
$a^{SIET}_{108,K}$	0.000167014	0.589230	0.556
Kansai Urban Banking Corporation (i=109)			
$a^{SIE}_{109,K}$	-4.91900	-6227.20	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (i=110)			
$a^{SIE}_{110,K}$	-4.86956	-4264.58	.000
Taisho Bank (i=111)			
$a^{SIE}_{111,K}$	-4.70868	-71.1447	0.000
$a^{SIEZ}_{111,K,4}$	0.000655466	0.443144	0.658

$a^{SIEZ}_{111,K,5}$	-0.400698	-4.72440	0.000
$a^{SIET}_{111,K}$	-0.00439855	-4.69167	0.000
Hanwa Bank (*i*=112)			
$a^{SIE}_{112,K}$	-5.07287	-94.6302	0.000
$a^{SIEZ}_{112,K,5}$	0.024703	0.332462	0.740
$a^{SIET}_{112,K}$	-0.00652994	-5.83214	0.000
Hyogo Bank (*i*=113)			
$a^{SIE}_{113,K}$	-4.92661	-698.058	0.000
$a^{SIEZ}_{113,K,5}$	-0.032818	-4.14951	0.000
$a^{SIET}_{113,K}$	-0.00217683	-19.7469	0.000
Hanshin Bank (*i*=114)			
$a^{SIE}_{114,K}$	-5.11090	-128.321	0.000
$a^{SIEZ}_{114,K,5}$	0.119656	2.63368	0.008
$a^{SIET}_{114,K}$	-0.00324893	-11.4475	0.000
Minato Bank (*i*=115)			
$a^{SIE}_{115,K}$	-4.86375	-4673.13	0.000
$a^{SIET}_{115,K}$	0.000216053	1.51168	0.131
Shimane Bank (*i*=116)			
$a^{SIE}_{116,K}$	-4.99782	-28.5943	0.000

$a_{116,K,4}^{SIEZ}$	0.000708648	0.153746	0.878
$a_{116,K,5}^{SIEZ}$	-0.034380	-0.226749	0.821
$a_{116,K}^{SIET}$	-0.00169213	-8.53103	0.000
Tomato Bank (*i*=117)			
$a_{117,K}^{SIE}$	-5.06796	-146.960	0000
$a_{117,K,4}^{SIEZ}$	-0.00203722	-2.29443	0.022
$a_{117,K,5}^{SIEZ}$	0.055987	1.58740	0.112
$a_{117,K}^{SIET}$	0.00223463	4.91713	0.000
Setouchi Bank (*i*=118)			
$a_{118,K}^{SIE}$	-5.04297	-447.515	0.000
$a_{118,K,5}^{SIEZ}$	-0.011969	-0.960963	0.337
$a_{118,K}^{SIET}$	0.000372991	3.95707	0.000
Hiroshima Sogo Bank (*i*=119)			
$a_{119,K}^{SIE}$	-5.00960	-222.174	0.000
$a_{119,K,5}^{SIEZ}$	0.052948	2.03409	0.042
$a_{119,K}^{SIET}$	0.000426580	2.28194	0.022
Momiji Bank (*i*=120)			
$a_{120,K}^{SIE}$	-4.78880	-886.414	0.000

$a_{120,K}^{SIET}$	-0.00989187	-25.3974	0.000
Saikyo Bank (i=121)			
$a_{121,K}^{SIE}$	-5.09004	-242.209	0.000
$a_{121,K,4}^{SIEZ}$	0.000980187	0.847004	0.397
$a_{121,K,5}^{SIEZ}$	0.031479	1.72099	0.085
$a_{121,K}^{SIET}$	0.000859794	5.33775	0.000
Tokushima Bank (i=122)			
$a_{122,K}^{SIE}$	-5.18017	-98.7422	0.000
$a_{122,K,4}^{SIEZ}$	0.00469427	7.06397	0.000
$a_{122,K,5}^{SIEZ}$	0.143158	2.43889	0.015
$a_{122,K}^{SIET}$	0.0000797746	0.401450	0.688
Kagawa Bank (i=123)			
$a_{123,K}^{SIE}$	-5.06207	-65.4660	0.000
$a_{123,K,4}^{SIEZ}$	0.00390977	3.81126	0.000
$a_{123,K,5}^{SIEZ}$	0.030763	0.372454	0.710
$a_{123,K}^{SIET}$	0.00132305	3.55590	0.000
Ehime Bank (i=124)			
$a_{124,K}^{SIE}$	-5.03990	-54.6826	0.000

$a^{SIEZ}_{124,K,4}$	-0.00155715	-1.44916	0.147
$a^{SIEZ}_{124,K,5}$	0.101131	1.07431	0.283
$a^{SIET}_{124,K}$	0.00319731	5.61100	0.000
Bank of Kochi (*i*=125)			
$a^{SIE}_{125,K}$	-5.16579	-88.5752	0.000
$a^{SIEZ}_{125,K,4}$	-0.000828060	-0.664432	0.506
$a^{SIEZ}_{125,K,5}$	0.233885	4.18227	0.000
$a^{SIET}_{125,K}$	-0.000104760	-0.483253	0.629
Nishi-Nippon Sogo Bank (*i*=126)			
$a^{SIE}_{126,K}$	-4.94195	-6382.16	0.000
Nishi-Nippon Bank (*i*=127)			
$a^{SIE}_{127,K}$	-4.88853	-21067.1	0.000
$a^{SIET}_{127,K}$	0.00528089	77.9180	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128)			
$a^{SIE}_{128,K}$	-4.75655	-3038.41	0.000
$a^{SIET}_{128,K}$	-0.000765308	-7.06615	0.000
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129)			
Fukuoka City Bank (*i*=130)			
$a^{SIE}_{130,K}$	-5.26059	-87.1291	0.000

$a_{130,K,5}^{SIEZ}$	0.402658	5.45252	0.000
$a_{130,K}^{SIET}$	0.00113254	2.11742	0.034
Fukuoka Chuo Bank (*i*=131)			
$a_{131,K}^{SIE}$	-5.48251	-32.4109	0.000
$a_{131,K,4}^{SIEZ}$	0.00130512	0.587325	0.557
$a_{131,K,5}^{SIEZ}$	0.422436	2.32505	0.020
$a_{131,K}^{SIET}$	0.00102879	1.58333	0.113
Saga Kyoei Bank (*i*=132)			
$a_{132,K}^{SIE}$	-4.77326	-51.6234	0.000
$a_{132,K,4}^{SIEZ}$	0.00897713	2.90113	0.004
$a_{132,K,5}^{SIEZ}$	-0.430909	-3.88563	0.000
$a_{132,K}^{SIET}$	-0.000675184	-1.00751	0.314
Bank of Nagasaki (*i*=133)			
$a_{133,K}^{SIE}$	-5.02596	-106.921	0.000
$a_{133,K,4}^{SIEZ}$	0.00219866	3.00681	0.003
$a_{133,K,5}^{SIEZ}$	-0.079392	-1.40660	0.160
$a_{133,K}^{SIET}$	0.00152455	12.1374	0.000
Kyushu Bank (*i*=134)			

$a^{SIE}_{134,K}$	-4.70733	-54.7232	0.000
$a^{SIEZ}_{134,K,5}$	-0.364794	-3.70979	0.000
$a^{SIET}_{134,K}$	-0.00132244	-3.07269	0.002
Kumamoto Bank (i=135)			
$a^{SIE}_{135,K}$	-5.11364	-4508.68	0.000
$a^{SIET}_{135,K}$	-0.00304944	-38.1191	0.000
Kumamoto Family Bank (i=136)			
$a^{SIE}_{136,K}$	-5.01987	-597.290	0.000
$a^{SIEZ}_{136,K,5}$	0.051920	5.64746	0.000
$a^{SIET}_{136,K}$	-0.000964663	-33.7528	0.000
Higo Family Bank (i=137)			
$a^{SIE}_{137,K}$	-5.08471	-2106.50	0.000
$a^{SIET}_{137,K}$	-0.00710085	-44.8870	0.000
Howa Bank (i=138)			
$a^{SIE}_{138,K}$	-5.15090	-297.945	0.000
$a^{SIEZ}_{138,K,4}$	-0.00108080	-1.01301	0.311
$a^{SIEZ}_{138,K,5}$	0.129207	7.73701	0.000
$a^{SIET}_{138,K}$	-0.000811916	-1.89945	0.058
Miyazaki Taiyo Bank (i=139)			

$a^{SIE}_{139,K}$	-5.20353	-30.1128	0.000
$a^{SIEZ}_{139,K,4}$	0.00675987	4.47132	0.000
$a^{SIEZ}_{139,K,5}$	0.113894	0.614742	0.539
$a^{SIET}_{139,K}$	0.000324090	0.416500	0.677
Minami-Nippon Bank (*i*=140)			
$a^{SIE}_{140,K}$	-5.19450	-132.474	0.000
$a^{SIEZ}_{140,K,4}$	-0.000157803	-0.143672	0.886
$a^{SIEZ}_{140,K,5}$	0.217106	5.62048	0.000
$a^{SIET}_{140,K}$	-0.00231805	-6.96259	0.000
Okinawa Kaiho Bank (*i*=141)			
$a^{SIE}_{141,K}$	-4.81513	-249.337	0.000
$a^{SIEZ}_{141,K,4}$	0.000778777	0.412765	0.680
$a^{SIEZ}_{141,K,5}$	-0.170840	-5.06792	0.000
$a^{SIET}_{141,K}$	0.000107813	1.28524	0.199
Tokyo Star Bank (*i*=142)			
$a^{SIE}_{142,K}$	-5.17289	-500.454	0.000
$a^{SIET}_{142,K}$	0.021868	33.6807	0.000
Saitama Resona Bank (*i*=143)			

$a_{143,K}^{SIE}$	-4.94619	-832.228	0.000
$a_{143,K}^{SIET}$	0.020283	67.7364	0.000
Number of Observations	4821		
Order of MA for the Error Term	5		
Test for Overidentification [*p*-value]	638.969 [0.300]		
Value Function	0.132539		

Note: 1. Tables 4.1.3 to 4.1.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.1.1.2), respectively.

2. The details of Eq. (3.1.1.2.4c) are as follows:

$a_{i,K}^{SIE}\left(\mathbf{z}_{K,i,t}^{Q},\tau_t^*\right)=a_{i,K}^{SIE}+a_{i,K,4}^{SIEZ}\cdot z_{4,i,t}^{Q}+a_{i,K,5}^{SIEZ}\cdot z_{5,i,t}^{Q}+a_{i,K}^{SIET}\cdot\tau_t^*$, *i*=2, 3, 5, 6, 9-17, 21-38, 40-43, 46, 47, 49, 50, 52, 53, 56-60, 63, 64, 66, 67, 70-75, 79, 81, 83-88, 90, 93, 95-105, 111, 116, 117, 121-125, 131-133, 138-141,

$a_{i,K}^{SIE}\left(\mathbf{z}_{K,i,t}^{Q},\tau_t^*\right)=a_{i,K}^{SIE}+a_{i,K,5}^{SIEZ}\cdot z_{5,i,t}^{Q}+a_{i,K}^{SIET}\cdot\tau_t^*$, *i*=1, 8, 18, 44, 55, 62, 68, 76, 78, 82, 89, 91, 94, 106-108, 112-114, 118, 119, 130, 134, 136,

$a_{i,K}^{SIE}\left(\mathbf{z}_{K,i,t}^{Q},\tau_t^*\right)=a_{i,K}^{SIE}+a_{i,K}^{SIET}\cdot\tau_t^*$, *i*=7, 51, 54, 61, 69, 80, 92, 115, 120, 127, 128, 135, 137, 142, 143,

$a_{i,K}^{SIE}\left(\mathbf{z}_{K,i,t}^{Q},\tau_t^*\right)=a_{i,K}^{SIE}$, *i*=19, 20, 39, 45, 48, 65, 77, 109, 110, 126,

where $z_{4,i,t}^{Q}$, $z_{5,i,t}^{Q}$, and τ_t^* are respectively the loan per case, the proportion of loans for small and medium firms, and the normalized time trend.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, the products of these dummies and the normalized time trend, the products of these dummies and some

endogenous quality variables in the previous period, the products of these dummies and the estimate of the static cost share of the physical capital, the products of these dummies, the normalized time trend, and this estimate, and the products of these dummies, quality variables, and this estimate.

4. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
5. The Seiwa Bank (i=4) is added to the Michinoku Bank (i=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129) is added to the Nishi-Nippon City Bank (i=128).

Table 4.1.4 Estimation Results for Eq. (3.2.1.2) Composing Eq. (3.1.1.1.2)

Parameter	Estimate	*t*-statistic	*p*-value
Yachiyo Bank (The present Kiraboshi Bank) (*i*=1)			
$b_{1,L}^{SIE}$	-4.93978	-12.8458	0.000
$b_{1,L,5}^{SIEZ}$	-0.045248	-0.118100	0.906
$b_{1,L}^{SIET}$	0.00301594	0.711232	0.477
Hokkaido Bank (*i*=2)			
$b_{2,L}^{SIE}$	-4.88363	-98.3813	0.000
$b_{2,L,4}^{SIEZ}$	0.00158105	2.52188	0.012
$b_{2,L,5}^{SIEZ}$	-0.082207	-1.29465	0.195
$b_{2,L}^{SIET}$	-0.00121226	-2.57881	0.010
Aomori Bank (*i*=3)			
$b_{3,L}^{SIE}$	-5.17215	-81.7112	0.000
$b_{3,L,4}^{SIEZ}$	0.00197577	1.61288	0.107
$b_{3,L,5}^{SIEZ}$	0.272886	3.08514	0.002
$b_{3,L}^{SIET}$	0.000408521	0.810684	0.418
Seiwa Bank (*i*=4)			
Seiwa Bank and Michinoku Bank (*i*=5)			
$b_{5,L}^{SIE}$	-5.06295	-19.7024	0.000

$b^{SIEZ}_{5,L,4}$	0.00293402	1.08127	0.280
$b^{SIEZ}_{5,L,5}$	0.062718	0.186523	0.852
$b^{SIET}_{5,L}$	-0.00130438	-0.938522	0.348
Akita Bank (i=6)			
$b^{SIE}_{6,L}$	-5.27009	-66.1060	0.000
$b^{SIEZ}_{6,L,4}$	0.00490325	3.64927	0.000
$b^{SIEZ}_{6,L,5}$	0.331875	3.67470	0.000
$b^{SIET}_{6,L}$	0.000977495	2.47032	0.013
Ugo Bank (i=7)			
$b^{SIE}_{7,L}$	-5.10011	-1800.76	0.000
$b^{SIET}_{7,L}$	-0.00175017	-5.52669	0.000
Hokuto Bank (i=8)			
$b^{SIE}_{8,L}$	-4.93086	-250.754	0.000
$b^{SIEZ}_{8,L,5}$	-0.066093	-2.96955	0.003
$b^{SIET}_{8,L}$	-0.00717184	-23.1431	0.000
Shonai Bank (i=9)			
$b^{SIE}_{9,L}$	-4.97116	-154.973	0.000
$b^{SIEZ}_{9,L,4}$	-0.00364245	-2.01591	0.044

$b_{9,L,5}^{SIEZ}$	-0.130749	-4.14487	0.000
$b_{9,L}^{SIET}$	0.000362296	0.831050	0.406
Yamagata Bank (*i*=10)			
$b_{10,L}^{SIE}$	-5.09451	-137.668	0.000
$b_{10,L,4}^{SIEZ}$	0.00140475	1.25194	0.211
$b_{10,L,5}^{SIEZ}$	0.127927	2.42935	0.015
$b_{10,L}^{SIET}$	0.000442421	2.39131	0.017
Bank of Iwate (*i*=11)			
$b_{11,L}^{SIE}$	-5.13077	-164.539	0.000
$b_{11,L,4}^{SIEZ}$	0.000413909	0.677818	0.498
$b_{11,L,5}^{SIEZ}$	0.261036	6.15489	0.000
$b_{11,L}^{SIET}$	0.00123714	4.09255	0.000
Tohoku Bank (*i*=12)			
$b_{12,L}^{SIE}$	-5.05493	-91.3842	0.000
$b_{12,L,4}^{SIEZ}$	-0.00472766	-2.40551	0.016
$b_{12,L,5}^{SIEZ}$	-0.049573	-0.851279	0.395
$b_{12,L}^{SIET}$	-0.00212636	-7.08526	0.000
77 Bank (*i*=13)			

$b^{SIE}_{13,L}$	-5.07115	-156.840	0.000
$b^{SIEZ}_{13,L,4}$	0.000143034	0.264429	0.791
$b^{SIEZ}_{13,L,5}$	0.378898	8.30540	0.000
$b^{SIET}_{13,L}$	0.000112824	0.752452	0.452
Toho Bank (i=14)			
$b^{SIE}_{14,L}$	-5.04419	-76.1420	0.000
$b^{SIEZ}_{14,L,4}$	0.000391804	0.148315	0.882
$b^{SIEZ}_{14,L,5}$	0.184911	2.69234	0.007
$b^{SIET}_{14,L}$	0.00194681	2.66056	0.008
Gunma Bank (i=15)			
$b^{SIE}_{15,L}$	-4.38347	-12.4208	0.000
$b^{SIEZ}_{15,L,4}$	-0.00547481	-2.33585	0.019
$b^{SIEZ}_{15,L,5}$	-0.484007	-1.03951	0.299
$b^{SIET}_{15,L}$	0.010217	3.37660	0.001
Ashikaga Bank (i=16)			
$b^{SIE}_{16,L}$	-4.88010	-278.491	0.000
$b^{SIEZ}_{16,L,4}$	0.000872873	2.64534	0.008
$b^{SIEZ}_{16,L,5}$	0.094981	4.72538	0.000

$b_{16,L}^{SIET}$	0.00363015	17.1974	0.000
Joyo Bank (i=17)			
$b_{17,L}^{SIE}$	-4.89227	-266.259	0.000
$b_{17,L,4}^{SIEZ}$	0.000551510	2.94639	0.003
$b_{17,L,5}^{SIEZ}$	0.214702	7.31689	0.000
$b_{17,L}^{SIET}$	0.00341717	22.8289	0.000
Kanto Bank (i=18)			
$b_{18,L}^{SIE}$	-5.12069	-91.1785	0.000
$b_{18,L,5}^{SIEZ}$	0.030007	0.452714	0.651
$b_{18,L}^{SIET}$	0.00133460	2.83542	0.005
Kanto Tsukuba Bank (i=19)			
$b_{19,L}^{SIE}$	-5.03423	-4825.42	0.000
Tsukuba Bank (i=20)			
$b_{20,L}^{SIE}$	-4.91285	-4106.41	0.000
Musashino Bank (i=21)			
$b_{21,L}^{SIE}$	-5.01049	-219.609	0.000
$b_{21,L,4}^{SIEZ}$	-0.00130618	-3.58924	0.000
$b_{21,L,5}^{SIEZ}$	0.114580	3.73224	0.000
$b_{21,L}^{SIET}$	0.00763753	73.4856	0.000

Chiba Bank (i=22)			
$b^{SIE}_{22,L}$	-4.48725	-26.3529	0.000
$b^{SIEZ}_{22,L,4}$	-0.000695771	-0.331433	0.740
$b^{SIEZ}_{22,L,5}$	-0.325486	-1.64083	0.101
$b^{SIET}_{22,L}$	0.00991409	4.34297	0.000
Chiba Kogyo Bank (i=23)			
$b^{SIE}_{23,L}$	-5.30885	-62.3169	0.000
$b^{SIEZ}_{23,L,4}$	-0.000276851	-0.117354	0.907
$b^{SIEZ}_{23,L,5}$	0.376901	3.45913	0.001
$b^{SIET}_{23,L}$	0.00278485	3.88405	0.000
Tokyo Tomin Bank (i=24)			
$b^{SIE}_{24,L}$	-4.94685	-111.524	0.000
$b^{SIEZ}_{24,L,4}$	-0.00187632	-1.84527	0.065
$b^{SIEZ}_{24,L,5}$	0.020780	0.472067	0.637
$b^{SIET}_{24,L}$	0.00389782	8.71642	0.000
Bank of Yokohama (i=25)			
$b^{SIE}_{25,L}$	-4.43545	-58.5900	0.000
$b^{SIEZ}_{25,L,4}$	-0.0000295599	-0.068022	0.946

$b^{SIEZ}_{25,L,5}$	-0.309536	-2.77866	0.005
$b^{SIET}_{25,L}$	0.00992558	5.68530	0.000
Daishi Bank (*i*=26)			
$b^{SIE}_{26,L}$	-4.97301	-123.873	0.000
$b^{SIEZ}_{26,L,4}$	0.000741915	2.14639	0.032
$b^{SIEZ}_{26,L,5}$	0.100598	1.79837	0.072
$b^{SIET}_{26,L}$	0.00134503	6.47955	0.000
Hokuetsu Bank (*i*=27)			
$b^{SIE}_{27,L}$	-5.08339	-263.182	0.000
$b^{SIEZ}_{27,L,4}$	0.0000559567	0.087985	0.930
$b^{SIEZ}_{27,L,5}$	0.114452	4.47608	0.000
$b^{SIET}_{27,L}$	0.00130638	6.14899	0.000
Yamanashi Chuo Bank (*i*=28)			
$b^{SIE}_{28,L}$	-5.14706	-114.814	0.000
$b^{SIEZ}_{28,L,4}$	0.000348651	0.409715	0.682
$b^{SIEZ}_{28,L,5}$	0.276489	5.25229	0.000
$b^{SIET}_{28,L}$	0.00242751	6.27427	0.000
Hachijuni Bank (*i*=29)			

$b_{29,L}^{SIE}$	-4.96584	-65.0216	0.000
$b_{29,L,4}^{SIEZ}$	0.00174149	3.87733	0.000
$b_{29,L,5}^{SIEZ}$	0.166550	1.46944	0.142
$b_{29,L}^{SIET}$	0.000678330	2.35667	0.018
Hokuriku Bank (*i*=30)			
$b_{30,L}^{SIE}$	-4.69723	-81.9855	0.000
$b_{30,L,4}^{SIEZ}$	-0.00185083	-4.83705	0.000
$b_{30,L,5}^{SIEZ}$	-0.174699	-2.18561	0.029
$b_{30,L}^{SIET}$	-0.00183850	-9.02559	0.000
Bank of Toyama (*i*=31)			
$b_{31,L}^{SIE}$	-4.45271	-9.24130	0.000
$b_{31,L,4}^{SIEZ}$	-0.00617936	-0.626867	0.531
$b_{31,L,5}^{SIEZ}$	-0.702407	-1.38805	0.165
$b_{31,L}^{SIET}$	-0.00419572	-1.62628	0.104
Hokkoku Bank (*i*=32)			
$b_{32,L}^{SIE}$	-4.85811	-53.0022	0.000
$b_{32,L,4}^{SIEZ}$	-0.00257061	-3.86270	0.000
$b_{32,L,5}^{SIEZ}$	-0.013559	-0.105655	0.916

$b^{SIET}_{32,L}$	-0.000273859	-0.432464	0.665
Fukui Bank (*i*=33)			
$b^{SIE}_{33,L}$	-4.95864	-223.425	0.000
$b^{SIEZ}_{33,L,4}$	-0.000997282	-3.16994	0.002
$b^{SIEZ}_{33,L,5}$	0.039029	1.30980	0.190
$b^{SIET}_{33,L}$	-0.00122415	-8.32502	0.000
Shizuoka Bank (*i*=34)			
$b^{SIE}_{34,L}$	-4.86102	-107.189	0.000
$b^{SIEZ}_{34,L,4}$	-0.000393523	-0.801146	0.423
$b^{SIEZ}_{34,L,5}$	0.109349	1.52645	0.127
$b^{SIET}_{34,L}$	-0.000665491	-1.97408	0.048
Suruga Bank (*i*=35)			
$b^{SIE}_{35,L}$	-4.95137	-172.057	0.000
$b^{SIEZ}_{35,L,4}$	-0.000125083	-0.489781	0.624
$b^{SIEZ}_{35,L,5}$	0.023889	0.712897	0.476
$b^{SIET}_{35,L}$	-0.00179182	-6.18221	0.000
Shimizu Bank (*i*=36)			
$b^{SIE}_{36,L}$	-4.84211	-122.450	0.000

$b^{SIEZ}_{36,L,4}$	-0.00121052	-2.84459	0.004
$b^{SIEZ}_{36,L,5}$	-0.237458	-5.58786	0.000
$b^{SIET}_{36,L}$	-0.000228640	-0.706975	0.480
Ogaki Kyoritsu Bank (*i*=37)			
$b^{SIE}_{37,L}$	-4.97463	-187.743	0.000
$b^{SIEZ}_{37,L,4}$	-0.00131343	-2.86287	0.004
$b^{SIEZ}_{37,L,5}$	0.102642	3.00275	0.003
$b^{SIET}_{37,L}$	0.00231107	12.3789	0.000
Juroku Bank (*i*=38)			
$b^{SIE}_{38,L}$	-4.86696	-490.596	0.000
$b^{SIEZ}_{38,L,4}$	0.000173608	2.13949	0.032
$b^{SIEZ}_{38,L,5}$	-0.049328	-4.23216	0.000
$b^{SIET}_{38,L}$	0.00111764	16.3478	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
$b^{SIE}_{39,L}$	-4.87491	-3278.75	0.000
Mie Bank (*i*=40)			
$b^{SIE}_{40,L}$	-5.01829	-71.6661	0.000
$b^{SIEZ}_{40,L,4}$	-0.000411530	-0.713200	0.476

$b^{SIEZ}_{40,L,5}$	-0.033471	-0.379963	0.704
$b^{SIET}_{40,L}$	0.00206486	7.48212	0.000
Hyakugo Bank (*i*=41)			
$b^{SIE}_{41,L}$	-5.04003	-168.987	0.000
$b^{SIEZ}_{41,L,4}$	0.000243596	0.710132	0.478
$b^{SIEZ}_{41,L,5}$	0.186589	5.06490	0.000
$b^{SIET}_{41,L}$	0.00100165	4.67526	0.000
Shiga Bank (*i*=42)			
$b^{SIE}_{42,L}$	-5.05171	-244.180	0.000
$b^{SIEZ}_{42,L,4}$	0.000399440	0.984011	0.325
$b^{SIEZ}_{42,L,5}$	0.212328	7.21536	0.000
$b^{SIET}_{42,L}$	-0.000450933	-3.48281	0.000
Bank of Kyoto (*i*=43)			
$b^{SIE}_{43,L}$	-4.69718	-104.142	0.000
$b^{SIEZ}_{43,L,4}$	-0.00178340	-2.61638	0.009
$b^{SIEZ}_{43,L,5}$	-0.165804	-3.30853	0.001
$b^{SIET}_{43,L}$	0.00281260	10.8349	0.000
Osaka Bank (*i*=44)			

$b^{SIE}_{44,L}$	-5.00127	-18.7121	0.000
$b^{SIEZ}_{44,L,5}$	0.053587	0.175558	0.861
$b^{SIET}_{44,L}$	0.00236246	0.667708	0.504
Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			
$b^{SIE}_{45,L}$	-4.87825	-1668.22	0.000
Senshu Bank (*i*=46)			
$b^{SIE}_{46,L}$	-5.10613	-89.7106	0.000
$b^{SIEZ}_{46,L,4}$	0.00163783	2.93494	0.003
$b^{SIEZ}_{46,L,5}$	0.054558	0.841728	0.400
$b^{SIET}_{46,L}$	0.000427800	0.793720	0.427
Ikeda Bank (*i*=47)			
$b^{SIE}_{47,L}$	-5.28951	-103.427	0.000
$b^{SIEZ}_{47,L,4}$	0.00458362	4.13812	0.000
$b^{SIEZ}_{47,L,5}$	0.234697	4.28111	0.000
$b^{SIET}_{47,L}$	0.000201792	0.328797	0.742
Senshu Ikeda Bank (*i*=48)			
$b^{SIE}_{48,L}$	-4.90027	-6865.02	0.000
Nanto Bank (*i*=49)			
$b^{SIE}_{49,L}$	-5.36643	-70.7330	0.000

$b^{SIEZ}_{49,L,4}$	0.00301097	3.60530	0.000
$b^{SIEZ}_{49,L,5}$	0.647262	6.70153	0.000
$b^{SIET}_{49,L}$	0.000696929	2.40869	0.016
Kiyo Bank (*i*=50)			
$b^{SIE}_{50,L}$	-5.22766	-49.0046	0.000
$b^{SIEZ}_{50,L,4}$	0.00458425	6.30692	0.000
$b^{SIEZ}_{50,L,5}$	0.348224	2.55534	0.011
$b^{SIET}_{50,L}$	-0.000841157	-0.963875	0.335
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
$b^{SIE}_{51,L}$	-4.91740	-460.219	0.000
$b^{SIET}_{51,L}$	0.000128469	0.202088	0.840
Tajima Bank (*i*=52)			
$b^{SIE}_{52,L}$	-5.35998	-104.737	0.000
$b^{SIEZ}_{52,L,4}$	-0.00113879	-0.696753	0.486
$b^{SIEZ}_{52,L,5}$	0.299003	5.44669	0.000
$b^{SIET}_{52,L}$	-0.00120502	-3.26623	0.001
Tottori Bank (*i*=53)			
$b^{SIE}_{53,L}$	-5.13953	-568.433	0.000

$b^{SIEZ}_{53,L,4}$	-0.000603459	-2.61190	0.009
$b^{SIEZ}_{53,L,5}$	0.059184	5.35321	0.000
$b^{SIET}_{53,L}$	-0.00155249	-32.7485	0.000
San-in Godo Bank (*i*=54)			
$b^{SIE}_{54,L}$	-4.89348	-2906.25	0.000
$b^{SIET}_{54,L}$	0.00414944	26.9419	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			
$b^{SIE}_{55,L}$	-4.97456	-198.723	0.000
$b^{SIEZ}_{55,L,5}$	0.174242	4.79314	0.000
$b^{SIET}_{55,L}$	-0.00279440	-11.1206	0.000
Chugoku Bank (*i*=56)			
$b^{SIE}_{56,L}$	-4.89964	-162.051	0.000
$b^{SIEZ}_{56,L,4}$	0.000523671	2.00164	0.045
$b^{SIEZ}_{56,L,5}$	0.120167	3.22878	0.001
$b^{SIET}_{56,L}$	0.00267307	36.6911	0.000
Hiroshima Bank (*i*=57)			
$b^{SIE}_{57,L}$	-4.88476	-55.8472	0.000
$b^{SIEZ}_{57,L,4}$	0.00194420	5.45838	0.000

$b^{SIEZ}_{57,L,5}$	0.104614	0.833645	0.404
$b^{SIET}_{57,L}$	0.00109094	2.37160	0.018
Yamaguchi Bank (*i*=58)			
$b^{SIE}_{58,L}$	-5.12473	-124.058	0.000
$b^{SIEZ}_{58,L,4}$	0.00318935	3.74685	0.000
$b^{SIEZ}_{58,L,5}$	0.326051	3.90818	0.000
$b^{SIET}_{58,L}$	-0.000934403	-2.50813	0.012
Awa Bank (*i*=59)			
$b^{SIE}_{59,L}$	-5.29857	-85.4397	0.000
$b^{SIEZ}_{59,L,4}$	0.00218925	2.88290	0.004
$b^{SIEZ}_{59,L,5}$	0.352736	4.67834	0.000
$b^{SIET}_{59,L}$	-0.000707430	-1.23522	0.217
Hyakujushi Bank (*i*=60)			
$b^{SIE}_{60,L}$	-5.11678	-216.319	0.000
$b^{SIEZ}_{60,L,4}$	0.00107413	5.75480	0.000
$b^{SIEZ}_{60,L,5}$	0.274303	7.55054	0.000
$b^{SIET}_{60,L}$	0.00151239	8.62953	0.000
Iyo Bank (*i*=61)			

$b_{61,L}^{SIE}$	-4.83223	-2326.62	0.000
$b_{61,L}^{SIET}$	0.00710311	33.6024	0.000
Iyo Bank (merged with the Toho Sogo Bank) (*i*=62)			
$b_{62,L}^{SIE}$	-4.85713	-9033.35	0.000
$b_{62,L}^{SIET}$	0.00271900	16.7405	0.000
Shikoku Bank (*i*=63)			
$b_{63,L}^{SIE}$	-5.28954	-62.8524	0.000
$b_{63,L,4}^{SIEZ}$	0.00297920	1.44427	0.149
$b_{63,L,5}^{SIEZ}$	0.402006	3.83584	0.000
$b_{63,L}^{SIET}$	-0.000442897	-0.811349	0.417
Bank of Fukuoka (*i*=64)			
$b_{64,L}^{SIE}$	-4.34706	-27.0698	0.000
$b_{64,L,4}^{SIEZ}$	-0.00142249	-1.05484	0.292
$b_{64,L,5}^{SIEZ}$	-0.605995	-2.69049	0.007
$b_{64,L}^{SIET}$	0.00554815	3.90918	0.000
Chikuho Bank (*i*=65)			
$b_{65,L}^{SIE}$	-5.16932	-2491.69	0.000
Bank of Saga (*i*=66)			
$b_{66,L}^{SIE}$	-5.40991	-57.3052	0.000

$b^{SIEZ}_{66,L,4}$	0.00490083	2.84469	0.004
$b^{SIEZ}_{66,L,5}$	0.473385	3.35529	0.001
$b^{SIET}_{66,L}$	-0.000533439	-0.855273	0.392
Eighteenth Bank (*i*=67)			
$b^{SIE}_{67,L}$	-5.22713	-119.737	0.000
$b^{SIEZ}_{67,L,4}$	0.000241207	0.359174	0.719
$b^{SIEZ}_{67,L,5}$	0.367196	6.10618	0.000
$b^{SIET}_{67,L}$	0.000944546	3.96194	0.000
Shinwa Bank (*i*=68)			
$b^{SIE}_{68,L}$	-5.00215	-246.688	0.000
$b^{SIEZ}_{68,L,5}$	0.055941	2.28625	0.022
$b^{SIET}_{68,L}$	0.00195751	16.6632	0.000
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
$b^{SIE}_{69,L}$	-4.82777	-1050.43	0.000
$b^{SIET}_{69,L}$	-0.00954359	-27.8433	0.000
Higo Bank (*i*=70)			
$b^{SIE}_{70,L}$	-5.14929	-49.5412	0.000
$b^{SIEZ}_{70,L,4}$	-0.00153695	-0.613518	0.540

$b^{SIEZ}_{70,L,5}$	0.401082	2.59869	0.009
$b^{SIET}_{70,L}$	0.00273689	4.19706	0.000
Oita Bank (*i*=71)			
$b^{SIE}_{71,L}$	-5.19768	-83.3648	0.000
$b^{SIEZ}_{71,L,4}$	-0.000435744	-0.423437	0.672
$b^{SIEZ}_{71,L,5}$	0.385198	4.18472	0.000
$b^{SIET}_{71,L}$	0.00154015	2.72163	0.006
Miyazaki Bank (*i*=72)			
$b^{SIE}_{72,L}$	-5.12421	-129.573	0.000
$b^{SIEZ}_{72,L,4}$	0.000162739	0.464976	0.642
$b^{SIEZ}_{72,L,5}$	0.171352	3.29181	0.001
$b^{SIET}_{72,L}$	0.00414055	49.6219	0.000
Kagoshima Bank (*i*=73)			
$b^{SIE}_{73,L}$	-4.65238	-113.574	0.000
$b^{SIEZ}_{73,L,4}$	-0.00139182	-2.41410	0.016
$b^{SIEZ}_{73,L,5}$	-0.360886	-6.99914	0.000
$b^{SIET}_{73,L}$	0.00311444	26.1125	0.000
Bank of Ryukyu (*i*=74)			

$b_{74,L}^{SIE}$	-5.04609	-318.602	0.000
$b_{74,L,4}^{SIEZ}$	-0.000864889	-2.81546	0.005
$b_{74,L,5}^{SIEZ}$	0.088160	5.22824	0.000
$b_{74,L}^{SIET}$	0.0000222548	0.130807	0.896
Bank of Okinawa (*i*=75)			
$b_{75,L}^{SIE}$	-5.28068	-130.457	0.000
$b_{75,L,4}^{SIEZ}$	0.000449907	0.658230	0.510
$b_{75,L,5}^{SIEZ}$	0.315881	7.36155	0.000
$b_{75,L}^{SIET}$	0.000316126	1.03562	0.300
North Pacific Bank (*i*=76)			
$b_{76,L}^{SIE}$	-4.53058	-38.1719	0.000
$b_{76,L,5}^{SIEZ}$	-0.514855	-3.30909	0.001
$b_{76,L}^{SIET}$	-0.00495146	-6.19127	0.000
North Pacific Bank (merged with the Sapporo Bank) (*i*=77)			
$b_{77,L}^{SIE}$	-4.90991	-1556.44	0.000
Sapporo Bank (*i*=78)			
$b_{78,L}^{SIE}$	-5.29679	-77.7781	0.000
$b_{78,L,5}^{SIEZ}$	0.419501	4.82478	0.000

$b^{SIET}_{78,L}$	-0.00574392	-12.0372	0.000
Syokusan Bank (*i*=79)			
$b^{SIE}_{79,L}$	-5.56434	-53.7953	0.000
$b^{SIEZ}_{79,L,4}$	0.017173	4.72475	0.000
$b^{SIEZ}_{79,L,5}$	0.502334	4.38136	0.000
$b^{SIET}_{79,L}$	-0.00443401	-6.00769	0.000
Kirayaka Bank (*i*=80)			
$b^{SIE}_{80,L}$	-4.98634	-505.879	0.000
$b^{SIET}_{80,L}$	-0.000173199	-0.313168	0.754
Kita-Nippon Bank (*i*=81)			
$b^{SIE}_{81,L}$	-5.00804	-92.0838	0.000
$b^{SIEZ}_{81,L,4}$	-0.00270030	-3.74227	0.000
$b^{SIEZ}_{81,L,5}$	0.059367	0.915428	0.360
$b^{SIET}_{81,L}$	-0.00133655	-3.32214	0.001
Tokuyo City Bank (*i*=82)			
$b^{SIE}_{82,L}$	-5.05601	-275.971	0.000
$b^{SIEZ}_{82,L,5}$	0.036387	1.65105	0.099
$b^{SIET}_{82,L}$	-0.00474260	-125.372	0.000
Sendai Bank (*i*=83)			

$b^{SIE}_{83,L}$	-5.01024	-264.427	0.000
$b^{SIEZ}_{83,L,4}$	-0.00284978	-4.13635	0.000
$b^{SIEZ}_{83,L,5}$	0.049835	2.29839	0.022
$b^{SIET}_{83,L}$	-0.000897210	-6.07320	0.000
Fukushima Bank (*i*=84)			
$b^{SIE}_{84,L}$	-4.82073	-50.5102	0.000
$b^{SIEZ}_{84,L,4}$	-0.00677283	-4.46406	0.000
$b^{SIEZ}_{84,L,5}$	-0.142637	-1.29918	0.194
$b^{SIET}_{84,L}$	-0.00314245	-8.48907	0.000
Daito Bank (*i*=85)			
$b^{SIE}_{85,L}$	-5.03108	-80.7808	0.000
$b^{SIEZ}_{85,L,4}$	-0.00341903	-1.61834	0.106
$b^{SIEZ}_{85,L,5}$	0.073689	1.22754	0.220
$b^{SIET}_{85,L}$	-0.00122967	-3.13556	0.002
Towa Bank (*i*=86)			
$b^{SIE}_{86,L}$	-5.14516	-32.9936	0.000
$b^{SIEZ}_{86,L,4}$	0.00443215	3.51933	0.000
$b^{SIEZ}_{86,L,5}$	0.163174	0.951849	0.341

$b^{SIET}_{86,L}$	0.00213177	6.34744	0.000
Tochigi Bank (*i*=87)			
$b^{SIE}_{87,L}$	-5.22363	-28.6599	0.000
$b^{SIEZ}_{87,L,4}$	0.00267418	2.39299	0.017
$b^{SIEZ}_{87,L,5}$	0.256013	1.28206	0.200
$b^{SIET}_{87,L}$	0.00706495	4.46735	0.000
Keiyo Bank (*i*=88)			
$b^{SIE}_{88,L}$	-4.72265	-25.4465	0.000
$b^{SIEZ}_{88,L,4}$	-0.000861527	-1.25719	0.209
$b^{SIEZ}_{88,L,5}$	-0.202522	-0.929544	0.353
$b^{SIET}_{88,L}$	0.00932320	14.8366	0.000
Taiheiyo Bank (*i*=89)			
$b^{SIE}_{89,L}$	-4.89858	-100.420	0.000
$b^{SIEZ}_{89,L,5}$	-0.259430	-5.41470	0.000
$b^{SIET}_{89,L}$	-0.00194738	-2.93798	0.003
Higashi-Nippon Bank (*i*=90)			
$b^{SIE}_{90,L}$	-4.96917	-41.2171	0.000
$b^{SIEZ}_{90,L,4}$	0.00219132	1.53168	0.126

$b^{SIEZ}_{90,L,5}$	-0.058074	-0.485114	0.628
$b^{SIET}_{90,L}$	0.00350650	3.35301	0.001
Tokyo Sowa Bank (*i*=91)			
$b^{SIE}_{91,L}$	-5.03823	-195.657	0.000
$b^{SIEZ}_{91,L,5}$	0.081874	2.88346	0.004
$b^{SIET}_{91,L}$	-0.00114807	-3.90984	0.000
Heiwa Sogo Bank (*i*=92)			
$b^{SIE}_{92,L}$	-5.09015	-1582.26	0.000
$b^{SIET}_{92,L}$	-0.00942373	-45.1652	0.000
Kanagawa Bank (*i*=93)			
$b^{SIE}_{93,L}$	-5.09184	-503.811	0.000
Niigata Chuo Bank (*i*=94)			
$b^{SIE}_{94,L}$	-4.73491	-54.0232	0.000
$b^{SIEZ}_{94,L,5}$	-0.278701	-2.99546	0.003
$b^{SIET}_{94,L}$	-0.00220835	-2.61338	0.009
Taiko Bank (*i*=95)			
$b^{SIE}_{95,L}$	-5.01731	-58.3752	0.000
$b^{SIEZ}_{95,L,4}$	-0.000815204	-0.277897	0.781
$b^{SIEZ}_{95,L,5}$	0.064937	0.808417	0.419

$b^{SIET}_{95,L}$	0.000951830	1.42708	0.154
Nagano Bank (*i*=96)			
$b^{SIE}_{96,L}$	-5.01512	-57.1554	0.000
$b^{SIEZ}_{96,L,4}$	0.00340638	0.737077	0.461
$b^{SIEZ}_{96,L,5}$	0.00731497	0.098038	0.922
$b^{SIET}_{96,L}$	-0.000731455	-1.57024	0.116
First Bank of Toyama (*i*=97)			
$b^{SIE}_{97,L}$	-5.26175	-26.5826	0.000
$b^{SIEZ}_{97,L,4}$	0.00888838	2.31965	0.020
$b^{SIEZ}_{97,L,5}$	0.267278	1.43431	0.151
$b^{SIET}_{97,L}$	-0.00125284	-1.34735	0.178
Fukuho Bank (*i*=98)			
$b^{SIE}_{98,L}$	-2.69354	-3.52952	0.000
$b^{SIEZ}_{98,L,4}$	-0.032802	-3.55939	0.000
$b^{SIEZ}_{98,L,5}$	-2.08238	-2.30615	0.021
$b^{SIET}_{98,L}$	-0.00409622	-1.31436	0.189
Shizuokachuo Bank (*i*=99)			
$b^{SIE}_{99,L}$	-5.76576	-16.7705	0.000

$b^{SIEZ}_{99,L,4}$	-0.000119699	-0.095442	0.924
$b^{SIEZ}_{99,L,5}$	0.841157	2.22722	0.026
$b^{SIET}_{99,L}$	-0.000980792	-0.841743	0.400
Gifu Bank (*i*=100)			
$b^{SIE}_{100,L}$	-4.99543	-52.2651	0.000
$b^{SIEZ}_{100,L,4}$	0.015021	3.96525	0.000
$b^{SIEZ}_{100,L,5}$	-0.150671	-1.83946	0.066
$b^{SIET}_{100,L}$	-0.00651329	-8.89181	0.000
Aichi Bank (*i*=101)			
$b^{SIE}_{101,L}$	-4.49408	-22.7560	0.000
$b^{SIEZ}_{101,L,4}$	-0.00679179	-4.57348	0.000
$b^{SIEZ}_{101,L,5}$	-0.385356	-1.70797	0.088
$b^{SIET}_{101,L}$	0.00399066	6.66171	0.000
Bank of Nagoya (*i*=102)			
$b^{SIE}_{102,L}$	-5.04582	-108.926	0.000
$b^{SIEZ}_{102,L,4}$	0.000902622	0.583751	0.559
$b^{SIEZ}_{102,L,5}$	0.126749	1.91761	0.055
$b^{SIET}_{102,L}$	0.000427090	0.514424	0.607

Chukyo Bank (i=103)			
$b^{SIE}_{103,L}$	-5.00385	-49.0491	0.000
$b^{SIEZ}_{103,L,4}$	0.0000373486	0.043103	0.966
$b^{SIEZ}_{103,L,5}$	0.080201	0.648642	0.517
$b^{SIET}_{103,L}$	-0.000876477	-1.89819	0.058
Daisan Bank (i=104)			
$b^{SIE}_{104,L}$	-4.96970	-60.2088	0.000
$b^{SIEZ}_{104,L,4}$	0.00196217	2.18557	0.029
$b^{SIEZ}_{104,L,5}$	0.012387	0.136692	0.891
$b^{SIET}_{104,L}$	0.00114654	2.06675	0.039
Biwako Bank (i=105)			
$b^{SIE}_{105,L}$	-4.90812	-407.303	0.000
$b^{SIEZ}_{105,L,4}$	-0.000580321	-4.72833	0.000
$b^{SIEZ}_{105,L,5}$	-0.080139	-6.20430	0.000
$b^{SIET}_{105,L}$	-0.00238688	-16.1630	0.000
Bank of Kinki (i=106)			
$b^{SIE}_{106,L}$	-4.72202	-33.7263	0.000
$b^{SIEZ}_{106,L,5}$	-0.221407	-1.42849	0.153

$b_{106,L}^{SIET}$	0.000420265	0.369755	0.712
Fukutoku Bank (*i*=107)			
$b_{107,L}^{SIE}$	-5.08149	-113.748	0.000
$b_{107,L,5}^{SIEZ}$	0.153991	2.80695	0.005
$b_{107,L}^{SIET}$	-0.00319670	-8.24782	0.000
Kansai Bank (*i*=108)			
$b_{108,L}^{SIE}$	-4.48722	-49.2398	0.000
$b_{108,L,5}^{SIEZ}$	-0.563664	-5.70724	0.000
$b_{108,L}^{SIET}$	0.00102638	1.52912	0.126
Kansai Urban Banking Corporation (*i*=109)			
$b_{109,L}^{SIE}$	-4.91937	-3799.98	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (*i*=110)			
$b_{110,L}^{SIE}$	-4.86952	-2308.19	0.000
Taisho Bank (*i*=111)			
$b_{111,L}^{SIE}$	-4.43224	-30.2210	0.000
$b_{111,L,4}^{SIEZ}$	0.00115343	0.524590	0.600
$b_{111,L,5}^{SIEZ}$	-0.719573	-4.29010	0.000
$b_{111,L}^{SIET}$	-0.00379737	-2.31002	0.021
Hanwa Bank (*i*=112)			

$b^{SIE}_{112,L}$	-5.06276	-52.2304	0.000
$b^{SIEZ}_{112,L,5}$	-0.00487569	-0.031440	0.975
$b^{SIET}_{112,L}$	-0.00760794	-2.55652	0.011
Hyogo Bank (*i*=113)			
$b^{SIE}_{113,L}$	-4.90778	-278.770	0.000
$b^{SIEZ}_{113,L,5}$	-0.054407	-2.69698	0.007
$b^{SIET}_{113,L}$	-0.00190270	-6.61236	0.000
Hanshin Bank (*i*=114)			
$b^{SIE}_{114,L}$	-5.16241	-68.1548	0.000
$b^{SIEZ}_{114,L,5}$	0.177602	2.10238	0.036
$b^{SIET}_{114,L}$	-0.00350060	-6.30626	0.000
Minato Bank (*i*=115)			
$b^{SIE}_{115,L}$	-4.85907	-1712.87	0.000
$b^{SIET}_{115,L}$	-0.000344522	-1.44868	0.147
Shimane Bank (*i*=116)			
$b^{SIE}_{116,L}$	-4.99810	-18.0522	0.000
$b^{SIEZ}_{116,L,4}$	0.000700022	0.096051	0.923
$b^{SIEZ}_{116,L,5}$	-0.034590	-0.143259	0.886

$b^{SIET}_{116,L}$	-0.00173890	-6.15276	0.000
Tomato Bank (i=117)			
$b^{SIE}_{117,L}$	-5.09038	-65.4932	0.000
$b^{SIEZ}_{117,L,4}$	-0.000376179	-0.198319	0.843
$b^{SIEZ}_{117,L,5}$	0.062722	0.857362	0.391
$b^{SIET}_{117,L}$	0.00190668	2.10173	0.036
Setouchi Bank (i=118)			
$b^{SIE}_{118,L}$	-5.03295	-277.622	0.000
$b^{SIEZ}_{118,L,5}$	-0.023660	-1.14542	0.252
$b^{SIET}_{118,L}$	0.000390530	2.24804	0.025
Hiroshima Sogo Bank (i=119)			
$b^{SIE}_{119,L}$	-4.97504	-153.264	0.000
$b^{SIEZ}_{119,L,5}$	0.013348	0.351791	0.725
$b^{SIET}_{119,L}$	0.000499879	2.09913	0.036
Momiji Bank (i=120)			
$b^{SIE}_{120,L}$	-4.78605	-918.086	0.000
$b^{SIET}_{120,L}$	-0.010181	-28.2136	0.000
Saikyo Bank (i=121)			
$b^{SIE}_{121,L}$	-5.10279	-234.858	0.000

$b^{SIEZ}_{121,L,4}$	0.000529658	0.359933	0.719
$b^{SIEZ}_{121,L,5}$	0.051000	1.78444	0.074
$b^{SIET}_{121,L}$	0.000936467	4.42498	0.000
Tokushima Bank (*i*=122)			
$b^{SIE}_{122,L}$	-5.21732	-103.314	0.000
$b^{SIEZ}_{122,L,4}$	0.00492585	2.93061	0.003
$b^{SIEZ}_{122,L,5}$	0.184497	3.36356	0.001
$b^{SIET}_{122,L}$	-0.0000656242	-0.238828	0.811
Kagawa Bank (*i*=123)			
$b^{SIE}_{123,L}$	-5.04371	-41.2414	0.000
$b^{SIEZ}_{123,L,4}$	0.00432451	3.29975	0.001
$b^{SIEZ}_{123,L,5}$	0.00459526	0.035264	0.972
$b^{SIET}_{123,L}$	0.00121434	1.92298	0.054
Ehime Bank (*i*=124)			
$b^{SIE}_{124,L}$	-5.01076	-34.4427	0.000
$b^{SIEZ}_{124,L,4}$	-0.00188542	-1.07567	0.282
$b^{SIEZ}_{124,L,5}$	0.071802	0.492116	0.623
$b^{SIET}_{124,L}$	0.00300709	3.30549	0.001

Bank of Kochi (i=125)			
$b^{SIE}_{125,L}$	-5.09706	-49.6819	0.000
$b^{SIEZ}_{125,L,4}$	-0.00159219	-0.721983	0.470
$b^{SIEZ}_{125,L,5}$	0.162630	1.68076	0.093
$b^{SIET}_{125,L}$	-0.000264836	-0.873577	0.382
Nishi-Nippon Sogo Bank (i=126)			
$b^{SIE}_{126,L}$	-4.94192	-4054.22	0.000
Nishi-Nippon Bank (i=127)			
$b^{SIE}_{127,L}$	-4.88856	-13876.5	0.000
$b^{SIET}_{127,L}$	0.00527598	48.3461	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=128)			
$b^{SIE}_{128,L}$	-4.75639	-1691.29	0.000
$b^{SIET}_{128,L}$	-0.000760474	-3.44927	0.001
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129)			
Fukuoka City Bank (i=130)			
$b^{SIE}_{130,L}$	-5.33642	-38.6384	0.000
$b^{SIEZ}_{130,L,5}$	0.495780	2.92753	0.003
$b^{SIET}_{130,L}$	0.000505551	0.425305	0.671
Fukuoka Chuo Bank (i=131)			

$b^{SIE}_{131,L}$	-5.08405	-1011.92	0.000
$b^{SIET}_{131,L}$	0.00119676	2.50624	0.012
Saga Kyoei Bank (*i*=132)			
$b^{SIE}_{132,L}$	-4.78104	-29.6534	0.000
$b^{SIEZ}_{132,L,4}$	0.010129	2.50599	0.012
$b^{SIEZ}_{132,L,5}$	-0.431790	-2.26007	0.024
$b^{SIET}_{132,L}$	-0.000708926	-0.637662	0.524
Bank of Nagasaki (*i*=133)			
$b^{SIE}_{133,L}$	-5.02105	-53.7422	0.000
$b^{SIEZ}_{133,L,4}$	0.00171536	1.45355	0.146
$b^{SIEZ}_{133,L,5}$	-0.080609	-0.730565	0.465
$b^{SIET}_{133,L}$	0.00151012	6.99698	0.000
Kyushu Bank (*i*=134)			
$b^{SIE}_{134,L}$	-4.73253	-31.8655	0.000
$b^{SIEZ}_{134,L,5}$	-0.338324	-1.93131	0.053
$b^{SIET}_{134,L}$	-0.00139934	-1.47231	0.141
Kumamoto Bank (*i*=135)			
$b^{SIE}_{135,L}$	-5.11398	-2865.74	0.000

$b^{SIET}_{135,L}$	-0.00304580	-18.4299	0.000
Kumamoto Family Bank (i=136)			
$b^{SIE}_{136,L}$	-4.98181	-3927.08	0.000
Higo Family Bank (i=137)			
$b^{SIE}_{137,L}$	-5.08509	-1306.03	0.000
$b^{SIET}_{137,L}$	-0.00718691	-29.2776	0.000
Howa Bank (i=138)			
$b^{SIE}_{138,L}$	-5.20653	-153.281	0.000
$b^{SIEZ}_{138,L,4}$	0.00220057	0.823271	0.410
$b^{SIEZ}_{138,L,5}$	0.155448	3.54158	0.000
$b^{SIET}_{138,L}$	-0.00212027	-1.97420	0.048
Miyazaki Taiyo Bank (i=139)			
$b^{SIE}_{139,L}$	-5.18114	-17.1777	0.000
$b^{SIEZ}_{139,L,4}$	0.00781066	3.64188	0.000
$b^{SIEZ}_{139,L,5}$	0.081244	0.248736	0.804
$b^{SIET}_{139,L}$	0.00000887185	0.00709057	0.994
Minami-Nippon Bank (i=140)			
$b^{SIE}_{140,L}$	-5.23578	-80.2350	0.000
$b^{SIEZ}_{140,L,4}$	0.00198821	1.17714	0.239

$b^{SIEZ}_{140,L,5}$	0.240052	3.69640	0.000
$b^{SIET}_{140,L}$	-0.00243703	-4.64956	0.000
Okinawa Kaiho Bank (*i*=141)			
$b^{SIE}_{141,L}$	-4.78015	-153.955	0.000
$b^{SIEZ}_{141,L,4}$	0.000878494	0.288446	0.773
$b^{SIEZ}_{141,L,5}$	-0.212691	-3.85325	0.000
$b^{SIET}_{141,L}$	0.000165956	0.889565	0.374
Tokyo Star Bank (*i*=142)			
$b^{SIE}_{142,L}$	-5.18168	-1089.65	0.000
$b^{SIET}_{142,L}$	0.022476	76.6203	0.000
Saitama Resona Bank (*i*=143)			
$b^{SIE}_{143,L}$	-4.94215	-412.804	0.000
$b^{SIET}_{143,L}$	0.019968	31.1551	0.000
Number of Observations	4821		
Order of MA for the Error Term	5		
Test for Overidentification [*p*-value]	634.143 [0.457]		
Value Function	0.131538		

Note: 1. Tables 4.1.3 to 4.1.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.1.1.2), respectively.

2. The details of Eq. (3.1.1.2.4d) are as follows:

$b_{i,L}^{SIE}\left(\mathbf{z}_{L,i,t}^{Q},\tau_t^*\right)=b_{i,L}^{SIE}+b_{i,L,4}^{SIEZ}\cdot z_{4,i,t}^{Q}+b_{i,L,5}^{SIEZ}\cdot z_{5,i,t}^{Q}+b_{i,L}^{SIET}\cdot\tau_t^*$, i=2, 3, 5, 6, 9-17, 21-38, 40-43, 46, 47, 49, 50, 52, 53, 56-60, 63, 64, 66, 67, 70-75, 79, 81, 83-88, 90, 95-105, 111, 116, 117, 121-125, 132, 133, 138-141,

$b_{i,L}^{SIE}\left(\mathbf{z}_{L,i,t}^{Q},\tau_t^*\right)=b_{i,L}^{SIE}+b_{i,L,5}^{SIEZ}\cdot z_{5,i,t}^{Q}+b_{i,L}^{SIET}\cdot\tau_t^*$, i=1, 8, 18, 44, 55, 68, 76, 78, 82, 89, 91, 94, 106-108, 112-114, 118, 119, 130, 134,

$b_{i,L}^{SIE}\left(\mathbf{z}_{L,i,t}^{Q},\tau_t^*\right)=b_{i,L}^{SIE}+b_{i,L}^{SIET}\cdot\tau_t^*$, i=7, 51, 54, 61, 62, 69, 80, 92, 115, 120, 127, 128, 131, 135, 137, 142, 143,

$b_{i,L}^{SIE}\left(\mathbf{z}_{L,i,t}^{Q},\tau_t^*\right)=b_{i,L}^{SIE}$, i=19, 20, 39, 45, 48, 65, 77, 93, 109, 110, 126, 136

where $z_{4,i,t}^{Q}$, $z_{5,i,t}^{Q}$, and τ_t^* are respectively the loan per case, the proportion of loans for small and medium firms, and the normalized time trend.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, the products of these dummies and the normalized time trend, the products of these dummies and some endogenous quality variables in the previous period, the products of these dummies and the estimate of the static cost share of the labor, the products of these dummies, the normalized time trend, and this estimate, and the products of these dummies, quality variables, and this estimate.

4. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.

5. The Seiwa Bank (i=4) is added to the Michinoku Bank (i=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129) is added to the Nishi-Nippon City Bank (i=128).

Table 4.1.5 Estimation Results for Eq. (3.2.1.3) Composing Eq. (3.1.1.1.2)

Parameter	Estimate	*t*-statistic	*p*-value
Yachiyo Bank (The present Kiraboshi Bank) (*i*=1)			
$b_{1,V}^{SIE}$	-4.95829	-9.99725	0.000
$b_{1,V,5}^{SIEZ}$	-0.029998	-0.060764	0.952
$b_{1,V}^{SIET}$	0.00413870	0.779396	0.436
Hokkaido Bank (*i*=2)			
$b_{2,V}^{SIE}$	-4.92101	-87.5359	0.000
$b_{2,V,4}^{SIEZ}$	0.00251829	1.76163	0.078
$b_{2,V,5}^{SIEZ}$	-0.047091	-0.678914	0.497
$b_{2,V}^{SIET}$	-0.00136006	-2.48201	0.013
Aomori Bank (*i*=3)			
$b_{3,V}^{SIE}$	-5.20225	-41.8322	0.000
$b_{3,V,4}^{SIEZ}$	0.00314817	1.34364	0.179
$b_{3,V,5}^{SIEZ}$	0.292053	1.76342	0.078
$b_{3,V}^{SIET}$	0.000823543	0.760924	0.447
Seiwa Bank (*i*=4)			
Seiwa Bank and Michinoku Bank (*i*=5)			
$b_{5,V}^{SIE}$	-4.79322	-9.62772	0.000

$b_{5,V,4}^{SIEZ}$	0.00162165	0.355200	0.722
$b_{5,V,5}^{SIEZ}$	-0.282501	-0.442745	0.658
$b_{5,V}^{SIET}$	-0.00285160	-1.11931	0.263
Akita Bank (*i*=6)			
$b_{6,V}^{SIE}$	-5.26088	-49.5079	0.000
$b_{6,V,4}^{SIEZ}$	0.00465259	1.76418	0.078
$b_{6,V,5}^{SIEZ}$	0.325309	2.77467	0.006
$b_{6,V}^{SIET}$	0.000659588	0.864219	0.387
Ugo Bank (*i*=7)			
$b_{7,V}^{SIE}$	-5.10377	-1029.59	0.000
$b_{7,V}^{SIET}$	-0.00218026	-4.17366	0.000
Hokuto Bank (*i*=8)			
$b_{8,V}^{SIE}$	-4.97599	-157.973	0.000
$b_{8,V,5}^{SIEZ}$	-0.016398	-0.487668	0.626
$b_{8,V}^{SIET}$	-0.00626420	-9.79487	0.000
Shonai Bank (*i*=9)			
$b_{9,V}^{SIE}$	-4.99764	-82.0658	0.000
$b_{9,V,4}^{SIEZ}$	-0.000730490	-0.170575	0.865

$b_{9,V,5}^{SIEZ}$	-0.129011	-2.36242	0.018
$b_{9,V}^{SIET}$	-0.0000349389	-0.037061	0.970
Yamagata Bank (*i*=10)			
$b_{10,V}^{SIE}$	-5.04764	-74.9125	0.000
$b_{10,V,4}^{SIEZ}$	0.00278734	1.35786	0.175
$b_{10,V,5}^{SIEZ}$	0.035709	0.371142	0.711
$b_{10,V}^{SIET}$	0.000262212	0.779074	0.436
Bank of Iwate (*i*=11)			
$b_{11,V}^{SIE}$	-5.03483	-88.3298	0.000
$b_{11,V,4}^{SIEZ}$	-0.000853619	-0.583953	0.559
$b_{11,V,5}^{SIEZ}$	0.131071	1.73941	0.082
$b_{11,V}^{SIET}$	0.000897046	1.35568	0.175
Tohoku Bank (*i*=12)			
$b_{12,V}^{SIE}$	-4.80558	-39.7693	0.000
$b_{12,V,4}^{SIEZ}$	-0.011419	-3.07960	0.002
$b_{12,V,5}^{SIEZ}$	-0.272837	-2.34046	0.019
$b_{12,V}^{SIET}$	-0.00215076	-4.37892	0.000
77 Bank (*i*=13)			

$b_{13,V}^{SIE}$	-5.03525	-79.2111	0.000
$b_{13,V,4}^{SIEZ}$	-0.000637151	-0.502769	0.615
$b_{13,V,5}^{SIEZ}$	0.338647	4.15205	0.000
$b_{13,V}^{SIET}$	0.000281584	0.879565	0.379
Toho Bank (i=14)			
$b_{14,V}^{SIE}$	-5.16788	-43.2989	0.000
$b_{14,V,4}^{SIEZ}$	0.00476601	1.33409	0.182
$b_{14,V,5}^{SIEZ}$	0.286036	2.28259	0.022
$b_{14,V}^{SIET}$	0.00130306	1.47572	0.140
Gunma Bank (i=15)			
$b_{15,V}^{SIE}$	-4.96269	-9.25102	0.000
$b_{15,V,4}^{SIEZ}$	0.000592168	0.150110	0.881
$b_{15,V,5}^{SIEZ}$	0.206412	0.297499	0.766
$b_{15,V}^{SIET}$	0.00445567	0.936557	0.349
Ashikaga Bank (i=16)			
$b_{16,V}^{SIE}$	-4.89027	-125.217	0.000
$b_{16,V,4}^{SIEZ}$	-0.000219623	-0.439630	0.660
$b_{16,V,5}^{SIEZ}$	0.139211	2.98516	0.003

$b^{SIET}_{16,V}$	0.00370348	9.73976	0.000
Joyo Bank (i=17)			
$b^{SIE}_{17,V}$	-4.87814	-145.093	0.000
$b^{SIEZ}_{17,V,4}$	0.000374595	0.951800	0.341
$b^{SIEZ}_{17,V,5}$	0.198090	3.82728	0.000
$b^{SIET}_{17,V}$	0.00325013	15.7451	0.000
Kanto Bank (i=18)			
$b^{SIE}_{18,V}$	-5.07330	-34.6340	0.000
$b^{SIEZ}_{18,V,5}$	-0.028264	-0.165393	0.869
$b^{SIET}_{18,V}$	0.00159108	1.19719	0.231
Kanto Tsukuba Bank (i=19)			
$b^{SIE}_{19,V}$	-5.03314	-3065.85	0.000
Tsukuba Bank (i=20)			
$b^{SIE}_{20,V}$	-4.91284	-3041.77	0.000
Musashino Bank (i=21)			
$b^{SIE}_{21,V}$	-5.03572	-151.164	0.000
$b^{SIEZ}_{21,V,4}$	-0.000988549	-2.03815	0.042
$b^{SIEZ}_{21,V,5}$	0.138035	3.28295	0.001
$b^{SIET}_{21,V}$	0.00757885	55.5350	0.000

Chiba Bank (i=22)			
$b^{SIE}_{22,V}$	-4.52937	-22.5068	0.000
$b^{SIEZ}_{22,V,4}$	-0.00274640	-0.798250	0.425
$b^{SIEZ}_{22,V,5}$	-0.200726	-0.922868	0.356
$b^{SIET}_{22,V}$	0.00923366	3.69059	0.000
Chiba Kogyo Bank (i=23)			
$b^{SIE}_{23,V}$	-5.36830	-32.4405	0.000
$b^{SIEZ}_{23,V,4}$	-0.0000222236	-0.00531796	0.996
$b^{SIEZ}_{23,V,5}$	0.442497	2.11903	0.034
$b^{SIET}_{23,V}$	0.00273158	2.17158	0.030
Tokyo Tomin Bank (i=24)			
$b^{SIE}_{24,V}$	-4.96548	-57.8985	0.000
$b^{SIEZ}_{24,V,4}$	-0.000622927	-0.293845	0.769
$b^{SIEZ}_{24,V,5}$	0.00896638	0.096517	0.923
$b^{SIET}_{24,V}$	0.00330731	3.41763	0.001
Bank of Yokohama (i=25)			
$b^{SIE}_{25,V}$	-4.37619	-52.9570	0.000
$b^{SIEZ}_{25,V,4}$	-0.00239804	-2.13379	0.033

$b_{25,V,5}^{SIEZ}$	-0.322856	-2.78178	0.005
$b_{25,V}^{SIET}$	0.010160	5.49591	0.000
Daishi Bank (*i*=26)			
$b_{26,V}^{SIE}$	-4.91502	-74.0719	0.000
$b_{26,V,4}^{SIEZ}$	-0.0000389700	-0.064824	0.948
$b_{26,V,5}^{SIEZ}$	0.031539	0.344911	0.730
$b_{26,V}^{SIET}$	0.00122019	4.03233	0.000
Hokuetsu Bank (*i*=27)			
$b_{27,V}^{SIE}$	-5.08129	-162.525	0.000
$b_{27,V,4}^{SIEZ}$	0.000891989	0.721938	0.470
$b_{27,V,5}^{SIEZ}$	0.092655	1.95948	0.050
$b_{27,V}^{SIET}$	0.00113669	2.89549	0.004
Yamanashi Chuo Bank (*i*=28)			
$b_{28,V}^{SIE}$	-5.14771	-73.5083	0.000
$b_{28,V,4}^{SIEZ}$	0.000814257	0.549238	0.583
$b_{28,V,5}^{SIEZ}$	0.262253	3.36869	0.001
$b_{28,V}^{SIET}$	0.00196629	3.77573	0.000
Hachijuni Bank (*i*=29)			

$b^{SIE}_{29,V}$	-4.95991	-57.2866	0.000
$b^{SIEZ}_{29,V,4}$	0.00159748	2.32190	0.020
$b^{SIEZ}_{29,V,5}$	0.161751	1.34265	0.179
$b^{SIET}_{29,V}$	0.000977328	2.33487	0.020
Hokuriku Bank (i=30)			
$b^{SIE}_{30,V}$	-4.64923	-38.2187	0.000
$b^{SIEZ}_{30,V,4}$	-0.00148819	-2.04365	0.041
$b^{SIEZ}_{30,V,5}$	-0.257332	-1.52159	0.128
$b^{SIET}_{30,V}$	-0.00184004	-4.93329	0.000
Bank of Toyama (i=31)			
$b^{SIE}_{31,V}$	-5.11546	-135.331	0.000
$b^{SIET}_{31,V}$	-0.00699394	-2.05701	0.040
Hokkoku Bank (i=32)			
$b^{SIE}_{32,V}$	-4.78171	-36.3361	0.000
$b^{SIEZ}_{32,V,4}$	-0.00238012	-1.71936	0.086
$b^{SIEZ}_{32,V,5}$	-0.127497	-0.683170	0.494
$b^{SIET}_{32,V}$	-0.000621356	-0.734679	0.463
Fukui Bank (i=33)			

$b_{33,V}^{SIE}$	-4.89632	-62.5102	0.000
$b_{33,V,4}^{SIEZ}$	-0.00211578	-1.66224	0.096
$b_{33,V,5}^{SIEZ}$	-0.020208	-0.204701	0.838
$b_{33,V}^{SIET}$	-0.00155146	-3.28722	0.001
Shizuoka Bank (i=34)			
$b_{34,V}^{SIE}$	-4.86099	-72.5489	0.000
$b_{34,V,4}^{SIEZ}$	-0.000633916	-1.12473	0.261
$b_{34,V,5}^{SIEZ}$	0.113480	1.17334	0.241
$b_{34,V}^{SIET}$	-0.000648655	-1.31687	0.188
Suruga Bank (i=35)			
$b_{35,V}^{SIE}$	-4.88954	-84.0392	0.000
$b_{35,V,4}^{SIEZ}$	-0.00106800	-1.36958	0.171
$b_{35,V,5}^{SIEZ}$	-0.036927	-0.581011	0.561
$b_{35,V}^{SIET}$	-0.00136932	-2.53877	0.011
Shimizu Bank (i=36)			
$b_{36,V}^{SIE}$	-4.82737	-59.9584	0.000
$b_{36,V,4}^{SIEZ}$	-0.00122743	-1.46891	0.142
$b_{36,V,5}^{SIEZ}$	-0.256084	-2.95623	0.003

$b^{SIET}_{36,V}$	-0.000130010	-0.207948	0.835
Ogaki Kyoritsu Bank (*i*=37)			
$b^{SIE}_{37,V}$	-4.98815	-124.177	0.000
$b^{SIEZ}_{37,V,4}$	-0.000916935	-1.16462	0.244
$b^{SIEZ}_{37,V,5}$	0.112025	2.21893	0.026
$b^{SIET}_{37,V}$	0.00230472	8.61166	0.000
Juroku Bank (*i*=38)			
$b^{SIE}_{38,V}$	-4.87267	-287.104	0.000
$b^{SIEZ}_{38,V,4}$	0.000202081	1.14820	0.251
$b^{SIEZ}_{38,V,5}$	-0.042488	-2.23533	0.025
$b^{SIET}_{38,V}$	0.00108386	10.3779	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
$b^{SIE}_{39,V}$	-4.87511	-2332.95	0.000
Mie Bank (*i*=40)			
$b^{SIE}_{40,V}$	-4.76882	-20.2361	0.000
$b^{SIEZ}_{40,V,4}$	-0.00207003	-1.02161	0.307
$b^{SIEZ}_{40,V,5}$	-0.337252	-1.20464	0.228
$b^{SIET}_{40,V}$	0.00212252	2.40858	0.016
Hyakugo Bank (*i*=41)			

$b_{41,V}^{SIE}$	-5.03717	-88.8843	0.000
$b_{41,V,4}^{SIEZ}$	0.000212968	0.267502	0.789
$b_{41,V,5}^{SIEZ}$	0.181832	2.67272	0.008
$b_{41,V}^{SIET}$	0.000904401	2.80617	0.005
Shiga Bank (*i*=42)			
$b_{42,V}^{SIE}$	-5.04195	-147.270	0.000
$b_{42,V,4}^{SIEZ}$	0.000361599	0.442732	0.658
$b_{42,V,5}^{SIEZ}$	0.200427	4.04640	0.000
$b_{42,V}^{SIET}$	-0.000343966	-1.65186	0.099
Bank of Kyoto (*i*=43)			
$b_{43,V}^{SIE}$	-4.78442	-63.5937	0.000
$b_{43,V,4}^{SIEZ}$	-0.000411725	-0.302257	0.762
$b_{43,V,5}^{SIEZ}$	-0.083707	-1.09025	0.276
$b_{43,V}^{SIET}$	0.00274464	5.69441	0.000
Osaka Bank (*i*=44)			
$b_{44,V}^{SIE}$	-4.46950	-10.9227	0.000
$b_{44,V,5}^{SIEZ}$	-0.540648	-1.16084	0.246
$b_{44,V}^{SIET}$	0.010617	1.78199	0.075

Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			
$b^{SIE}_{45,V}$	-4.87650	-1324.04	0.000
Senshu Bank (*i*=46)			
$b^{SIE}_{46,V}$	-5.18076	-36.0650	0.000
$b^{SIEZ}_{46,V,4}$	0.00194075	1.71194	0.087
$b^{SIEZ}_{46,V,5}$	0.147925	0.905163	0.365
$b^{SIET}_{46,V}$	0.0000685228	0.054911	0.956
Ikeda Bank (*i*=47)			
$b^{SIE}_{47,V}$	-5.36600	-50.9950	0.000
$b^{SIEZ}_{47,V,4}$	0.00329284	1.55583	0.120
$b^{SIEZ}_{47,V,5}$	0.372077	3.43535	0.001
$b^{SIET}_{47,V}$	-0.00106930	-0.744814	0.456
Senshu Ikeda Bank (*i*=48)			
$b^{SIE}_{48,V}$	-4.90066	-5424.92	0.000
Nanto Bank (*i*=49)			
$b^{SIE}_{49,V}$	-5.32849	-30.6659	0.000
$b^{SIEZ}_{49,V,4}$	0.00237225	1.08176	0.279
$b^{SIEZ}_{49,V,5}$	0.605270	2.85346	0.004
$b^{SIET}_{49,V}$	0.000957800	1.75670	0.079

Kiyo Bank (*i*=50)			
$b_{50,V}^{SIE}$	-5.18734	-24.8904	0.000
$b_{50,V,4}^{SIEZ}$	0.00387844	2.55740	0.011
$b_{50,V,5}^{SIEZ}$	0.308197	1.16697	0.243
$b_{50,V}^{SIET}$	-0.000402167	-0.239704	0.811
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
$b_{51,V}^{SIE}$	-4.91904	-403.306	0.000
$b_{51,V}^{SIET}$	0.000222657	0.303946	0.761
Tajima Bank (*i*=52)			
$b_{52,V}^{SIE}$	-5.33542	-57.0876	0.000
$b_{52,V,4}^{SIEZ}$	-0.000635696	-0.207979	0.835
$b_{52,V,5}^{SIEZ}$	0.259494	2.72281	0.006
$b_{52,V}^{SIET}$	-0.000964822	-1.40973	0.159
Tottori Bank (*i*=53)			
$b_{53,V}^{SIE}$	-5.14325	-284.701	0.000
$b_{53,V,4}^{SIEZ}$	-0.000724102	-1.72146	0.085
$b_{53,V,5}^{SIEZ}$	0.065878	2.94045	0.003
$b_{53,V}^{SIET}$	-0.00154516	-16.9021	0.000
San-in Godo Bank (*i*=54)			

$b_{54,V}^{SIE}$	-4.89511	-1165.40	0.000
$b_{54,V}^{SIET}$	0.00400136	10.1821	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			
$b_{55,V}^{SIE}$	-4.98435	-132.353	0.000
$b_{55,V,5}^{SIEZ}$	0.182880	3.47971	0.001
$b_{55,V}^{SIET}$	-0.00265259	-8.01534	0.000
Chugoku Bank (*i*=56)			
$b_{56,V}^{SIE}$	-4.82306	-60.9909	0.000
$b_{56,V,4}^{SIEZ}$	-0.000847093	-1.42874	0.153
$b_{56,V,5}^{SIEZ}$	0.050306	0.500604	0.617
$b_{56,V}^{SIET}$	0.00258668	13.7711	0.000
Hiroshima Bank (*i*=57)			
$b_{57,V}^{SIE}$	-4.97293	-40.2981	0.000
$b_{57,V,4}^{SIEZ}$	0.00147990	1.85499	0.064
$b_{57,V,5}^{SIEZ}$	0.246136	1.45862	0.145
$b_{57,V}^{SIET}$	0.000344940	0.564678	0.572
Yamaguchi Bank (*i*=58)			
$b_{58,V}^{SIE}$	-5.16826	-60.1235	0.000

$b^{SIEZ}_{58,V,4}$	0.00163657	0.773329	0.439
$b^{SIEZ}_{58,V,5}$	0.432047	2.38576	0.017
$b^{SIET}_{58,V}$	-0.0000312480	-0.031169	0.975
Awa Bank (*i*=59)			
$b^{SIE}_{59,V}$	-5.38024	-45.7454	0.000
$b^{SIEZ}_{59,V,4}$	0.00114208	0.531441	0.595
$b^{SIEZ}_{59,V,5}$	0.470799	2.85635	0.004
$b^{SIET}_{59,V}$	-0.000462259	-0.508943	0.611
Hyakujushi Bank (*i*=60)			
$b^{SIE}_{60,V}$	-5.11290	-105.747	0.000
$b^{SIEZ}_{60,V,4}$	0.000908565	1.67232	0.094
$b^{SIEZ}_{60,V,5}$	0.274861	4.28595	0.000
$b^{SIET}_{60,V}$	0.00152319	5.28436	0.000
Iyo Bank (*i*=61)			
$b^{SIE}_{61,V}$	-4.83620	-828.558	0.000
$b^{SIET}_{61,V}$	0.00673965	10.3097	0.000
Iyo Bank (merged with the Toho Sogo Bank) (*i*=62)			
$b^{SIE}_{62,V}$	-4.99433	-225.306	0.000

$b^{SIEZ}_{62,V,5}$	0.168829	6.14429	0.000
$b^{SIET}_{62,V}$	0.00323938	33.1339	0.000
Shikoku Bank (*i*=63)			
$b^{SIE}_{63,V}$	-5.48189	-26.0450	0.000
$b^{SIEZ}_{63,V,4}$	-0.020990	-2.05044	0.040
$b^{SIEZ}_{63,V,5}$	1.07955	2.92602	0.003
$b^{SIET}_{63,V}$	0.00275939	0.964291	0.335
Bank of Fukuoka (*i*=64)			
$b^{SIE}_{64,V}$	-4.44968	-21.0721	0.000
$b^{SIEZ}_{64,V,4}$	-0.00123635	-0.526134	0.599
$b^{SIEZ}_{64,V,5}$	-0.449768	-1.56236	0.118
$b^{SIET}_{64,V}$	0.00467046	2.52374	0.012
Chikuho Bank (*i*=65)			
$b^{SIE}_{65,V}$	-5.17552	-1807.34	0.000
Bank of Saga (*i*=66)			
$b^{SIE}_{66,V}$	-5.29833	-39.9464	0.000
$b^{SIEZ}_{66,V,4}$	0.00565918	2.21364	0.027
$b^{SIEZ}_{66,V,5}$	0.308033	1.59209	0.111

$b_{66,V}^{SIET}$	-0.000576957	-0.677539	0.498
Eighteenth Bank (*i*=67)			
$b_{67,V}^{SIE}$	-5.23678	-106.116	0.000
$b_{67,V,4}^{SIEZ}$	0.00118749	1.04714	0.295
$b_{67,V,5}^{SIEZ}$	0.365148	5.79109	0.000
$b_{67,V}^{SIET}$	0.000897510	2.64993	0.008
Shinwa Bank (*i*=68)			
$b_{68,V}^{SIE}$	-4.93536	-131.976	0.000
$b_{68,V,5}^{SIEZ}$	-0.027305	-0.601999	0.547
$b_{68,V}^{SIET}$	0.00207760	9.05758	0.000
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
$b_{69,V}^{SIE}$	-4.83193	-741.926	0.000
$b_{69,V}^{SIET}$	-0.00921979	-18.7459	0.000
Higo Bank (*i*=70)			
$b_{70,V}^{SIE}$	-5.25021	-25.1384	0.000
$b_{70,V,4}^{SIEZ}$	-0.00236744	-0.562698	0.574
$b_{70,V,5}^{SIEZ}$	0.556272	1.74591	0.081
$b_{70,V}^{SIET}$	0.00341496	2.28171	0.023
Oita Bank (*i*=71)			

$b^{SIE}_{71,V}$	-5.08086	-46.1988	0.000
$b^{SIEZ}_{71,V,4}$	-0.000705454	-0.407273	0.684
$b^{SIEZ}_{71,V,5}$	0.208268	1.27412	0.203
$b^{SIET}_{71,V}$	0.00164376	1.82645	0.068
Miyazaki Bank (i=72)			
$b^{SIE}_{72,V}$	-5.07247	-105.426	0.000
$b^{SIEZ}_{72,V,4}$	0.000102689	0.237693	0.812
$b^{SIEZ}_{72,V,5}$	0.106579	1.73501	0.083
$b^{SIET}_{72,V}$	0.00397687	30.0594	0.000
Kagoshima Bank (i=73)			
$b^{SIE}_{73,V}$	-4.61412	-83.0139	0.000
$b^{SIEZ}_{73,V,4}$	-0.00135228	-1.74982	0.080
$b^{SIEZ}_{73,V,5}$	-0.418857	-6.02062	0.000
$b^{SIET}_{73,V}$	0.00311489	21.7148	0.000
Bank of Ryukyu (i=74)			
$b^{SIE}_{74,V}$	-5.03584	-198.255	0.000
$b^{SIEZ}_{74,V,4}$	-0.000585179	-1.33910	0.181
$b^{SIEZ}_{74,V,5}$	0.073733	3.03439	0.002

$b^{SIET}_{74,V}$	0.0000934098	0.385397	0.700
Bank of Okinawa (*i*=75)			
$b^{SIE}_{75,V}$	-5.25070	-78.5926	0.000
$b^{SIEZ}_{75,V,4}$	-0.000238311	-0.182780	0.855
$b^{SIEZ}_{75,V,5}$	0.290737	4.25939	0.000
$b^{SIET}_{75,V}$	0.000384312	0.783556	0.433
North Pacific Bank (*i*=76)			
$b^{SIE}_{76,V}$	-4.82899	-28.1681	0.000
$b^{SIEZ}_{76,V,5}$	-0.143713	-0.630402	0.528
$b^{SIET}_{76,V}$	-0.00458699	-3.12010	0.002
North Pacific Bank (merged with the Sapporo Bank) (*i*=77)			
$b^{SIE}_{77,V}$	-4.91016	-1290.28	0.000
Sapporo Bank (*i*=78)			
$b^{SIE}_{78,V}$	-5.24382	-32.4407	0.000
$b^{SIEZ}_{78,V,5}$	0.345172	1.68012	0.093
$b^{SIET}_{78,V}$	-0.00636571	-5.94059	0.000
Syokusan Bank (*i*=79)			
$b^{SIE}_{79,V}$	-5.42340	-36.1186	0.000
$b^{SIEZ}_{79,V,4}$	0.022193	3.00058	0.003

$b^{SIEZ}_{79,V,5}$	0.295274	2.06919	0.039
$b^{SIET}_{79,V}$	-0.00329917	-2.61186	0.009
Kirayaka Bank (*i*=80)			
$b^{SIE}_{80,V}$	-4.98777	-374.940	0.000
$b^{SIET}_{80,V}$	-0.000184434	-0.258921	0.796
Kita-Nippon Bank (*i*=81)			
$b^{SIE}_{81,V}$	-4.89007	-46.5584	0.000
$b^{SIEZ}_{81,V,4}$	-0.00318777	-1.97215	0.049
$b^{SIEZ}_{81,V,5}$	-0.076678	-0.626729	0.531
$b^{SIET}_{81,V}$	-0.00218346	-2.84474	0.004
Tokuyo City Bank (*i*=82)			
$b^{SIE}_{82,V}$	-5.00798	-123.245	0.000
$b^{SIEZ}_{82,V,5}$	-0.020995	-0.428529	0.668
$b^{SIET}_{82,V}$	-0.00465021	-83.9920	0.000
Sendai Bank (*i*=83)			
$b^{SIE}_{83,V}$	-5.03582	-150.996	0.000
$b^{SIEZ}_{83,V,4}$	-0.00262766	-2.00166	0.045
$b^{SIEZ}_{83,V,5}$	0.076132	2.07665	0.038

$b^{SIET}_{83,V}$	-0.000989130	-3.66209	0.000
Fukushima Bank (*i*=84)			
$b^{SIE}_{84,V}$	-4.76658	-33.5204	0.000
$b^{SIEZ}_{84,V,4}$	-0.010826	-3.58891	0.000
$b^{SIEZ}_{84,V,5}$	-0.176304	-1.05582	0.291
$b^{SIET}_{84,V}$	-0.00388915	-5.55384	0.000
Daito Bank (*i*=85)			
$b^{SIE}_{85,V}$	-4.98374	-40.0422	0.000
$b^{SIEZ}_{85,V,4}$	-0.00514653	-1.14965	0.250
$b^{SIEZ}_{85,V,5}$	0.038794	0.322387	0.747
$b^{SIET}_{85,V}$	-0.00150439	-2.62124	0.009
Towa Bank (*i*=86)			
$b^{SIE}_{86,V}$	-5.10143	-16.0582	0.000
$b^{SIEZ}_{86,V,4}$	0.00429091	1.52381	0.128
$b^{SIEZ}_{86,V,5}$	0.116384	0.335205	0.737
$b^{SIET}_{86,V}$	0.00212017	3.29852	0.001
Tochigi Bank (*i*=87)			
$b^{SIE}_{87,V}$	-5.00276	-16.2430	0.000

$b^{SIEZ}_{87,V,4}$	0.00282509	1.77913	0.075
$b^{SIEZ}_{87,V,5}$	0.020353	0.060520	0.952
$b^{SIET}_{87,V}$	0.00492316	1.74047	0.082
Keiyo Bank (*i*=88)			
$b^{SIE}_{88,V}$	-4.74901	-11.9653	0.000
$b^{SIEZ}_{88,V,4}$	-0.00169596	-1.37603	0.169
$b^{SIEZ}_{88,V,5}$	-0.155797	-0.343190	0.731
$b^{SIET}_{88,V}$	0.00931384	6.66061	0.000
Taiheiyo Bank (*i*=89)			
$b^{SIE}_{89,V}$	-5.28088	-12.4907	0.000
$b^{SIEZ}_{89,V,5}$	0.103810	0.259431	0.795
$b^{SIET}_{89,V}$	-0.00766184	-1.27986	0.201
Higashi-Nippon Bank (*i*=90)			
$b^{SIE}_{90,V}$	-5.04700	-24.3191	0.000
$b^{SIEZ}_{90,V,4}$	0.00384296	1.70752	0.088
$b^{SIEZ}_{90,V,5}$	-0.00129099	-0.00606332	0.995
$b^{SIET}_{90,V}$	0.00226902	1.29893	0.194
Tokyo Sowa Bank (*i*=91)			

$b^{SIE}_{91,V}$	-4.97525	-102.238	0.000
$b^{SIEZ}_{91,V,5}$	0.010851	0.198955	0.842
$b^{SIET}_{91,V}$	-0.000613114	-1.38034	0.167
Heiwa Sogo Bank (*i*=92)			
$b^{SIE}_{92,V}$	-5.09498	-458.417	0.000
$b^{SIET}_{92,V}$	-0.00970405	-13.4339	0.000
Kanagawa Bank (*i*=93)			
$b^{SIE}_{93,V}$	-5.08214	-491.191	0.000
Niigata Chuo Bank (*i*=94)			
$b^{SIE}_{94,V}$	-4.82790	-29.8947	0.000
$b^{SIEZ}_{94,V,5}$	-0.187372	-1.08528	0.278
$b^{SIET}_{94,V}$	-0.00352526	-2.36643	0.018
Taiko Bank (*i*=95)			
$b^{SIE}_{95,V}$	-4.90510	-26.2911	0.000
$b^{SIEZ}_{95,V,4}$	-0.011228	-1.34434	0.179
$b^{SIEZ}_{95,V,5}$	0.069682	0.413554	0.679
$b^{SIET}_{95,V}$	0.000117821	0.121476	0.903
Nagano Bank (*i*=96)			
$b^{SIE}_{96,V}$	-5.08446	-26.5233	0.000

$b^{SIEZ}_{96,V,4}$	0.00225883	0.232323	0.816
$b^{SIEZ}_{96,V,5}$	0.099214	0.659216	0.510
$b^{SIET}_{96,V}$	-0.000779614	-1.23596	0.216
First Bank of Toyama (*i*=97)			
$b^{SIE}_{97,V}$	0.158324	0.036812	0.971
$b^{SIEZ}_{97,V,4}$	-0.163983	-1.48568	0.137
$b^{SIEZ}_{97,V,5}$	-4.60619	-1.10881	0.268
$b^{SIET}_{97,V}$	-0.020133	-1.91864	0.055
Fukuho Bank (*i*=98)			
$b^{SIE}_{98,V}$	-13.7491	-3.57873	0.000
$b^{SIEZ}_{98,V,4}$	0.153436	3.72492	0.000
$b^{SIEZ}_{98,V,5}$	5.47010	1.62478	0.104
$b^{SIET}_{98,V}$	-0.184587	-4.98390	0.000
Shizuokachuo Bank (*i*=99)			
$b^{SIE}_{99,V}$	-5.11561	-72.1060	0.000
$b^{SIEZ}_{99,V,4}$	0.00604584	1.30034	0.193
$b^{SIET}_{99,V}$	-0.00209076	-0.986733	0.324
Gifu Bank (*i*=100)			

$b^{SIE}_{100,V}$	-5.14708	-25.7664	0.000
$b^{SIEZ}_{100,V,4}$	0.016124	2.13098	0.033
$b^{SIEZ}_{100,V,5}$	0.016635	0.094823	0.924
$b^{SIET}_{100,V}$	-0.00629430	-3.94821	0.000
Aichi Bank (*i*=101)			
$b^{SIE}_{101,V}$	-4.29916	-9.48374	0.000
$b^{SIEZ}_{101,V,4}$	-0.00547873	-1.58334	0.113
$b^{SIEZ}_{101,V,5}$	-0.641070	-1.27723	0.202
$b^{SIET}_{101,V}$	0.00357476	2.31890	0.020
Bank of Nagoya (*i*=102)			
$b^{SIE}_{102,V}$	-5.09871	-64.2302	0.000
$b^{SIEZ}_{102,V,4}$	0.000495724	0.195116	0.845
$b^{SIEZ}_{102,V,5}$	0.196693	1.78848	0.074
$b^{SIET}_{102,V}$	0.000382864	0.255315	0.798
Chukyo Bank (*i*=103)			
$b^{SIE}_{103,V}$	-5.15094	-9.26722	0.000
$b^{SIEZ}_{103,V,4}$	0.00877738	0.936917	0.349
$b^{SIEZ}_{103,V,5}$	0.108735	0.206131	0.837

$b^{SIET}_{103,V}$	-0.00544303	-1.12166	0.262
Daisan Bank (i=104)			
$b^{SIE}_{104,V}$	-4.97400	-24.1229	0.000
$b^{SIEZ}_{104,V,4}$	0.00213198	1.11050	0.267
$b^{SIEZ}_{104,V,5}$	0.014071	0.063207	0.950
$b^{SIET}_{104,V}$	0.00109915	0.846910	0.397
Biwako Bank (i=105)			
$b^{SIE}_{105,V}$	-4.92738	-210.341	0.000
$b^{SIEZ}_{105,V,4}$	-0.000577702	-4.60662	0.000
$b^{SIEZ}_{105,V,5}$	-0.058034	-2.32527	0.020
$b^{SIET}_{105,V}$	-0.00248524	-11.9827	0.000
Bank of Kinki (i=106)			
$b^{SIE}_{106,V}$	-4.76192	-17.1102	0.000
$b^{SIEZ}_{106,V,5}$	-0.194978	-0.636977	0.524
$b^{SIET}_{106,V}$	-0.00108051	-0.453720	0.650
Fukutoku Bank (i=107)			
$b^{SIE}_{107,V}$	-5.10715	-42.9941	0.000
$b^{SIEZ}_{107,V,5}$	0.182749	1.29176	0.196

$b_{107,V}^{SIET}$	-0.00349168	-2.88633	0.004
Kansai Bank (i=108)			
$b_{108,V}^{SIE}$	-4.91273	-26.6582	0.000
$b_{108,V,5}^{SIEZ}$	-0.103635	-0.527662	0.598
$b_{108,V}^{SIET}$	-0.00147695	-1.21711	0.224
Kansai Urban Banking Corporation (i=109)			
$b_{109,V}^{SIE}$	-4.91810	-2390.65	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (i=110)			
$b_{110,V}^{SIE}$	-4.86962	-1859.02	0.000
Taisho Bank (i=111)			
$b_{111,V}^{SIE}$	-5.04478	-18.9601	0.000
$b_{111,V,4}^{SIEZ}$	0.00100481	0.235444	0.814
$b_{111,V,5}^{SIEZ}$	-0.033892	-0.106559	0.915
$b_{111,V}^{SIET}$	-0.00549867	-1.92049	0.055
Hanwa Bank (i=112)			
$b_{112,V}^{SIE}$	-5.17034	-61.5898	0.000
$b_{112,V,5}^{SIEZ}$	0.149625	0.990952	0.322
$b_{112,V}^{SIET}$	-0.00531459	-1.25354	0.210
Hyogo Bank (i=113)			

$b^{SIE}_{113,V}$	-4.96960	-123.394	0.000
$b^{SIEZ}_{113,V,5}$	0.016900	0.365581	0.715
$b^{SIET}_{113,V}$	-0.00278945	-4.37641	0.000
Hanshin Bank (*i*=114)			
$b^{SIE}_{114,V}$	-5.21969	-20.9145	0.000
$b^{SIEZ}_{114,V,5}$	0.246495	0.885545	0.376
$b^{SIET}_{114,V}$	-0.00403915	-2.20303	0.028
Minato Bank (*i*=115)			
$b^{SIE}_{115,V}$	-4.86566	-1520.45	0.000
$b^{SIET}_{115,V}$	0.000460978	1.81472	0.070
Shimane Bank (*i*=116)			
$b^{SIE}_{116,V}$	-4.96738	-9.34933	0.000
$b^{SIEZ}_{116,V,4}$	-0.000240022	-0.017137	0.986
$b^{SIEZ}_{116,V,5}$	-0.054578	-0.117676	0.906
$b^{SIET}_{116,V}$	-0.00180028	-2.81588	0.005
Tomato Bank (*i*=117)			
$b^{SIE}_{117,V}$	-5.08820	-39.9124	0.000
$b^{SIEZ}_{117,V,4}$	-0.00252517	-0.901120	0.368

$b_{117,V,5}^{SIEZ}$	0.081202	0.657113	0.511
$b_{117,V}^{SIET}$	0.00267286	1.57141	0.116
Setouchi Bank (*i*=118)			
$b_{118,V}^{SIE}$	-5.07188	-118.891	0.000
$b_{118,V,5}^{SIEZ}$	0.020081	0.422376	0.673
$b_{118,V}^{SIET}$	0.000265136	0.819618	0.412
Hiroshima Sogo Bank (*i*=119)			
$b_{119,V}^{SIE}$	-5.09323	-75.4797	0.000
$b_{119,V,5}^{SIEZ}$	0.147271	1.90539	0.057
$b_{119,V}^{SIET}$	-0.0000593281	-0.100877	0.920
Momiji Bank (*i*=120)			
$b_{120,V}^{SIE}$	-4.78726	-615.698	0.000
$b_{120,V}^{SIET}$	-0.010027	-18.5111	0.000
Saikyo Bank (*i*=121)			
$b_{121,V}^{SIE}$	-5.12131	-61.3834	0.000
$b_{121,V,4}^{SIEZ}$	0.00250671	0.541024	0.588
$b_{121,V,5}^{SIEZ}$	0.056552	0.681741	0.495
$b_{121,V}^{SIET}$	0.000281987	0.325501	0.745
Tokushima Bank (*i*=122)			

$b^{SIE}_{122,V}$	-5.32389	-26.6036	0.000
$b^{SIEZ}_{122,V,4}$	0.00877784	1.85144	0.064
$b^{SIEZ}_{122,V,5}$	0.257206	1.32421	0.185
$b^{SIET}_{122,V}$	-0.000676016	-0.756705	0.449
Kagawa Bank (*i*=123)			
$b^{SIE}_{123,V}$	-4.92877	-20.3369	0.000
$b^{SIEZ}_{123,V,4}$	0.00183328	0.430581	0.667
$b^{SIEZ}_{123,V,5}$	-0.091755	-0.345849	0.729
$b^{SIET}_{123,V}$	0.00104531	0.776017	0.438
Ehime Bank (*i*=124)			
$b^{SIE}_{124,V}$	-4.91915	-15.1424	0.000
$b^{SIEZ}_{124,V,4}$	-0.00269733	-0.707032	0.480
$b^{SIEZ}_{124,V,5}$	-0.023129	-0.070125	0.944
$b^{SIET}_{124,V}$	0.00248457	1.26933	0.204
Bank of Kochi (*i*=125)			
$b^{SIE}_{125,V}$	-5.21657	-27.5873	0.000
$b^{SIEZ}_{125,V,4}$	-0.000734689	-0.173729	0.862
$b^{SIEZ}_{125,V,5}$	0.291506	1.65719	0.097

$b_{125,V}^{SIET}$	-0.000136103	-0.230698	0.818
Nishi-Nippon Sogo Bank (*i*=126)			
$b_{126,V}^{SIE}$	-4.94217	-1778.78	0.000
Nishi-Nippon Bank (*i*=127)			
$b_{127,V}^{SIE}$	-4.88860	-8668.33	0.000
$b_{127,V}^{SIET}$	0.00530570	32.9761	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128)			
$b_{128,V}^{SIE}$	-4.75623	-1728.35	0.000
$b_{128,V}^{SIET}$	-0.000792433	-3.61776	0.000
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129)			
Fukuoka City Bank (*i*=130)			
$b_{130,V}^{SIE}$	-5.27948	-23.5155	0.000
$b_{130,V,5}^{SIEZ}$	0.425687	1.54537	0.122
$b_{130,V}^{SIET}$	0.000889926	0.439975	0.660
Fukuoka Chuo Bank (*i*=131)			
$b_{131,V}^{SIE}$	-5.08131	-527.954	0.000
$b_{131,V}^{SIET}$	0.000656438	1.02558	0.305
Saga Kyoei Bank (*i*=132)			
$b_{132,V}^{SIE}$	-4.65841	-16.6631	0.000

$b^{SIEZ}_{132,V,4}$	0.011341	1.56024	0.119
$b^{SIEZ}_{132,V,5}$	-.583914	-1.70420	0.088
$b^{SIET}_{132,V}$	-0.00153972	-0.790636	0.429
Bank of Nagasaki (*i*=133)			
$b^{SIE}_{133,V}$	-4.75340	-17.2147	0.000
$b^{SIEZ}_{133,V,4}$	0.00614317	1.59210	0.111
$b^{SIEZ}_{133,V,5}$	-0.422122	-1.25965	0.208
$b^{SIET}_{133,V}$	0.000519660	0.610282	0.542
Kyushu Bank (*i*=134)			
$b^{SIE}_{134,V}$	-4.73950	-19.3900	0.000
$b^{SIEZ}_{134,V,5}$	-0.330617	-1.14350	0.253
$b^{SIET}_{134,V}$	-0.00156960	-0.998000	0.318
Kumamoto Bank (*i*=135)			
$b^{SIE}_{135,V}$	-5.11499	-1123.44	0.000
$b^{SIET}_{135,V}$	-0.00314498	-7.02784	0.000
Kumamoto Family Bank (*i*=136)			
$b^{SIE}_{136,V}$	-5.01311	-117.967	0.000
$b^{SIEZ}_{136,V,5}$	0.059863	1.28512	0.199

$b_{136,V}^{SIET}$	-0.00243159	-24.5498	0.000
Higo Family Bank (*i*=137)			
$b_{137,V}^{SIE}$	-5.08620	-586.699	0.000
$b_{137,V}^{SIET}$	-0.00721076	-13.0601	0.000
Howa Bank (*i*=138)			
$b_{138,V}^{SIE}$	-5.11241	-101.056	0.000
$b_{138,V,4}^{SIEZ}$	-0.00246749	-0.704214	0.481
$b_{138,V,5}^{SIEZ}$	0.098803	1.43544	0.151
$b_{138,V}^{SIET}$	-0.000153684	-0.116921	0.907
Miyazaki Taiyo Bank (*i*=139)			
$b_{139,V}^{SIE}$	-4.94712	-10.0577	0.000
$b_{139,V,4}^{SIEZ}$	0.00508010	1.41154	0.158
$b_{139,V,5}^{SIEZ}$	-0.155296	-0.290101	0.772
$b_{139,V}^{SIET}$	-0.000682699	-0.310828	0.756
Minami-Nippon Bank (*i*=140)			
$b_{140,V}^{SIE}$	-5.20108	-71.8281	0.000
$b_{140,V,4}^{SIEZ}$	-0.000184763	-0.081248	0.935
$b_{140,V,5}^{SIEZ}$	0.225133	2.88693	0.004

$b^{SIET}_{140,V}$	-0.00270015	-3.60431	0.000
Okinawa Kaiho Bank (*i*=141)			
$b^{SIE}_{141,V}$	-4.83882	-84.5908	0.000
$b^{SIEZ}_{141,V,4}$	0.0000348873	0.00725659	0.994
$b^{SIEZ}_{141,V,5}$	-0.136810	-1.49154	0.136
$b^{SIET}_{141,V}$	0.0000284734	0.100998	0.920
Tokyo Star Bank (*i*=142)			
$b^{SIE}_{142,V}$	-5.16838	-443.217	0.000
$b^{SIET}_{142,V}$	0.021591	24.4502	0.000
Saitama Resona Bank (*i*=143)			
$b^{SIE}_{143,V}$	-4.94711	-346.516	0.000
$b^{SIET}_{143,V}$	0.020317	26.6185	0.000
Number of Observations	4821		
Order of MA for the Error Term	5		
Test for Overidentification [*p*-value]	634.252 [0.456]		
Value Function	0.131560		

Note: 1. Tables 4.1.3 to 4.1.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.1.1.2), respectively.

2. The details of Eq. (3.1.1.2.4d) are as follows:

$b^{SIE}_{i,V}\left(\mathbf{z}^{Q}_{V,i,t},\tau^{*}_{t}\right)=b^{SIE}_{i,V}+b^{SIEZ}_{i,V,4}\cdot z^{Q}_{4,i,t}+b^{SIEZ}_{i,V,5}\cdot z^{Q}_{5,i,t}+b^{SIET}_{i,V}\cdot\tau^{*}_{t}$, *i*=2, 3, 5, 6, 9-17, 21-30, 32-38, 40-43, 46, 47, 49, 50, 52, 53, 56-60, 63, 64, 66, 67, 70-75, 79, 81, 83-88, 90, 95-98, 100-105, 111, 116, 117, 121-125, 132, 133, 138-141,

$b_{i,V}^{SIE}\left(\mathbf{z}_{V,i,t}^{Q},\tau_t^*\right)=b_{i,V}^{SIE}+b_{i,V,5}^{SIEZ}\cdot z_{5,i,t}^{Q}+b_{i,V}^{SIET}\cdot\tau_t^*$, i=1, 8, 18, 44, 55, 62, 68, 76, 78, 82, 89, 91, 94, 106-108, 112-114, 118, 119, 130, 134, 136,

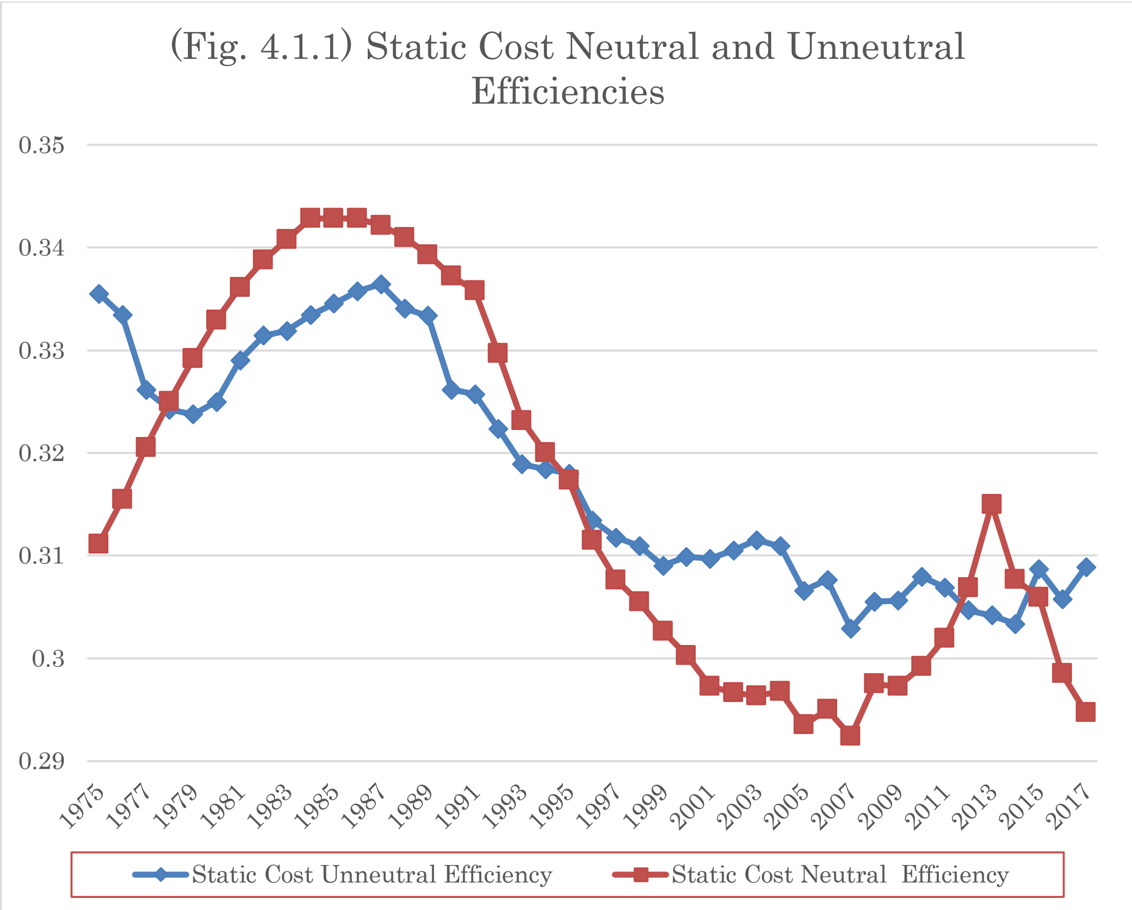
$b_{i,V}^{SIE}\left(\mathbf{z}_{V,i,t}^{Q},\tau_t^*\right)=b_{i,V}^{SIE}+b_{i,V,4}^{SIEZ}\cdot z_{4,i,t}^{Q}+b_{i,V}^{SIET}\cdot\tau_t^*$, i=99,

$b_{i,V}^{SIE}\left(\mathbf{z}_{V,i,t}^{Q},\tau_t^*\right)=b_{i,V}^{SIE}+b_{i,V}^{SIET}\cdot\tau_t^*$, i=7, 31, 51, 54, 61, 69, 80, 92, 115, 120, 127, 128, 131, 135, 137, 142, 143,

$b_{i,V}^{SIE}\left(\mathbf{z}_{V,i,t}^{Q},\tau_t^*\right)=b_{i,V}^{SIE}$, i=19, 20, 39, 45, 48, 65, 77, 93, 109, 110, 126,

where $z_{4,i,t}^{Q}$, $z_{5,i,t}^{Q}$, and τ_t^* are respectively the loan per case, the proportion of loans for small and medium firms, and the normalized time trend.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, the products of these dummies and the normalized time trend, the products of these dummies and some endogenous quality variables in the previous period, the products of these dummies and this estimate, the products of these dummies, the normalized time trend, and the estimate of the static cost share of the current goods, the products of these dummies, quality variables, and this estimate, the products of these dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period.
4. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
5. The Seiwa Bank (i=4) is added to the Michinoku Bank (i=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129) is added to the Nishi-Nippon City Bank (i=128).



(Fig. 4.1.1) Static Cost Neutral and Unneutral Efficiencies

Table 4.2.1 Estimation Results for the Dynamic Variable Cost Function (1)

Parameter	Estimate	*t*-statistic	*p*-value
a_{SL}	0.195955	3.57748	0.000
a_{SL}^{EF}	0.231317	2.47625	0.013
$a_{SL,L}^{HI}$	-0.182866	-4.12135	0.000
$a_{SL,1}^{Z}$	-1.62213	-6.70780	0.000
$a_{SL,3}^{Z}$	-8.15102	-12.1839	0.000
$a_{SL,4}^{Z}$	-0.00746860	-14.0356	0.000
$a_{SL,5}^{Z}$	-0.089755	-2.57857	0.010
$a_{SL,26}^{Z}$	0.118915	2.72417	0.006
$a_{SL,7}^{Z}$	-0.179730	-6.19424	0.000
$a_{SL,16}^{Z}$	0.280002	6.80780	0.000
$a_{SL,17}^{Z}$	-0.158053	-2.98494	0.003
$a_{SL,11}^{Z}$	-0.090380	-7.90952	0.000
$a_{SL,13}^{Z}$	0.142341	3.94530	0.000
a_{LL}	-0.265104	-3.45195	0.001
a_{LL}^{EF}	0.866678	5.67093	0.000
$a_{LL,L}^{HI}$	0.171347	2.35424	0.019

$a^{Z}_{LL,14}$	-1.21801	-3.85304	0.000
$a^{Z}_{LL,2}$	-0.155292	-1.89573	0.058
$a^{Z}_{LL,3}$	13.8161	13.3223	0.000
$a^{Z}_{LL,4}$	0.00291364	4.82806	0.000
$a^{Z}_{LL,6}$	-0.256811	-4.76996	0.000
$a^{Z}_{LL,27}$	-0.072207	-4.45818	0.000
$a^{Z}_{LL,16}$	-0.185856	-4.22599	0.000
$a^{Z}_{LL,24}$	0.255346	4.83222	0.000
$a^{Z}_{LL,21}$	0.091028	2.89989	0.004
$a^{Z}_{LL,25}$	0.086882	4.93302	0.000
$a^{Z}_{LL,9}$	0.244655	3.87843	0.000
$a^{Z}_{LL,13}$	-0.046783	-0.966931	0.334
a_{DD}	-0.196676	-2.79264	0.005
a^{EF}_{DD}	-0.506124	-3.87948	0.000
$a^{HI}_{DD,L}$	-0.010982	-0.175566	0.861
$a^{Z}_{DD,18}$	2.48516	5.36587	0.000
$a^{Z}_{DD,19}$	1.23936	2.38945	0.017

$a_{DD,20}^{Z}$	0.0000575692	8.75936	0.000
$a_{DD,23}^{Z}$	0.379906	8.17442	0.000
$a_{DD,7}^{Z}$	0.087116	2.56675	0.010
$a_{DD,13}^{Z}$	0.331241	5.66828	0.000
a_{TD}	0.637677	6.31935	0.000
a_{TD}^{EF}	-0.867045	-3.92730	0.000
$a_{TD,L}^{HI}$	-0.043565	-0.482564	0.629
$a_{TD,18}^{Z}$	-1.57468	-2.80826	0.005
$a_{TD,22}^{Z}$	1.41406	2.63352	0.008
$a_{TD,20}^{Z}$	-0.0000667036	-7.97178	0.000
$a_{TD,7}^{Z}$	0.109196	3.28905	0.001
$a_{TD,16}^{Z}$	-0.210503	-3.72569	0.000
$a_{TD,24}^{Z}$	-0.093188	-2.58928	0.010
$a_{TD,17}^{Z}$	0.326167	4.34824	0.000
$a_{TD,9}^{Z}$	-0.353104	-6.89244	0.000
$a_{TD,13}^{Z}$	0.026378	0.360134	0.719
a_{S}	0.043194	0.920300	0.357

a_{S}^{EF}	0.110076	1.11572	0.265
$a_{S,L}^{HI}$	-0.048184	-0.970675	0.332
$a_{S,23}^{Z}$	0.138640	3.52763	0.000
$a_{S,16}^{Z}$	0.184072	8.21743	0.000
$a_{S,21}^{Z}$	0.052545	1.67963	0.093
$a_{S,13}^{Z}$	-0.190924	-3.92674	0.000
a_{C}	-0.052458	-1.60328	0.109
a_{C}^{EF}	0.066823	1.01580	0.310
$a_{C,L}^{HI}$	0.047924	1.52878	0.126
$a_{C,13}^{Z}$	-0.111058	-4.16950	0.000
a_{CL}	-0.00306763	-0.178199	0.859
a_{CL}^{EF}	-0.023749	-0.661353	0.508
$a_{CL,L}^{HI}$	0.028061	1.80405	0.071
$a_{CL,13}^{Z}$	-0.040953	-2.41814	0.016
a_{A}	0.011038	0.730958	0.465
a_{A}^{EF}	0.080522	2.71789	0.007
$a_{A,L}^{HI}$	0.012871	0.924322	0.355

$a^{Z}_{A,23}$	-0.041422	-2.97345	0.003
$a^{Z}_{A,7}$	-0.028406	-4.42831	0.000
$a^{Z}_{A,16}$	-0.060845	-7.40533	0.000
$a^{Z}_{A,13}$	-0.00856384	-0.581100	0.561
a_{CM}	-0.012911	-3.79884	0.000
a^{EF}_{CM}	0.018291	5.13006	0.000
$a^{HI}_{CM,L}$	0.00202005	0.664002	0.507
$a^{Z}_{CM,9}$	0.072760	7.37317	0.000
$a^{Z}_{CM,13}$	0.00576709	2.05458	0.040
a_{CD}	0.016613	2.46804	0.014
a^{EF}_{CD}	-0.059732	-7.19667	0.000
$a^{HI}_{CD,L}$	-0.015183	-2.57901	0.010
$a^{Z}_{CD,13}$	0.049785	5.54749	0.000
a_{L}	0.486922	84.9468	0.000
a^{SIE}_{L}	-0.000222417	-1.58989	0.112
$a^{HI}_{L,L}$	0.00410728	3.26340	0.001
$a^{Z}_{L,14}$	-2.02468	-13.2207	0.000

$a^{Z}_{L,2}$	0.135176	8.96537	0.000
$a^{Z}_{L,3}$	-0.514562	-14.6298	0.000
$a^{Z}_{L,4}$	-0.0000771321	-1.20629	0.228
$a^{Z}_{L,5}$	-0.043544	-13.3470	0.000
$a^{Z}_{L,6}$	-0.063278	-6.26421	0.000
$a^{Z}_{L,26}$	0.089819	12.6714	0.000
$a^{Z}_{L,15}$	0.00769822	2.30843	0.021
$a^{Z}_{L,27}$	0.00268101	1.00207	0.316
$a^{Z}_{L,18}$	-0.234813	-1.94309	0.052
$a^{Z}_{L,22}$	2.13303	20.8594	0.000
$a^{Z}_{L,20}$	0.0000115346	14.9144	0.000
$a^{Z}_{L,23}$	0.00753050	3.25678	0.001
$a^{Z}_{L,7}$	0.00494849	2.66610	0.008
$a^{Z}_{L,16}$	0.017538	9.19307	0.000
$a^{Z}_{L,24}$	0.00891358	4.31459	0.000
$a^{Z}_{L,21}$	0.00950152	4.35934	0.000
$a^{Z}_{L,25}$	0.013696	6.99359	0.000

$a^{Z}_{L,8}$	0.014714	7.37228	0.000
$a^{Z}_{L,17}$	0.00731785	3.28221	0.001
$a^{Z}_{L,9}$	0.015448	7.14705	0.000
$a^{Z}_{L,10}$	0.022777	10.8852	0.000
$a^{Z}_{L,11}$	0.00171576	0.948969	0.343
$a^{Z}_{L,12}$	0.018543	21.1740	0.000
$a^{Z}_{L,13}$	-0.010915	-10.2144	0.000
a^{B}_{L}	0.0000000788263	1.15054	0.250
a_{K}	0.027792	14.6540	0.000
a^{SIE}_{K}	0.000145301	4.30666	0.000
$a^{HI}_{K,L}$	-0.00133697	-3.19959	0.001
$a^{Z}_{K,14}$	0.794227	16.5710	0.000
$a^{Z}_{K,2}$	-0.088380	-16.5006	0.000
$a^{Z}_{K,3}$	-0.053864	-3.60746	0.000
$a^{Z}_{K,4}$	-0.0000934590	-4.38896	0.000
$a^{Z}_{K,5}$	0.00885258	7.82645	0.000
$a^{Z}_{K,6}$	-0.015220	-5.69610	0.000

$a_{K,26}^{Z}$	-0.031142	-16.1247	0.000
$a_{K,15}^{Z}$	-0.000648688	-0.812527	0.416
$a_{K,27}^{Z}$	-0.00735316	-8.20146	0.000
$a_{K,18}^{Z}$	-0.396550	-9.93534	0.000
$a_{K,22}^{Z}$	0.543991	14.8028	0.000
$a_{K,20}^{Z}$	0.00000619027	25.8678	0.000
$a_{K,23}^{Z}$	-0.00322737	-4.71334	0.000
$a_{K,7}^{Z}$	-0.00335717	-6.47782	0.000
$a_{K,16}^{Z}$	-0.00491366	-9.32115	0.000
$a_{K,24}^{Z}$	-0.00303922	-5.11127	0.000
$a_{K,21}^{Z}$	-0.00525064	-8.59778	0.000
$a_{K,25}^{Z}$	-0.00284030	-5.19034	0.000
$a_{K,8}^{Z}$	-0.00207633	-3.78566	0.000
$a_{K,17}^{Z}$	0.00305614	4.69227	0.000
$a_{K,9}^{Z}$	-0.000303071	-0.487529	0.626
$a_{K,10}^{Z}$	-0.000856110	-1.39886	0.162
$a_{K,11}^{Z}$	0.00240917	4.84267	0.000

$a_{K,12}^{Z}$	-0.000211155	-0.805782	0.420
$a_{K,13}^{Z}$	0.00102905	2.96760	0.003
a_{K}^{B}	-0.000000161329	-0.149556	0.881
a_{V}	0.355622	41.6137	0.000
a_{V}^{SIE}	0.000186389	0.879266	0.379
$a_{V,L}^{HI}$	-0.00483039	-2.63287	0.008
$a_{V,14}^{Z}$	2.24173	9.53984	0.000
$a_{V,2}^{Z}$	-0.113207	-4.98745	0.000
$a_{V,3}^{Z}$	0.833446	16.0946	0.000
$a_{V,4}^{Z}$	0.000212992	2.19981	0.028
$a_{V,5}^{Z}$	0.056699	11.6650	0.000
$a_{V,6}^{Z}$	0.111359	7.55057	0.000
$a_{V,26}^{Z}$	-0.103668	-9.81416	0.000
$a_{V,15}^{Z}$	-0.010969	-2.17546	0.030
$a_{V,27}^{Z}$	0.00353041	0.873044	0.383
$a_{V,18}^{Z}$	0.763951	4.23704	0.000
$a_{V,22}^{Z}$	-3.78566	-23.2627	0.000

$a^{Z}_{V,20}$	-0.0000238217	-20.3431	0.000
$a^{Z}_{V,23}$	-0.00805588	-2.30427	0.021
$a^{Z}_{V,7}$	-0.00401864	-1.46081	0.144
$a^{Z}_{V,16}$	-0.021446	-7.57105	0.000
$a^{Z}_{V,24}$	-0.010341	-3.37884	0.001
$a^{Z}_{V,21}$	-0.00894895	-2.72226	0.006
$a^{Z}_{V,25}$	-0.017776	-6.05666	0.000
$a^{Z}_{V,8}$	-0.020103	-6.73437	0.000
$a^{Z}_{V,17}$	-0.014215	-4.32974	0.000
$a^{Z}_{V,9}$	-0.023041	-7.05904	0.000
$a^{Z}_{V,10}$	-0.033550	-10.6741	0.000
$a^{Z}_{V,11}$	-0.00507844	-1.89384	0.058
$a^{Z}_{V,12}$	-0.027815	-21.6006	0.000
$a^{Z}_{V,13}$	0.015439	9.86157	0.000
b^{QQ}_{SLSL}	0.095204	3.16542	0.002
b^{QQ}_{SLLL}	-0.177690	-2.98700	0.003
b^{QQ}_{SLDD}	-0.319240	-6.52355	0.000

b_{SLTD}^{QQ}	-0.093902	-1.48449	0.138
b_{SLS}^{QQ}	0.229761	8.77048	0.000
b_{SLC}^{QQ}	0.126992	4.70830	0.000
b_{SLCL}^{QQ}	0.083484	5.87381	0.000
b_{SLA}^{QQ}	-0.032792	-2.17638	0.030
b_{SLCM}^{QQ}	0.00267878	1.36656	0.172
b_{SLCD}^{QQ}	-0.046939	-5.45291	0.000
b_{LLLL}^{QQ}	0.193065	1.65317	0.098
b_{LLDD}^{QQ}	-0.089788	-1.44524	0.148
b_{LLTD}^{QQ}	0.164012	1.20441	0.228
b_{LLS}^{QQ}	0.00294413	0.055103	0.956
b_{LLC}^{QQ}	-0.063644	-2.01773	0.044
b_{LLCL}^{QQ}	0.019085	0.890710	0.373
b_{LLA}^{QQ}	0.032813	2.23733	0.025
b_{LLCM}^{QQ}	-0.00665074	-1.66882	0.095
b_{LLCD}^{QQ}	-0.019014	-2.18990	0.029
b_{DDDD}^{QQ}	-0.120838	-3.22141	0.001

b^{QQ}_{DDTD}	0.228804	3.13558	0.002
b^{QQ}_{DDS}	-0.034082	-1.67877	0.093
b^{QQ}_{DDC}	0.127717	5.06597	0.000
b^{QQ}_{DDCL}	0.00190813	0.116073	0.908
b^{QQ}_{DDA}	0.049809	3.79477	0.000
b^{QQ}_{DDCM}	0.011206	3.92833	0.000
b^{QQ}_{DDCD}	0.015386	2.43703	0.015
b^{QQ}_{TDTD}	-0.157389	-0.921512	0.357
b^{QQ}_{TDS}	-0.164569	-3.68892	0.000
b^{QQ}_{TDC}	0.061635	1.26591	0.206
b^{QQ}_{TDCL}	-0.083517	-2.98848	0.003
b^{QQ}_{TDA}	0.012887	0.584267	0.559
b^{QQ}_{TDCM}	0.00577339	1.43043	0.153
b^{QQ}_{TDCD}	0.055681	3.76341	0.000
b^{QQ}_{SS}	-0.00884182	-3.08374	0.002
b^{QQ}_{SC}	-0.090270	-4.23710	0.000
b^{QQ}_{SCL}	0.032986	2.40791	0.016

b_{SA}^{QQ}	0.029358	3.67955	0.000
b_{SCM}^{QQ}	-0.000495814	-0.667195	0.505
b_{SCD}^{QQ}	-0.016747	-3.83746	0.000
b_{CC}^{QQ}	-0.102404	-4.56896	0.000
b_{CCL}^{QQ}	-0.011498	-1.18962	0.234
b_{CA}^{QQ}	-0.033932	-4.44365	0.000
b_{CCM}^{QQ}	-0.000416246	-0.190196	0.849
b_{CCD}^{QQ}	0.016593	6.01921	0.000
b_{CLCL}^{QQ}	-0.00723165	-1.00021	0.317
b_{CLA}^{QQ}	-0.000252926	-0.049832	0.960
b_{CLCM}^{QQ}	0.000747221	0.752337	0.452
b_{CLCD}^{QQ}	-0.015410	-6.38203	0.000
b_{AA}^{QQ}	-0.00873112	-2.64433	0.008
b_{ACM}^{QQ}	-0.00609042	-7.80829	0.000
b_{ACD}^{QQ}	0.00556686	3.25274	0.001
b_{CMCM}^{QQ}	-0.000159303	-0.592317	0.554
b_{CMCD}^{QQ}	-0.000806853	-2.93602	0.003

b_{CDCD}^{QQ}	0.00438943	3.98077	0.000
b_{LL}^{PP}	0.197451	186.164	0.000
b_{LK}^{PP}	-0.00663165	-20.7537	0.000
b_{LV}^{PP}	-0.145950	-60.3152	0.000
b_{KK}^{PP}	0.00530513	43.2432	0.000
b_{KV}^{PP}	0.00621914	11.8607	0.000
b_{VV}^{PP}	0.139731	54.7099	0.000
b_{LL}^{B}	0.837321×10^{-12}	0.072792	0.942
b_{LK}^{B}	0.198619×10^{-6}	2.09090	0.037
b_{KK}^{B}	0.758281×10^{-9}	0.835162	0.404
b_{SLL}^{QP}	-0.00239537	-1.83737	0.066
b_{SLK}^{QP}	0.00307560	8.80007	0.000
b_{SLV}^{QP}	0.000449295	0.240850	0.810
b_{LLL}^{QP}	-0.047996	-26.4646	0.000
b_{LLK}^{QP}	-0.00699741	-11.4023	0.000
b_{LLV}^{QP}	0.079775	29.7524	0.000
b_{DDL}^{QP}	-0.00671261	-3.74176	0.000

b_{DDK}^{QP}	-0.00221826	-4.24117	0.000
b_{DDV}^{QP}	0.012436	4.73539	0.000
b_{TDL}^{QP}	0.033695	16.0778	0.000
b_{TDK}^{QP}	0.013619	22.0065	0.000
b_{TDV}^{QP}	-0.064984	-21.1695	0.000
b_{SL}^{QP}	0.000383125	0.662382	0.508
b_{SK}^{QP}	0.000749619	6.43982	0.000
b_{SV}^{QP}	-0.00135229	-1.50821	0.132
b_{CL}^{QP}	0.00613461	8.32547	0.000
b_{CK}^{QP}	-0.00124873	-4.67812	0.000
b_{CV}^{QP}	-0.00798624	-7.42908	0.000
b_{CLL}^{QP}	0.00283553	5.94965	0.000
b_{CLK}^{QP}	0.00165340	12.0857	0.000
b_{CLV}^{QP}	-0.00599183	-8.38538	0.000
b_{AL}^{QP}	-0.00344457	-6.12577	0.000
b_{AK}^{QP}	-0.00251043	-14.6713	0.000
b_{AV}^{QP}	0.00779643	9.46448	0.000

b_{CML}^{QP}	-0.000507408	-5.76785	0.000
b_{CMK}^{QP}	-0.0000125129	-0.578455	0.563
b_{CMV}^{QP}	0.000779985	5.69090	0.000
b_{CDL}^{QP}	0.00225449	13.9853	0.000
b_{CDK}^{QP}	0.0000742500	1.22739	0.220
b_{CDV}^{QP}	-0.00348483	-14.3630	0.000
b_{SLT}^{QT}	0.015680	7.05896	0.000
b_{LLT}^{QT}	-0.010920	-2.80524	0.005
b_{DDT}^{QT}	0.00764737	2.24691	0.025
b_{TDT}^{QT}	-0.00460475	-0.855540	0.392
b_{ST}^{QT}	0.00912212	3.24117	0.001
b_{CT}^{QT}	-0.00177485	-1.07697	0.281
b_{CLT}^{QT}	0.00115000	1.18815	0.235
b_{AT}^{QT}	-0.00633267	-7.12981	0.000
b_{CMT}^{QT}	-0.000365761	-2.40475	0.016
b_{CDT}^{QT}	-0.00150343	-3.29490	0.001
b_{LT}^{PT}	-0.00389490	-25.3595	0.000

b_{KT}^{PT}	0.00117574	17.7663	0.000
b_{VT}^{PT}	0.00467561	20.2766	0.000
R-squared	Variable Cost Function		0.992079
	Share of Labor		0.530480
	Share of Physical Capital		0.857089
Number of Observations	4678		
Order of MA for the Error Term	3		
Test for Overidentification [p-value]	1087.87 [0.889]		
Value Function	0.232551		

Note: 1. Tables 4.2.1 and 4.2.2 show the results of the simultaneous GMM estimation of the dynamic variable cost function explained in Subsection 3.1.2.2, with the dynamic cost share equations explained in the same subsection. Table 4.2.1 gives the estimates of the parameters other than the coefficients of the individual bank dummies in Eq. (3.1.2.2.1a); Table 4.2.2 gives the estimates of the coefficients.

2. The details of Eqs. (3.1.2.2.1b) and (3.1.2.2.1c) are as follows:

$$a_{SL}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{SL,i,t}^{Q}\right) = a_{SL} + a_{SL}^{EF} \cdot EF_{i,t-1}^{S} + a_{SL,L}^{HI} \cdot HI_{L,t-1} + \sum_{h\in\{1,3,4,5,7,11,13,16,17,26\}} a_{SL,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{LL}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{LL,i,t}^{Q}\right) = a_{LL} + a_{LL}^{EF} \cdot EF_{i,t-1}^{S} + a_{LL,L}^{HI} \cdot HI_{L,t-1} + \sum_{h\in\{2,3,4,6,9,13,14,16,21,24,25,27\}} a_{LL,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{DD}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{DD,i,t}^{Q}\right) = a_{DD} + a_{DD}^{EF} \cdot EF_{i,t-1}^{S} + a_{DD,L}^{HI} \cdot HI_{L,t-1} + \sum_{h\in\{7,13,18-20,23\}} a_{DD,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{TD}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{TD,i,t}^{Q}\right) = a_{TD} + a_{TD}^{EF} \cdot EF_{i,t-1}^{S} + a_{TD,L}^{HI} \cdot HI_{L,t-1} + \sum_{h\in\{7,9,13,16-18,20,22,24\}} a_{TD,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{S}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{S,i,t}^{Q}\right) = a_{S} + a_{S}^{EF} \cdot EF_{i,t-1}^{S} + a_{S,L}^{HI} \cdot HI_{L,t-1} + \sum_{h\in\{13,16,21,23\}} a_{S,h}^{Z} \cdot z_{h,i,t}^{Q} ,$$

$$a_{C}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{C,i,t}^{Q}\right) = a_{C} + a_{C}^{EF} \cdot EF_{i,t-1}^{S} + a_{C,L}^{HI} \cdot HI_{L,t-1} + a_{C,13}^{Z} \cdot z_{13,i,t}^{Q} ,$$

$$a_{CL}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{CL,i,t}^{Q}\right) = a_{CL} + a_{CL}^{EF}\cdot EF_{i,t-1}^{S} + a_{CL,L}^{HI}\cdot HI_{L,t-1} + a_{CL,13}^{Z}\cdot z_{13,i,t}^{Q},$$

$$a_{A}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{A,i,t}^{Q}\right) = a_{A} + a_{A}^{EF}\cdot EF_{i,t-1}^{S} + a_{A,L}^{HI}\cdot HI_{L,t-1} + \sum_{h\in\{7,13,16,23\}} a_{A,h}^{Z}\cdot z_{h,i,t}^{Q},$$

$$a_{CM}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{CM,i,t}^{Q}\right) = a_{CM} + a_{CM}^{EF}\cdot EF_{i,t-1}^{S} + a_{CM,L}^{HI}\cdot HI_{L,t-1} + \sum_{h\in\{9,13\}} a_{CM,h}^{Z}\cdot z_{h,i,t}^{Q},$$

$$a_{CD}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \mathbf{z}_{CD,i,t}^{Q}\right) = a_{CD} + a_{CD}^{EF}\cdot EF_{i,t-1}^{S} + a_{CD,L}^{HI}\cdot HI_{L,t-1} + a_{CD,13}^{Z}\cdot z_{13,i,t}^{Q},$$

$$a_{j}\left(A_{i,j,t-1}^{SIE}, HI_{L,t-1}, \mathbf{z}_{j,i,t}^{Q}\right) = a_{j} + a_{j}^{SIE}\cdot A_{i,j,t-1}^{SIE} + a_{j,L}^{HI}\cdot HI_{L,t-1} + \sum_{h\in\{2-18,20-27\}} a_{j,h}^{Z}\cdot z_{h,i,t}^{Q}, \quad j\in\{L,K,V\},$$

where $EF_{i,t-1}^{S}$ is the static cost unneutral efficiency in the previous period, $HI_{L,t-1}$ is the Herfindahl index of loans (i.e., the sum of the short-term and long-term loans) in the previous period, $A_{i,j,t-1}^{SIE}$ ($j\in\{L,K,V\}$) are the inefficiency coefficients of static factor demand functions in the previous period, $z_{h,i,t}^{Q}$ ($h=1,\ldots,27$) are the short-term prime rate ($h=1$), the capital ratio of borrower firms ($h=2$), the loan loss provision rate ($h=3$), the loan per case ($h=4$), the proportion of loans for small and medium firms ($h=5$), the Herfindahl index of loan proportions classified by industry ($h=6$), the regional dummy in the Tohoku area, which takes a value of unity if the bank concerned operates in the Tohoku area ($h=7$), the regional dummy in the Kinki area ($h=8$), the regional dummy in the Chugoku area ($h=9$), the regional dummy in the Sikoku area ($h=10$), the regional dummy in the Kyusyu area ($h=11$), the bank dummy in the second-tier regional banks, which takes a value of unity if the bank concerned is the member bank of the Second Association of Regional Banks ($h=12$), the bank dummy in the large banks, which takes a value of unity if the total financial asset of the bank concerned is larger than that of the average bank ($h=13$), the long-term prime rate ($h=14$), the proportion of loans secured by real estate ($h=15$), the regional dummy in the Kanto area ($h=16$), the regional dummy in the Sanin area ($h=17$), the yield on government bonds ($h=18$), the postal savings interest rate of ordinary savings ($h=19$), the TOPIX ($h=20$), the regional dummy in the Hokuriku area ($h=21$), the postal savings interest rate of postal savings certificates ($h=22$), the regional dummy in the Hokkaido area ($h=23$), the regional dummy in the Koshinetsu area ($h=24$), the regional dummy in the Tokai area ($h=25$), the proportion of loans for real estate business ($h = 26$), and the proportion of loans without collateral and without warranty ($h = 27$).

3. The conditional heterosckedascity of the error term is explicitly controlled. The autocorrelation is, furthermore, corrected when it is found. When including the moving average of the error term in the estimate of the covariance matrix of the orthogonality conditions, we use Bartrett's spectral density kernel proposed by Newey and West (1987) in order to guarantee that the estimate of the covariance matrix is a positive definite matrix.
4. The endogeneity of some variables is taken into account by using different instrumental variables for each equation. For the instrumental variables, in addition to those used in the estimation of the static variable cost function in the second stage (other than the products of the individual bank dummies and the square of the normalized time trend, and the products of these dummies and their cube), the following variables are used: the products of the individual bank dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period for all equations, the inefficiency coefficients of static factor demand functions in the previous period for each dynamic cost share equation, the Herfindahl index of loans in the previous period for all dynamic cost share equations, the products of the logarithms of the factor prices in the current period and the inefficiency coefficients of static factor demand functions in the previous period, and the products of the logarithms of their factor prices and the Herfindahl index of loans in the previous period for the dynamic variable cost function and each dynamic cost share equation, the products of the logarithms of the financial goods in the previous period and the static cost unneutral efficiency in the previous period, and the products of the logarithms of their financial goods and the Herfindahl index of loans in the previous period for the dynamic variable cost function.
5. The estimates of parameters related to the current goods price ($p^{*}_{V,i,t}$) are calculated from the condition of linear homogeneity with respect to factor prices.
6. The number of the samples that violate the concavity conditions for factor prices is 2425 out of 4678 (i.e., the number of all samples), meaning that these samples account for 52 percent of all samples. How to decrease these samples is a task for the future.

Table 4.2.2 Estimation Results for the Dynamic Variable Cost Function (2):

$a_i\left(EF^S_{i,t-1}, HI_{L,t-1}, \tau^*_t\right)$

Parameter	Estimate	*t*-statistic	*p*-value
Yachiyo Bank (The present Kiraboshi Bank) (*i*=1)			
a_1	8.27426	3.35895	0.001
a_1^{EF}	6.67609	0.875047	0.382
a_1^{T}	0.049703	1.21920	0.223
Hokkaido Bank (*i*=2)			
a_2	9.78652	51.4333	0.000
a_2^{EF}	2.66339	3.07105	0.002
$a_{2,L}^{HI}$	-0.283551	-6.75097	0.000
a_2^{T}	-0.029966	-11.0310	0.000
Aomori Bank (*i*=3)			
a_3	10.7364	97.0799	0.000
a_3^{EF}	-2.18011	-6.01758	0.000
$a_{3,L}^{HI}$	0.180320	2.49433	0.013
a_3^{T}	-0.00956026	-4.93683	0.000
Seiwa Bank (*i*=4)			
Seiwa Bank and Michinoku Bank (*i*=5)			

a_5	-2.09823	-0.615929	0.538
a_5^{EF}	-0.470445	-0.666903	0.505
$a_{5,L}^{HI}$	24.5560	3.68373	0.000
a_5^{T}	-0.017825	-6.12583	0.000
Akita Bank (i=6)			
a_6	10.3267	69.2256	0.000
a_6^{EF}	-0.887780	-2.25382	0.024
$a_{6,L}^{HI}$	0.190507	2.26910	0.023
a_6^{T}	-0.012789	-5.75479	0.000
Ugo Bank (i=7)			
a_7	9.64044	204.974	0.000
a_7^{T}	-0.000184823	-0.068490	0.945
Hokuto Bank (i=8)			
a_8	8.59197	37.6802	0.000
a_8^{EF}	4.22568	6.20713	0.000
a_8^{T}	-0.088667	-8.77920	0.000
Shonai Bank (i=9)			
a_9	9.36995	44.2345	0.000

a_9^{EF}	0.133695	0.358604	0.720
$a_{9,L}^{HI}$	0.255728	1.93591	0.053
a_9^{T}	-0.00302612	-1.26764	0.205
Yamagata Bank (*i*=10)			
a_{10}	11.0069	42.8222	0.000
a_{10}^{EF}	-2.59210	-3.79141	0.000
$a_{10,L}^{HI}$	-0.303178	-1.23391	0.217
a_{10}^{T}	-0.00887720	-3.95117	0.000
Bank of Iwate (*i*=11)			
a_{11}	11.0536	31.4160	0.000
a_{11}^{EF}	-1.03520	-2.53007	0.011
$a_{11,L}^{HI}$	-1.60423	-1.94348	0.052
a_{11}^{T}	-0.00946355	-4.36193	0.000
Tohoku Bank (*i*=12)			
a_{12}	8.98087	23.8770	0.000
a_{12}^{EF}	-0.494783	-2.64212	0.008
$a_{12,L}^{HI}$	2.11708	2.26441	0.024
a_{12}^{T}	-0.00185580	-0.604081	0.546

77 Bank (i=13)			
a_{13}	10.5226	79.5388	0.000
a_{13}^{EF}	-1.71714	-2.64912	0.008
$a_{13,L}^{HI}$	0.477123	2.41031	0.016
a_{13}^{T}	-0.026490	-7.21561	0.000
Toho Bank (i=14)			
a_{14}	10.6434	50.4257	0.000
a_{14}^{EF}	-0.194695	-0.302118	0.763
$a_{14,L}^{HI}$	-0.610102	-1.18485	0.236
a_{14}^{T}	-0.00568056	-1.56533	0.118
Gunma Bank (i=15)			
a_{15}	9.72920	18.0784	0.000
a_{15}^{EF}	-0.033699	-0.041723	0.967
$a_{15,L}^{HI}$	1.40500	1.57766	0.115
a_{15}^{T}	0.000360947	0.078670	0.937
Ashikaga Bank (i=16)			
a_{16}	9.31122	20.9067	0.000
a_{16}^{EF}	-2.88181	-3.24658	0.001

$a^{HI}_{16,L}$	2.60130	4.29247	0.000
a^{T}_{16}	0.000929160	0.208710	0.835
Joyo Bank (*i*=17)			
a_{17}	11.4820	81.1282	0.000
a^{EF}_{17}	-5.72902	-4.93119	0.000
$a^{HI}_{17,L}$	-0.195888	-2.96639	0.003
a^{T}_{17}	-0.013817	-4.42134	0.000
Kanto Bank (*i*=18)			
a_{18}	6.52408	3.70988	0.000
a^{EF}_{18}	5.67784	1.85139	0.064
a^{T}_{18}	0.027521	1.76995	0.077
Kanto Tsukuba Bank (*i*=19)			
a_{19}	10.0765	272.245	0.000
Tsukuba Bank (*i*=20)			
a_{20}	10.5461	200.512	0.000
Musashino Bank (*i*=21)			
a_{21}	10.6727	63.4237	0.000
a^{EF}_{21}	-1.23065	-3.14243	0.002
$a^{HI}_{21,L}$	-0.019006	-0.226548	0.821

a_{21}^{T}	-0.00132887	-0.234288	0.815
Chiba Bank (*i*=22)			
a_{22}	10.7952	36.4202	0.000
a_{22}^{EF}	0.886929	0.830976	0.406
$a_{22,L}^{HI}$	-0.138476	-0.267010	0.789
a_{22}^{T}	0.011586	2.79899	0.005
Chiba Kogyo Bank (*i*=23)			
a_{23}	10.7797	47.4492	0.000
a_{23}^{EF}	-1.47670	-5.00034	0.000
$a_{23,L}^{HI}$	-0.270405	-0.541151	0.588
a_{23}^{T}	-0.00986326	-3.16995	0.002
Tokyo Tomin Bank (*i*=24)			
a_{24}	10.2646	48.7808	0.000
a_{24}^{EF}	-0.182413	-0.297602	0.766
$a_{24,L}^{HI}$	0.032165	0.166958	0.867
a_{24}^{T}	-0.00334711	-0.841177	0.400
Bank of Yokohama (*i*=25)			
a_{25}	3.46659	1.53072	0.126

a_{25}^{EF}	-5.66485	-1.46000	0.144
$a_{25,L}^{HI}$	8.54839	3.71889	0.000
a_{25}^{T}	-0.011428	-1.66099	0.097
Daishi Bank (i=26)			
a_{26}	7.40516	18.0718	0.000
a_{26}^{EF}	14.1199	6.41237	0.000
$a_{26,L}^{HI}$	0.442318	1.57292	0.116
a_{26}^{T}	-0.000715858	-0.159268	0.873
Hokuetsu Bank (i=27)			
a_{27}	10.5920	34.6387	0.000
a_{27}^{EF}	-1.22161	-1.82550	0.068
$a_{27,L}^{HI}$	-0.146569	-0.376331	0.707
a_{27}^{T}	-0.016542	-5.08136	0.000
Yamanashi Chuo Bank (i=28)			
a_{28}	10.1963	86.1668	0.000
a_{28}^{EF}	0.320710	0.727462	0.467
a_{28}^{T}	-0.017425	-5.49323	0.000
Hachijuni Bank (i=29)			

a_{29}	11.9887	37.2438	0.000
a_{29}^{EF}	-0.370926	-0.446203	0.655
$a_{29,L}^{HI}$	-1.57449	-3.72010	0.000
a_{29}^{T}	-0.025448	-7.63828	0.000
Hokuriku Bank (*i*=30)			
a_{30}	9.90663	27.4695	0.000
a_{30}^{EF}	3.42198	3.45510	0.001
$a_{30,L}^{HI}$	0.228790	0.464989	0.642
a_{30}^{T}	-0.032693	-9.30213	0.000
Bank of Toyama (*i*=31)			
a_{31}	9.07523	35.6343	0.000
a_{31}^{EF}	0.375085	2.47531	0.013
$a_{31,L}^{HI}$	-0.126709	-0.453830	0.650
a_{31}^{T}	-0.012889	-4.96734	0.000
Hokkoku Bank (*i*=32)			
a_{32}	9.97780	56.3169	0.000
a_{32}^{EF}	1.73848	2.30710	0.021
a_{32}^{T}	-0.026565	-10.4909	0.000

Fukui Bank (i=33)			
a_{33}	9.12753	17.8292	0.000
a_{33}^{EF}	3.22280	3.37687	0.001
$a_{33,L}^{HI}$	0.309320	0.492092	0.623
a_{33}^{T}	-0.026344	-9.67415	0.000
Shizuoka Bank (i=34)			
a_{34}	11.1583	25.0655	0.000
a_{34}^{EF}	3.73733	1.14409	0.253
$a_{34,L}^{HI}$	-1.89387	-3.12241	0.002
a_{34}^{T}	-0.020849	-7.78009	0.000
Suruga Bank (i=35)			
a_{35}	11.2918	17.4549	0.000
a_{35}^{EF}	-4.64183	-1.97727	0.048
$a_{35,L}^{HI}$	0.336779	0.537790	0.591
a_{35}^{T}	-0.012254	-2.45644	0.014
Shimizu Bank (i=36)			
a_{36}	9.78795	43.5301	0.000
a_{36}^{EF}	0.197694	0.572231	0.567

$a_{36,L}^{HI}$	-0.352691	-0.791049	0.429
a_{36}^{T}	-0.00450362	-2.66864	0.008
Ogaki Kyoritsu Bank (*i*=37)			
a_{37}	10.0561	47.8000	0.000
a_{37}^{EF}	1.64359	1.74711	0.081
$a_{37,L}^{HI}$	-0.175010	-3.26155	0.001
a_{37}^{T}	0.00610828	1.72120	0.085
Juroku Bank (*i*=38)			
a_{38}	13.9166	16.8912	0.000
a_{38}^{EF}	-12.9506	-5.60977	0.000
$a_{38,L}^{HI}$	-1.83204	-1.50895	0.131
a_{38}^{T}	-0.016450	-5.11831	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
a_{39}	10.2994	188.899	0.000
Mie Bank (*i*=40)			
a_{40}	8.67525	15.4097	0.000
a_{40}^{EF}	1.59932	2.90032	0.004
$a_{40,L}^{HI}$	0.901470	0.812597	0.416

a_{40}^{T}	0.00620328	2.13917	0.032
Hyakugo Bank (*i*=41)			
a_{41}	11.2762	41.1377	0.000
a_{41}^{EF}	1.01734	1.67519	0.094
$a_{41,L}^{HI}$	-3.06144	-3.77467	0.000
a_{41}^{T}	-0.00517813	-2.45724	0.014
Shiga Bank (*i*=42)			
a_{42}	10.7400	90.0420	0.000
a_{42}^{EF}	-1.36100	-1.83646	0.066
$a_{42,L}^{HI}$	-0.125564	-1.65814	0.097
a_{42}^{T}	-0.011800	-5.52301	0.000
Bank of Kyoto (*i*=43)			
a_{43}	11.1429	40.9020	0.000
a_{43}^{EF}	-3.07378	-1.87131	0.061
a_{43}^{T}	-0.00554470	-1.35271	0.176
Osaka Bank (*i*=44)			
a_{44}	11.1428	53.2725	0.000
a_{44}^{EF}	-3.77727	-4.88698	0.000

a_{44}^{T}	-0.017514	-3.97784	0.000
Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			
a_{45}	10.5290	232.653	0.000
Senshu Bank (*i*=46)			
a_{46}	9.77877	53.6720	0.000
a_{46}^{EF}	-0.183969	-0.460333	0.645
$a_{46,L}^{HI}$	0.326877	1.42691	0.154
a_{46}^{T}	0.00226942	0.906407	0.365
Ikeda Bank (*i*=47)			
a_{47}	9.84814	91.7475	0.000
a_{47}^{EF}	-0.447452	-1.95313	0.051
$a_{47,L}^{HI}$	0.712329	3.07851	0.002
a_{47}^{T}	-0.00529010	-1.80330	0.071
Senshu Ikeda Bank (*i*=48)			
a_{48}	10.3087	219.754	0.000
Nanto Bank (*i*=49)			
a_{49}	10.9671	155.805	0.000
a_{49}^{EF}	-2.56213	-8.05881	0.000
a_{49}^{T}	-0.00977166	-3.79381	0.000

Kiyo Bank (i=50)			
a_{50}	10.6732	116.703	0.000
a_{50}^{EF}	0.968982	2.23370	0.026
$a_{50,L}^{HI}$	-0.681112	-5.07966	0.000
a_{50}^{T}	0.000827737	0.310544	0.756
Kiyo Bank (merged with the Wakayama Bank) (i=51)			
a_{51}	10.1215	228.035	0.000
a_{51}^{T}	0.00803137	2.57402	0.010
Tajima Bank (i=52)			
a_{52}	10.1421	63.4065	0.000
a_{52}^{EF}	-0.867457	-4.32419	0.000
$a_{52,L}^{HI}$	-0.235258	-2.53650	0.011
a_{52}^{T}	0.013416	5.44805	0.000
Tottori Bank (i=53)			
a_{53}	9.00181	21.8395	0.000
a_{53}^{EF}	1.06041	1.56066	0.119
a_{53}^{T}	-0.022795	-4.76045	0.000
San-in Godo Bank (i=54)			
a_{54}	10.0771	280.981	0.000

a_{54}^{T}	-0.035726	-7.69344	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			
a_{55}	11.7645	52.6574	0.000
a_{55}^{EF}	-7.86088	-5.69975	0.000
a_{55}^{T}	-0.000807544	-0.225519	0.822
Chugoku Bank (*i*=56)			
a_{56}	10.0127	26.2737	0.000
a_{56}^{EF}	10.3366	4.18380	0.000
$a_{56,L}^{HI}$	-0.804581	-1.52015	0.128
a_{56}^{T}	-0.012034	-2.34568	0.019
Hiroshima Bank (*i*=57)			
a_{57}	11.6978	85.1264	0.000
a_{57}^{EF}	-8.04850	-7.53013	0.000
$a_{57,L}^{HI}$	0.046285	0.884866	0.376
a_{57}^{T}	-0.028173	-7.52643	0.000
Yamaguchi Bank (*i*=58)			
a_{58}	11.7658	56.8079	0.000
a_{58}^{EF}	-5.04680	-24.3489	0.000

$a^{HI}_{58,L}$	-0.329026	-1.24589	0.213
a^{T}_{58}	-0.026780	-8.28041	0.000
Awa Bank (i=59)			
a_{59}	11.2734	29.9257	0.000
a^{EF}_{59}	-0.752814	-3.03319	0.002
$a^{HI}_{59,L}$	-1.70552	-2.42062	0.015
a^{T}_{59}	-0.011680	-5.87258	0.000
Hyakujushi Bank (i=60)			
a_{60}	11.0546	32.2244	0.000
a^{EF}_{60}	0.645325	1.33220	0.183
$a^{HI}_{60,L}$	-1.39581	-2.05164	0.040
a^{T}_{60}	-0.00632608	-3.41951	0.001
Iyo Bank (i=61)			
a_{61}	10.4973	489.866	0.000
a^{T}_{61}	0.0000826738	0.031332	0.975
Iyo Bank (merged with the Toho Sogo Bank) (i=62)			
a_{62}	7.83897	16.1632	0.000
a^{EF}_{62}	15.9045	5.51852	0.000

a_{62}^{T}	0.026101	4.15409	0.000
Shikoku Bank (*i*=63)			
a_{63}	10.2740	46.0880	0.000
a_{63}^{EF}	-0.631983	-4.40632	0.000
$a_{63,L}^{HI}$	0.256888	0.640820	0.522
a_{63}^{T}	-0.014459	-10.7126	0.000
Bank of Fukuoka (*i*=64)			
a_{64}	10.8557	87.5683	0.000
a_{64}^{EF}	0.461161	0.402672	0.687
$a_{64,L}^{HI}$	-0.012725	-0.199557	0.842
a_{64}^{T}	-0.00918288	-2.81479	0.005
Chikuho Bank (*i*=65)			
a_{65}	8.50233	34.1931	0.000
a_{65}^{EF}	0.622761	2.48286	0.013
$a_{65,L}^{HI}$	-0.157253	-1.94653	0.052
a_{65}^{T}	0.00893154	3.63245	0.000
Bank of Saga (*i*=66)			
a_{66}	12.0632	19.5411	0.000

a_{66}^{EF}	-0.061313	-0.305044	0.760
$a_{66,L}^{HI}$	-2.54969	-3.00126	0.003
a_{66}^{T}	-0.00156548	-0.848968	0.396
Eighteenth Bank (*i*=67)			
a_{67}	10.6051	106.907	0.000
a_{67}^{EF}	-1.18190	-3.20167	0.001
$a_{67,L}^{HI}$	-0.182715	-3.30885	0.001
a_{67}^{T}	-0.00624474	-3.73655	0.000
Shinwa Bank (*i*=68)			
a_{68}	10.2743	9.04585	0.000
a_{68}^{EF}	-0.361874	-0.089372	0.929
a_{68}^{T}	-0.00660161	-0.515815	0.606
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
a_{69}	10.3998	138.410	0.000
a_{69}^{T}	-0.023764	-4.72867	0.000
Higo Bank (*i*=70)			
a_{70}	10.4087	129.713	0.000
a_{70}^{EF}	-0.926149	-3.12595	0.002

$a_{70,L}^{HI}$	0.294934	5.98225	0.000
a_{70}^{T}	-0.00610139	-3.05959	0.002
Oita Bank (*i*=71)			
a_{71}	11.9409	25.1935	0.000
a_{71}^{EF}	-0.288529	-0.882057	0.378
$a_{71,L}^{HI}$	-2.32717	-3.16076	0.002
a_{71}^{T}	-0.014275	-7.30140	0.000
Miyazaki Bank (*i*=72)			
a_{72}	11.4725	39.9145	0.000
a_{72}^{EF}	0.767917	1.82666	0.068
$a_{72,L}^{HI}$	-2.66283	-5.82518	0.000
a_{72}^{T}	0.00997017	2.83310	0.005
Kagoshima Bank (*i*=73)			
a_{73}	10.6724	33.1016	0.000
a_{73}^{EF}	-1.47159	-3.44697	0.001
$a_{73,L}^{HI}$	0.053387	0.102025	0.919
a_{73}^{T}	-0.010041	-3.10582	0.002
Bank of Ryukyu (*i*=74)			

a_{74}	9.21520	14.5408	0.000
a_{74}^{EF}	-0.706509	-0.936604	0.349
$a_{74,L}^{HI}$	2.69085	1.62191	0.105
a_{74}^{T}	0.00132141	0.924053	0.355
Bank of Okinawa (i=75)			
a_{75}	9.09138	11.5115	0.000
a_{75}^{EF}	-0.831045	-3.73812	0.000
$a_{75,L}^{HI}$	2.85065	1.42467	0.154
a_{75}^{T}	0.00549957	3.34157	0.001
North Pacific Bank (i=76)			
a_{76}	10.4117	156.408	0.000
a_{76}^{EF}	-0.420311	-1.62727	0.104
a_{76}^{T}	-0.034028	-9.10432	0.000
North Pacific Bank (merged with the Sapporo Bank) (i=77)			
a_{77}	9.88837	141.865	0.000
Sapporo Bank (i=78)			
a_{78}	9.89447	43.4224	0.000
a_{78}^{EF}	1.11574	1.45836	0.145

a_{78}^{T}	-0.043236	-7.01075	0.000
Syokusan Bank (*i*=79)			
a_{79}	10.0293	25.0431	0.000
a_{79}^{EF}	-0.112016	-0.620558	0.535
$a_{79,L}^{HI}$	-1.15308	-1.04861	0.294
a_{79}^{T}	-0.017021	-7.42174	0.000
Kirayaka Bank (*i*=80)			
a_{80}	8.96864	91.2574	0.000
a_{80}^{T}	0.034227	6.34436	0.000
Kita-Nippon Bank (*i*=81)			
a_{81}	10.0852	30.4034	0.000
a_{81}^{EF}	1.04832	1.97524	0.048
$a_{81,L}^{HI}$	-1.65669	-2.07861	0.038
a_{81}^{T}	-0.022212	-8.82688	0.000
Tokuyo City Bank (*i*=82)			
a_{82}	15.4271	15.9308	0.000
a_{82}^{EF}	-14.7794	-5.96558	0.000
a_{82}^{T}	0.077683	4.14637	0.000
Sendai Bank (*i*=83)			

a_{83}	8.97752	30.3230	0.000
a_{83}^{EF}	0.417385	0.648505	0.517
$a_{83,L}^{HI}$	0.737747	3.90045	0.000
a_{83}^{T}	-0.017980	-4.72159	0.000
Fukushima Bank (*i*=84)			
a_{84}	10.1801	48.6838	0.000
a_{84}^{EF}	-0.459913	-2.16417	0.030
$a_{84,L}^{HI}$	-0.919029	-1.74691	0.081
a_{84}^{T}	-0.011597	-4.30518	0.000
Daito Bank (*i*=85)			
a_{85}	10.2700	41.3321	0.000
a_{85}^{EF}	-0.645853	-1.50034	0.134
$a_{85,L}^{HI}$	-1.17916	-2.44756	0.014
a_{85}^{T}	-0.00510076	-1.62326	0.105
Towa Bank (*i*=86)			
a_{86}	7.14655	8.29795	0.000
a_{86}^{EF}	3.23969	2.94234	0.003
$a_{86,L}^{HI}$	3.37263	2.12311	0.034

a_{86}^{T}	0.00677879	1.02873	0.304
Tochigi Bank (*i*=87)			
a_{87}	9.95577	92.3160	0.000
a_{87}^{EF}	0.378649	1.68761	0.091
$a_{87,L}^{HI}$	-0.097780	-1.04229	0.297
a_{87}^{T}	0.019794	6.12863	0.000
Keiyo Bank (*i*=88)			
a_{88}	11.2328	37.9768	0.000
a_{88}^{EF}	0.321033	0.769309	0.442
$a_{88,L}^{HI}$	-2.09258	-3.99052	0.000
a_{88}^{T}	0.018021	3.34959	0.001
Taiheiyo Bank (*i*=89)			
a_{89}	8.23356	16.6850	0.000
a_{89}^{EF}	1.76254	2.82761	0.005
a_{89}^{T}	-0.017062	-1.59570	0.111
Higashi-Nippon Bank (*i*=90)			
a_{90}	9.89077	60.6023	0.000
a_{90}^{EF}	1.01951	1.94317	0.052

$a_{90,L}^{HI}$	-0.661449	-3.14210	0.002
a_{90}^{T}	0.00414144	1.15973	0.246
Tokyo Sowa Bank (*i*=91)			
a_{91}	8.59976	17.2024	0.000
a_{91}^{EF}	6.62684	3.82232	0.000
a_{91}^{T}	-0.00155269	-0.459683	0.646
Heiwa Sogo Bank (*i*=92)			
a_{92}	10.2922	124.205	0.000
a_{92}^{T}	-0.012414	-2.68036	0.007
Kanagawa Bank (*i*=93)			
a_{93}	8.80274	6.13885	0.000
a_{93}^{EF}	3.87988	3.04578	0.002
$a_{93,L}^{HI}$	-2.06356	-1.37978	0.168
a_{93}^{T}	-0.00627918	-2.70641	0.007
Niigata Chuo Bank (*i*=94)			
a_{94}	9.68841	56.5996	0.000
a_{94}^{EF}	1.02094	2.13799	0.033
a_{94}^{T}	-0.016345	-3.99467	0.000
Taiko Bank (*i*=95)			

a_{95}	9.30642	68.1769	0.000
a_{95}^{EF}	1.01861	3.52053	0.000
$a_{95,L}^{HI}$	0.782235	3.38814	0.001
a_{95}^{T}	-0.015400	-6.06293	0.000
Nagano Bank (*i*=96)			
a_{96}	10.1800	21.7498	0.000
a_{96}^{EF}	-0.499855	-0.514394	0.607
$a_{96,L}^{HI}$	-0.304884	-0.704905	0.481
a_{96}^{T}	-0.016869	-7.01629	0.000
First Bank of Toyama (*i*=97)			
a_{97}	9.71442	47.9084	0.000
a_{97}^{EF}	1.43239	6.52691	0.000
$a_{97,L}^{HI}$	-0.622137	-2.15738	0.031
a_{97}^{T}	-0.027781	-11.4762	0.000
Fukuho Bank (*i*=98)			
a_{98}	7.19580	11.9545	0.000
a_{98}^{EF}	-0.131010	-1.33389	0.182
$a_{98,L}^{HI}$	3.39944	4.07408	0.000

a_{98}^{T}	-0.018631	-9.70732	0.000
Shizuokachuo Bank (*i*=99)			
a_{99}	10.3580	26.8383	0.000
a_{99}^{EF}	-0.142689	-1.51957	0.129
$a_{99,L}^{HI}$	-2.44793	-2.88775	0.004
a_{99}^{T}	-0.00855740	-4.79545	0.000
Gifu Bank (*i*=100)			
a_{100}	11.0405	13.6901	0.000
a_{100}^{EF}	0.773371	5.00207	0.000
$a_{100,L}^{HI}$	-3.89659	-1.95223	0.051
a_{100}^{T}	-0.016586	-6.01209	0.000
Aichi Bank (*i*=101)			
a_{101}	6.74474	4.25413	0.000
a_{101}^{EF}	-0.380531	-2.00511	0.045
$a_{101,L}^{HI}$	10.3316	2.23409	0.025
a_{101}^{T}	-0.00746129	-4.43081	0.000
Bank of Nagoya (*i*=102)			
a_{102}	12.2026	11.7145	0.000

a_{102}^{EF}	2.01515	4.23031	0.000
$a_{102,L}^{HI}$	-6.62189	-2.16359	0.030
a_{102}^{T}	-0.00818316	-4.56968	0.000
Chukyo Bank (*i*=103)			
a_{103}	7.63679	5.97853	0.000
a_{103}^{EF}	-0.362914	-0.720706	0.471
$a_{103,L}^{HI}$	7.47078	1.97760	0.048
a_{103}^{T}	-0.021271	-12.4619	0.000
Daisan Bank (*i*=104)			
a_{104}	6.35105	12.8305	0.000
a_{104}^{EF}	4.02914	2.63217	0.008
$a_{104,L}^{HI}$	7.11653	5.45166	0.000
a_{104}^{T}	0.00212433	0.616907	0.537
Biwako Bank (*i*=105)			
a_{105}	3.04908	2.78896	0.005
a_{105}^{EF}	28.0182	9.60117	0.000
$a_{105,L}^{HI}$	-4.35043	-9.96251	0.000
a_{105}^{T}	-0.149667	-11.1897	0.000

Bank of Kinki (i=106)			
a_{106}	10.1705	28.7417	0.000
a_{106}^{EF}	0.482114	0.322274	0.747
a_{106}^{T}	-0.023945	-7.03892	0.000
Fukutoku Bank (i=107)			
a_{107}	10.4028	50.8427	0.000
a_{107}^{EF}	-0.998520	-1.32999	0.184
a_{107}^{T}	-0.016094	-5.23995	0.000
Kansai Bank (i=108)			
a_{108}	10.0771	72.0845	0.000
a_{108}^{EF}	-1.05065	-2.76880	0.006
a_{108}^{T}	-0.014817	-5.29393	0.000
Kansai Urban Banking Corporation (i=109)			
a_{109}	9.88925	204.787	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (i=110)			
a_{110}	9.72237	116.379	0.000
Taisho Bank (i=111)			
a_{111}	8.61117	69.7145	0.000
a_{111}^{EF}	0.201913	0.941294	0.347

a_{111}^{T}	-0.00565988	-1.68449	0.092
Hanwa Bank (*i*=112)			
a_{112}	6.44980	12.5972	0.000
a_{112}^{EF}	6.32574	5.76367	0.000
a_{112}^{T}	-0.109774	-7.26087	0.000
Hyogo Bank (*i*=113)			
a_{113}	15.1040	6.40958	0.000
a_{113}^{EF}	-16.9459	-1.97305	0.048
a_{113}^{T}	0.041849	1.53472	0.125
Hanshin Bank (*i*=114)			
a_{114}	9.70979	106.521	0.000
a_{114}^{EF}	-0.061939	-0.269702	0.787
a_{114}^{T}	-0.017453	-7.94685	0.000
Minato Bank (*i*=115)			
a_{115}	10.2658	232.284	0.000
a_{115}^{T}	-0.00502511	-1.51550	0.130
Shimane Bank (*i*=116)			
a_{116}	9.58075	18.2078	0.000
a_{116}^{EF}	0.626777	0.482191	0.630

$a_{116,L}^{HI}$	-0.574156	-4.58014	0.000
a_{116}^{T}	-0.018274	-3.94898	0.000
Tomato Bank (*i*=117)			
a_{117}	8.56788	17.3632	0.000
a_{117}^{EF}	-0.095460	-0.148526	0.882
$a_{117,L}^{HI}$	1.37700	3.02200	0.003
a_{117}^{T}	-0.011105	-2.99306	0.003
Setouchi Bank (*i*=118)			
a_{118}	13.1886	5.66880	0.000
a_{118}^{EF}	-7.69378	-1.52519	0.127
a_{118}^{T}	-0.016426	-2.86856	0.004
Hiroshima Sogo Bank (*i*=119)			
a_{119}	9.09308	21.4135	0.000
a_{119}^{EF}	3.55458	2.40612	0.016
a_{119}^{T}	-0.022704	-6.92655	0.000
Momiji Bank (*i*=120)			
a_{120}	10.6581	215.958	0.000
a_{120}^{T}	-0.046922	-10.3620	0.000
Saikyo Bank (*i*=121)			

a_{121}	11.5986	35.0621	0.000
a_{121}^{EF}	-3.31202	-5.30693	0.000
$a_{121,L}^{HI}$	-0.525878	-3.49190	0.000
a_{121}^{T}	-0.012464	-4.37547	0.000
Tokushima Bank (*i*=122)			
a_{122}	12.2556	28.5985	0.000
a_{122}^{EF}	-0.144964	-0.872798	0.383
$a_{122,L}^{HI}$	-4.45684	-5.74516	0.000
a_{122}^{T}	-0.010592	-5.37644	0.000
Kagawa Bank (*i*=123)			
a_{123}	9.92375	28.5903	0.000
a_{123}^{EF}	1.37374	3.13241	0.002
$a_{123,L}^{HI}$	-1.01953	-2.02567	0.043
a_{123}^{T}	-0.00243314	-1.23519	0.217
Ehime Bank (*i*=124)			
a_{124}	9.67622	87.3610	0.000
a_{124}^{EF}	0.860786	2.91924	0.004
$a_{124,L}^{HI}$	0.026587	0.493520	0.622

a_{124}^{T}	0.00403859	2.17606	0.030
Bank of Kochi (*i*=125)			
a_{125}	9.86393	35.9450	0.000
a_{125}^{EF}	-0.321229	-1.58796	0.112
$a_{125,L}^{HI}$	0.163508	0.369129	0.712
a_{125}^{T}	-0.019562	-14.4977	0.000
Nishi-Nippon Sogo Bank (*i*=126)			
a_{126}	10.7039	256.175	0.000
Nishi-Nippon Bank (*i*=127)			
a_{127}	10.6335	466.317	0.000
a_{127}^{T}	-0.00858539	-3.53339	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128)			
a_{128}	11.0463	277.506	0.000
a_{128}^{T}	-0.011185	-3.05450	0.002
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129)			
Fukuoka City Bank (*i*=130)			
a_{130}	10.0072	54.6361	0.000
a_{130}^{EF}	1.14283	1.57191	0.116
a_{130}^{T}	0.00405087	0.889481	0.374

Fukuoka Chuo Bank (*i*=131)			
a_{131}	6.79294	10.7399	0.000
a_{131}^{EF}	3.90722	3.45168	0.001
$a_{131,L}^{HI}$	-0.030553	-0.370699	0.711
a_{131}^{T}	0.014179	4.01031	0.000
Saga Kyoei Bank (*i*=132)			
a_{132}	8.76426	148.724	0.000
Bank of Nagasaki (*i*=133)			
a_{133}	9.59079	25.4960	0.000
a_{133}^{EF}	-1.00728	-1.35187	0.176
$a_{133,L}^{HI}$	-0.257529	-2.41084	0.016
a_{133}^{T}	-0.000834021	-0.244513	0.807
Kyushu Bank (*i*=134)			
a_{134}	10.4258	62.2162	0.000
a_{134}^{EF}	-2.02081	-4.99533	0.000
a_{134}^{T}	-0.00528801	-2.63342	0.008
Kumamoto Bank (*i*=135)			
a_{135}	9.28792	197.599	0.000
a_{135}^{T}	0.00334305	0.891755	0.373

Kumamoto Family Bank (*i*=136)			
a_{136}	5.42096	2.50256	0.012
a_{136}^{EF}	14.8072	2.06415	0.039
a_{136}^{T}	-0.046524	-3.57207	0.000
Higo Family Bank (*i*=137)			
a_{137}	9.52146	169.270	0.000
a_{137}^{T}	-0.022406	-4.38825	0.000
Howa Bank (*i*=138)			
a_{138}	12.2979	34.8238	0.000
a_{138}^{EF}	-0.089636	-0.382215	0.702
$a_{138,L}^{HI}$	-4.37197	-9.21896	0.000
a_{138}^{T}	-0.011768	-8.36928	0.000
Miyazaki Taiyo Bank (*i*=139)			
a_{139}	10.5382	38.5364	0.000
a_{139}^{EF}	-0.759105	-2.92234	0.003
$a_{139,L}^{HI}$	-1.60097	-3.43794	0.001
a_{139}^{T}	0.00395929	2.65707	0.008
Minami-Nippon Bank (*i*=140)			
a_{140}	8.10673	17.5543	0.000

a_{140}^{EF}	1.27593	5.35614	0.000
$a_{140,L}^{HI}$	1.64344	2.51575	0.012
a_{140}^{T}	-0.030338	-12.2851	0.000
Okinawa Kaiho Bank (*i*=141)			
a_{141}	7.02852	7.05290	0.000
a_{141}^{EF}	-1.51036	-2.66400	0.008
$a_{141,L}^{HI}$	7.09361	2.69953	0.007
a_{141}^{T}	0.00874724	5.11076	0.000
Tokyo Star Bank (*i*=142)			
a_{142}	9.16507	81.4630	0.000
a_{142}^{T}	0.090324	12.1334	0.000
Saitama Resona Bank (*i*=143)			
a_{143}	10.5913	90.1020	0.000
a_{143}^{T}	0.015953	1.82978	0.067

Note: 1. Tables 4.2.1 and 4.2.2 show the results of the simultaneous GMM estimation of the dynamic variable cost function explained in Subsection 3.1.2.2, with the dynamic cost share equations explained in the same subsection. Table 4.2.1 gives the estimates of the parameters other than the coefficients of the individual bank dummies in Eq. (3.1.2.2.1a); Table 4.2.2 gives the estimates of the coefficients.

2. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.

3. The Seiwa Bank (*i*=4) is added to the Michinoku Bank (*i*=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the

Bank of Nagasaki) (i=129) is added to the Nishi-Nippon City Bank (i=128).

Table 4.2.3 Estimation Results for Eq. (3.2.1.1) Composing Eq. (3.1.2.1.2)

Parameter	Estimate	*t*-statistic	*p*-value
Yachiyo Bank (The present Kiraboshi Bank) (*i*=1)			
$a_{1,K}^{DIE}$	-5.13231	-310.481	0.000
$a_{1,K}^{DIEE}$	0.814188	15.9344	0.000
$a_{1,K}^{DIET}$	0.00766961	27.6601	0.000
Hokkaido Bank (*i*=2)			
$a_{2,K}^{DIE}$	-5.02259	-1824.58	0.000
$a_{2,K}^{DIEE}$	0.634296	55.2686	0.000
$a_{2,K,L}^{DIEH}$	-0.054487	-207.625	0.000
$a_{2,K}^{DIET}$	-0.00545091	-168.357	0.000
Aomori Bank (*i*=3)			
$a_{3,K}^{DIE}$	-4.80728	-1650.69	0.000
$a_{3,K}^{DIEE}$	-0.446522	-42.2705	0.000
$a_{3,K,L}^{DIEH}$	0.041636	38.2669	0.000
$a_{3,K}^{DIET}$	-0.00118695	-69.4969	0.000
Seiwa Bank (*i*=4)			
Seiwa Bank and Michinoku Bank (*i*=5)			
$a_{5,K}^{DIE}$	-7.09014	-69.3686	0.000

$a_{5,K}^{DIEE}$	-0.025073	-0.904267	0.366
$a_{5,K,L}^{DIEH}$	4.29800	22.4253	0.000
$a_{5,K}^{DIET}$	-0.00297272	-38.2914	0.000
Akita Bank (*i*=6)			
$a_{6,K}^{DIE}$	-4.89786	-995.343	0.000
$a_{6,K}^{DIEE}$	-0.147314	-10.9527	0.000
$a_{6,K,L}^{DIEH}$	0.036231	16.8422	0.000
$a_{6,K}^{DIET}$	-0.00187354	-80.6924	0.000
Ugo Bank (*i*=7)			
$a_{7,K}^{DIE}$	-5.02697	-5824.66	0.000
$a_{7,K}^{DIET}$	0.000372854	6.71813	0.000
Hokuto Bank (*i*=8)			
$a_{8,K}^{DIE}$	-5.19287	-1803.33	0.000
$a_{8,K}^{DIEE}$	0.715851	80.0813	0.000
$a_{8,K}^{DIET}$	-0.015139	-113.762	0.000
Shonai Bank (*i*=9)			
$a_{9,K}^{DIE}$	-5.09564	-853.319	0.000
$a_{9,K}^{DIEE}$	0.059543	5.67776	0.000

$a_{9,K,L}^{DIEH}$	0.047647	24.9128	0.000
$a_{9,K}^{DIET}$	0.0000417825	2.39460	0.017
Yamagata Bank (i=10)			
$a_{10,K}^{DIE}$	-4.72854	-359.556	0.000
$a_{10,K}^{DIEE}$	-0.591278	-15.7460	0.000
$a_{10,K,L}^{DIEH}$	-0.059935	-25.2578	0.000
$a_{10,K}^{DIET}$	-0.00116673	-25.9893	0.000
Bank of Iwate (i=11)			
$a_{11,K}^{DIE}$	-4.71737	-643.010	0.000
$a_{11,K}^{DIEE}$	-0.148925	-7.46963	0.000
$a_{11,K,L}^{DIEH}$	-0.433987	-13.7885	0.000
$a_{11,K}^{DIET}$	-0.00113617	-38.5837	0.000
Tohoku Bank (i=12)			
$a_{12,K}^{DIE}$	-5.11572	-617.253	0.000
$a_{12,K}^{DIEE}$	-0.107241	-21.1937	0.000
$a_{12,K,L}^{DIEH}$	0.340424	19.0244	0.000
$a_{12,K}^{DIET}$	0.000432118	7.44278	0.000
77 Bank (i=13)			

$a_{13,K}^{DIE}$	-4.87013	-1120.15	0.000
$a_{13,K}^{DIEE}$	-0.290445	-26.8526	0.000
$a_{13,K,L}^{DIEH}$	0.111504	25.6921	0.000
$a_{13,K}^{DIET}$	-0.00478759	-144.535	0.000
Toho Bank (*i*=14)			
$a_{14,K}^{DIE}$	-4.81883	-1090.33	0.000
$a_{14,K}^{DIEE}$	0.051459	3.10423	0.002
$a_{14,K,L}^{DIEH}$	-0.183072	-16.0284	0.000
$a_{14,K}^{DIET}$	-0.0000627233	-0.845818	0.398
Gunma Bank (*i*=15)			
$a_{15,K}^{DIE}$	-4.90832	-303.738	0.000
$a_{15,K}^{DIEE}$	-0.061375	-2.58243	0.010
$a_{15,K,L}^{DIEH}$	0.128646	4.50100	0.000
$a_{15,K}^{DIET}$	0.000755321	6.48624	0.000
Ashikaga Bank (*i*=16)			
$a_{16,K}^{DIE}$	-5.06125	-414.587	0.000
$a_{16,K}^{DIEE}$	-0.603385	-19.9876	0.000
$a_{16,K,L}^{DIEH}$	0.475976	34.8953	0.000

$a_{16,K}^{DIET}$	0.000538082	4.36319	0.000
Joyo Bank (*i*=17)			
$a_{17,K}^{DIE}$	-4.66165	-865.634	0.000
$a_{17,K}^{DIEE}$	-1.14817	-24.9644	0.000
$a_{17,K,L}^{DIEH}$	-0.036921	-13.5148	0.000
$a_{17,K}^{DIET}$	-0.00211055	-26.5105	0.000
Kanto Bank (*i*=18)			
$a_{18,K}^{DIE}$	-5.80985	-152.043	0.000
$a_{18,K}^{DIEE}$	1.41544	21.3793	0.000
$a_{18,K}^{DIET}$	0.00753223	24.2345	0.000
Kanto Tsukuba Bank (*i*=19)			
$a_{19,K}^{DIE}$	-4.93103	-146118.0	0.000
Tsukuba Bank (*i*=20)			
$a_{20,K}^{DIE}$	-4.83647	-13822.5	0.000
Musashino Bank (*i*=21)			
$a_{21,K}^{DIE}$	-4.82419	-707.963	0.000
$a_{21,K}^{DIEE}$	-0.248086	-14.4321	0.000
$a_{21,K,L}^{DIEH}$	0.000147343	0.056077	0.955
$a_{21,K}^{DIET}$	0.000375598	1.90196	0.057

Chiba Bank (i=22)			
$a^{DIE}_{22,K}$	-4.77753	-568.784	0.000
$a^{DIEE}_{22,K}$	0.198365	5.07229	0.000
$a^{DIEH}_{22,K,L}$	-0.073007	-5.38500	0.000
$a^{DIET}_{22,K}$	0.00303052	24.3272	0.000
Chiba Kogyo Bank (i=23)			
$a^{DIE}_{23,K}$	-4.77344	-869.306	0.000
$a^{DIEE}_{23,K}$	-0.275487	-38.7783	0.000
$a^{DIEH}_{23,K,L}$	-0.123142	-8.05765	0.000
$a^{DIET}_{23,K}$	-0.00121273	-23.9672	0.000
Tokyo Tomin Bank (i=24)			
$a^{DIE}_{24,K}$	-4.87994	-880.674	0.000
$a^{DIEE}_{24,K}$	-0.109685	-6.09565	0.000
$a^{DIEH}_{24,K,L}$	0.00865947	2.29438	0.022
$a^{DIET}_{24,K}$	-0.000378560	-3.91936	0.000
Bank of Yokohama (i=25)			
$a^{DIE}_{25,K}$	-6.14229	-493.185	0.000
$a^{DIEE}_{25,K}$	-0.960569	-29.4943	0.000

$a^{DIEH}_{25,K,L}$	1.57045	111.181	0.000
$a^{DIET}_{25,K}$	-0.00139041	-31.7935	0.000
Daishi Bank (i=26)			
$a^{DIE}_{26,K}$	-5.47349	-524.366	0.000
$a^{DIEE}_{26,K}$	2.77020	51.5055	0.000
$a^{DIEH}_{26,K,L}$	0.115887	10.9335	0.000
$a^{DIET}_{26,K}$	0.000386391	5.16294	0.000
Hokuetsu Bank (i=27)			
$a^{DIE}_{27,K}$	-4.82283	-599.927	0.000
$a^{DIEE}_{27,K}$	-0.299535	-15.6112	0.000
$a^{DIEH}_{27,K,L}$	-0.014614	-1.75083	0.080
$a^{DIET}_{27,K}$	-0.00274280	-63.0836	0.000
Yamanashi Chuo Bank (i=28)			
$a^{DIE}_{28,K}$	-4.91495	-1158.43	0.000
$a^{DIEE}_{28,K}$	0.058920	3.86447	0.000
$a^{DIET}_{28,K}$	-0.00278386	-78.2100	0.000
Hachijuni Bank (i=29)			
$a^{DIE}_{29,K}$	-4.53078	-526.650	0.000

$a_{29,K}^{DIEE}$	-0.00606025	-0.151695	0.879
$a_{29,K,L}^{DIEH}$	-0.363017	-47.3052	0.000
$a_{29,K}^{DIET}$	-0.00439267	-188.759	0.000
Hokuriku Bank (*i*=30)			
$a_{30,K}^{DIE}$	-4.95648	-1005.41	0.000
$a_{30,K}^{DIEE}$	0.670699	21.0167	0.000
$a_{30,K,L}^{DIEH}$	0.023786	4.87420	0.000
$a_{30,K}^{DIET}$	-0.00589446	-89.8855	0.000
Bank of Toyama (*i*=31)			
$a_{31,K}^{DIE}$	-5.12630	-1236.19	0.000
$a_{31,K}^{DIEE}$	0.079286	30.1177	0.000
$a_{31,K,L}^{DIEH}$	-0.038017	-8.54133	0.000
$a_{31,K}^{DIET}$	-0.00196545	-56.3119	0.000
Hokkoku Bank (*i*=32)			
$a_{32,K}^{DIE}$	-4.94244	-1353.81	0.000
$a_{32,K}^{DIEE}$	0.270470	17.7407	0.000
$a_{32,K}^{DIET}$	-0.00453865	-151.938	0.000
Fukui Bank (*i*=33)			

$a^{DIE}_{33,K}$	-5.11313	-292.080	0.000
$a^{DIEE}_{33,K}$	0.541515	16.1158	0.000
$a^{DIEH}_{33,K,L}$	0.078035	2.50286	0.012
$a^{DIET}_{33,K}$	-0.00432014	-54.0978	0.000
Shizuoka Bank (i=34)			
$a^{DIE}_{34,K}$	-4.69922	-545.047	0.000
$a^{DIEE}_{34,K}$	0.866426	23.1962	0.000
$a^{DIEH}_{34,K,L}$	-0.466625	-32.5542	0.000
$a^{DIET}_{34,K}$	-0.00353537	-150.623	0.000
Suruga Bank (i=35)			
$a^{DIE}_{35,K}$	-4.63228	-187.399	0.000
$a^{DIEE}_{35,K}$	-1.01914	-12.2546	0.000
$a^{DIEH}_{35,K,L}$	-0.025876	-2.04227	0.041
$a^{DIET}_{35,K}$	-0.00152138	-9.29715	0.000
Shimizu Bank (i=36)			
$a^{DIE}_{36,K}$	-4.96130	-1696.05	0.000
$a^{DIEE}_{36,K}$	0.034853	2.49199	0.013
$a^{DIEH}_{36,K,L}$	-0.139646	-9.03390	0.000

$a_{36,K}^{DIET}$	-0.000213848	-5.55344	0.000
Ogaki Kyoritsu Bank (*i*=37)			
$a_{37,K}^{DIE}$	-4.90865	-654.380	0.000
$a_{37,K}^{DIEE}$	0.165396	4.73376	0.000
$a_{37,K,L}^{DIEH}$	-0.031386	-19.8664	0.000
$a_{37,K}^{DIET}$	0.00142118	12.3282	0.000
Juroku Bank (*i*=38)			
$a_{38,K}^{DIE}$	-4.29947	-136.567	0.000
$a_{38,K}^{DIEE}$	-2.27652	-25.0495	0.000
$a_{38,K,L}^{DIEH}$	-0.219087	-4.36818	0.000
$a_{38,K}^{DIET}$	-0.00245348	-22.0908	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
$a_{39,K}^{DIE}$	-4.88649	-173808.0	0.000
Mie Bank (*i*=40)			
$a_{40,K}^{DIE}$	-5.16502	-221.488	0.000
$a_{40,K}^{DIEE}$	0.207900	9.25768	0.000
$a_{40,K,L}^{DIEH}$	0.174628	3.98720	0.000
$a_{40,K}^{DIET}$	0.00143555	17.9754	0.000
Hyakugo Bank (*i*=41)			

$a^{DIE}_{41,K}$	-4.73759	-604.823	0.000
$a^{DIEE}_{41,K}$	0.140258	7.41226	0.000
$a^{DIEH}_{41,K,L}$	-0.478024	-23.1265	0.000
$a^{DIET}_{41,K}$	-0.000461421	-15.3056	0.000
Shiga Bank (*i*=42)			
$a^{DIE}_{42,K}$	-4.80618	-710.067	0.000
$a^{DIEE}_{42,K}$	-0.272351	-6.27510	0.000
$a^{DIEH}_{42,K,L}$	-0.027750	-10.2381	0.000
$a^{DIET}_{42,K}$	-0.00163610	-36.3277	0.000
Bank of Kyoto (*i*=43)			
$a^{DIE}_{43,K}$	-4.71836	-269.792	0.000
$a^{DIEE}_{43,K}$	-0.671755	-6.36414	0.000
$a^{DIET}_{43,K}$	-0.000582078	-2.83588	0.005
Osaka Bank (*i*=44)			
$a^{DIE}_{44,K}$	-4.75553	-614.420	0.000
$a^{DIEE}_{44,K}$	-0.647661	-22.8582	0.000
$a^{DIET}_{44,K}$	-0.00224557	-13.8333	0.000
Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			

$a_{45,K}^{DIE}$	-4.84207	-11367.3	0.000
Senshu Bank (*i*=46)			
$a_{46,K}^{DIE}$	-5.02389	-1783.34	0.000
$a_{46,K}^{DIEE}$	0.025152	3.71387	0.000
$a_{46,K,L}^{DIEH}$	0.065245	33.9824	0.000
$a_{46,K}^{DIET}$	0.00118908	55.1146	0.000
Ikeda Bank (*i*=47)			
$a_{47,K}^{DIE}$	-4.99166	-3436.06	0.000
$a_{47,K}^{DIEE}$	-0.067094	-16.0409	0.000
$a_{47,K,L}^{DIEH}$	0.140422	64.1201	0.000
$a_{47,K}^{DIET}$	-0.000242661	-5.04068	0.000
Senshu Ikeda Bank (*i*=48)			
$a_{48,K}^{DIE}$	-4.88345	-21035.1	0.000
Nanto Bank (*i*=49)			
$a_{49,K}^{DIE}$	-4.75820	-1132.16	0.000
$a_{49,K}^{DIEE}$	-0.538037	-22.1165	0.000
$a_{49,K}^{DIET}$	-0.00129233	-43.8674	0.000
Kiyo Bank (*i*=50)			
$a_{50,K}^{DIE}$	-4.83823	-3158.42	0.000

$a_{50,K}^{DIEE}$	0.239424	46.0263	0.000
$a_{50,K,L}^{DIEH}$	-0.127610	-157.180	0.000
$a_{50,K}^{DIET}$	0.000805198	52.5103	0.000
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
$a_{51,K}^{DIE}$	-4.92270	-5332.47	0.000
$a_{51,K}^{DIET}$	0.00168963	29.6088	0.000
Tajima Bank (*i*=52)			
$a_{52,K}^{DIE}$	-4.94178	-1355.77	0.000
$a_{52,K}^{DIEE}$	-0.154477	-37.8660	0.000
$a_{52,K,L}^{DIEH}$	-0.034456	-12.8190	0.000
$a_{52,K}^{DIET}$	0.00302755	52.9283	0.000
Tottori Bank (*i*=53)			
$a_{53,K}^{DIE}$	-5.14050	-456.404	0.000
$a_{53,K}^{DIEE}$	0.193704	10.3390	0.000
$a_{53,K}^{DIET}$	-0.00368745	-29.3086	0.000
San-in Godo Bank (*i*=54)			
$a_{54,K}^{DIE}$	-4.94500	-10687.0	0.000
$a_{54,K}^{DIET}$	-0.00677672	-243.255	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			

$a^{DIE}_{55,K}$	-4.59849	-883.245	0.000
$a^{DIEE}_{55,K}$	-1.59489	-49.7860	0.000
$a^{DIET}_{55,K}$	0.000571671	4.89512	0.000
Chugoku Bank (*i*=56)			
$a^{DIE}_{56,K}$	-4.88713	-591.833	0.000
$a^{DIEE}_{56,K}$	1.70282	24.7612	0.000
$a^{DIEH}_{56,K,L}$	-0.186377	-15.1932	0.000
$a^{DIET}_{56,K}$	-0.00239869	-21.3587	0.000
Hiroshima Bank (*i*=57)			
$a^{DIE}_{57,K}$	-4.62892	-1714.87	0.000
$a^{DIEE}_{57,K}$	-1.51183	-58.6324	0.000
$a^{DIEH}_{57,K,L}$	0.011138	10.0219	0.000
$a^{DIET}_{57,K}$	-0.00490524	-107.082	0.000
Yamaguchi Bank (*i*=58)			
$a^{DIE}_{58,K}$	-4.63885	-461.187	0.000
$a^{DIEE}_{58,K}$	-0.979079	-88.8884	0.000
$a^{DIEH}_{58,K,L}$	-0.024797	-2.11400	0.035
$a^{DIET}_{58,K}$	-0.00464619	-164.573	0.000

Awa Bank (*i*=59)			
$a_{59,K}^{DIE}$	-4.66046	-514.874	0.000
$a_{59,K}^{DIEE}$	-0.173347	-13.1723	0.000
$a_{59,K,L}^{DIEH}$	-0.397211	-27.3785	0.000
$a_{59,K}^{DIET}$	-0.00184577	-38.8439	0.000
Hyakujushi Bank (*i*=60)			
$a_{60,K}^{DIE}$	-4.71124	-335.013	0.000
$a_{60,K}^{DIEE}$	0.134181	6.03569	0.000
$a_{60,K,L}^{DIEH}$	-0.336099	-13.5625	0.000
$a_{60,K}^{DIET}$	-0.000651290	-16.7844	0.000
Iyo Bank (*i*=61)			
$a_{61,K}^{DIE}$	-4.86089	-4765.12	0.000
$a_{61,K}^{DIET}$	0.000383676	6.22582	0.000
Iyo Bank (merged with the Toho Sogo Bank) (*i*=62)			
$a_{62,K}^{DIE}$	-5.28228	-295.171	0.000
$a_{62,K}^{DIEE}$	2.55049	23.9411	0.000
$a_{62,K}^{DIET}$	0.00453288	19.4046	0.000
Shikoku Bank (*i*=63)			
$a_{63,K}^{DIE}$	-4.95687	-760.852	0.000

$a_{63,K}^{DIEE}$	-0.143848	-31.8577	0.000
$a_{63,K,L}^{DIEH}$	0.157639	12.1686	0.000
$a_{63,K}^{DIET}$	-0.00225004	-221.370	0.000
Bank of Fukuoka (*i*=64)			
$a_{64,K}^{DIE}$	-4.79553	-1696.19	0.000
$a_{64,K}^{DIEE}$	0.208831	7.69495	0.000
$a_{64,K,L}^{DIEH}$	-0.00721779	-3.65488	0.000
$a_{64,K}^{DIET}$	-0.00100541	-25.3816	0.000
Chikuho Bank (*i*=65)			
$a_{65,K}^{DIE}$	-5.25916	-695.717	0.000
$a_{65,K}^{DIEE}$	0.138099	19.0628	0.000
$a_{65,K,L}^{DIEH}$	-0.031405	-22.9935	0.000
$a_{65,K}^{DIET}$	0.00234072	91.6257	0.000
Bank of Saga (*i*=66)			
$a_{66,K}^{DIE}$	-4.47016	-188.579	0.000
$a_{66,K}^{DIEE}$	-0.020361	-2.51328	0.012
$a_{66,K,L}^{DIEH}$	-0.598605	-18.4877	0.000
$a_{66,K}^{DIET}$	0.000371501	8.21546	0.000

Eighteenth Bank (*i*=67)			
$a_{67,K}^{DIE}$	-4.82852	-1975.10	0.000
$a_{67,K}^{DIEE}$	-0.263023	-29.0386	0.000
$a_{67,K,L}^{DIEH}$	-0.031280	-20.2324	0.000
$a_{67,K}^{DIET}$	-0.000656334	-22.5198	0.000
Shinwa Bank (*i*=68)			
$a_{68,K}^{DIE}$	-4.98239	-109.719	0.000
$a_{68,K}^{DIEE}$	0.221100	1.36103	0.174
$a_{68,K}^{DIET}$	0.000329968	0.678054	0.498
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
$a_{69,K}^{DIE}$	-4.87085	-9067.72	0.000
$a_{69,K}^{DIET}$	-0.00437530	-106.827	0.000
Higo Bank (*i*=70)			
$a_{70,K}^{DIE}$	-4.86738	-1905.69	0.000
$a_{70,K}^{DIEE}$	-0.214035	-19.1402	0.000
$a_{70,K,L}^{DIEH}$	0.057792	52.3370	0.000
$a_{70,K}^{DIET}$	-0.000626664	-19.1959	0.000
Oita Bank (*i*=71)			
$a_{71,K}^{DIE}$	-4.57220	-261.744	0.000

$a_{71,K}^{DIEE}$	-0.044176	-4.35999	0.000
$a_{71,K,L}^{DIEH}$	-0.463705	-17.3835	0.000
$a_{71,K}^{DIET}$	-0.00213961	-85.7598	0.000
Miyazaki Bank (*i*=72)			
$a_{72,K}^{DIE}$	-4.61693	-882.837	0.000
$a_{72,K}^{DIEE}$	0.171819	29.6779	0.000
$a_{72,K,L}^{DIEH}$	-0.610809	-84.3167	0.000
$a_{72,K}^{DIET}$	0.00274661	71.5424	0.000
Kagoshima Bank (*i*=73)			
$a_{73,K}^{DIE}$	-4.83299	-504.220	0.000
$a_{73,K}^{DIEE}$	-0.330217	-27.7104	0.000
$a_{73,K,L}^{DIEH}$	0.041013	3.30977	0.001
$a_{73,K}^{DIET}$	-0.00155400	-31.2504	0.000
Bank of Ryukyu (*i*=74)			
$a_{74,K}^{DIE}$	-5.04137	-443.832	0.000
$a_{74,K}^{DIEE}$	-0.145478	-11.6563	0.000
$a_{74,K,L}^{DIEH}$	0.361996	11.6025	0.000
$a_{74,K}^{DIET}$	0.000889840	56.0421	0.000

Bank of Okinawa (i=75)			
$a^{DIE}_{75,K}$	-5.06092	-413.683	0.000
$a^{DIEE}_{75,K}$	-0.163044	-30.2089	0.000
$a^{DIEH}_{75,K,L}$	0.376212	12.2169	0.000
$a^{DIET}_{75,K}$	0.00169872	106.063	0.000
North Pacific Bank (i=76)			
$a^{DIE}_{76,K}$	-4.85901	-3312.56	0.000
$a^{DIEE}_{76,K}$	-0.142453	-22.2142	0.000
$a^{DIET}_{76,K}$	-0.00586751	-239.013	0.000
North Pacific Bank (merged with the Sapporo Bank) (i=77)			
$a^{DIE}_{77,K}$	-4.96603	-23514.7	0.000
Sapporo Bank (i=78)			
$a^{DIE}_{78,K}$	-4.95052	-756.992	0.000
$a^{DIEE}_{78,K}$	0.127867	5.28520	0.000
$a^{DIET}_{78,K}$	-0.00729426	-46.8645	0.000
Syokusan Bank (i=79)			
$a^{DIE}_{79,K}$	-4.89922	-574.101	0.000
$a^{DIEE}_{79,K}$	-0.033546	-12.4169	0.000
$a^{DIEH}_{79,K,L}$	-0.341670	-13.8705	0.000

$a_{79,K}^{DIET}$	-0.00260957	-106.330	0.000
Kirayaka Bank (*i*=80)			
$a_{80,K}^{DIE}$	-5.14394	-3350.40	0.000
$a_{80,K}^{DIET}$	0.00662346	74.1122	0.000
Kita-Nippon Bank (*i*=81)			
$a_{81,K}^{DIE}$	-4.89201	-677.194	0.000
$a_{81,K}^{DIEE}$	0.122285	6.86953	0.000
$a_{81,K,L}^{DIEH}$	-0.370172	-20.3678	0.000
$a_{81,K}^{DIET}$	-0.00338827	-72.5996	0.000
Tokuyo City Bank (*i*=82)			
$a_{82,K}^{DIE}$	-4.03001	-146.847	0.000
$a_{82,K}^{DIEE}$	-2.54274	-36.8237	0.000
$a_{82,K}^{DIET}$	0.013110	24.0891	0.000
Sendai Bank (*i*=83)			
$a_{83,K}^{DIE}$	-5.14626	-552.917	0.000
$a_{83,K}^{DIEE}$	0.042071	1.96524	0.049
$a_{83,K,L}^{DIEH}$	0.153999	30.2831	0.000
$a_{83,K}^{DIET}$	-0.00283099	-27.0113	0.000
Fukushima Bank (*i*=84)			

$a_{84,K}^{DIE}$	-4.91105	-900.563	0.000
$a_{84,K}^{DIEE}$	-0.105184	-16.4173	0.000
$a_{84,K,L}^{DIEH}$	-0.182971	-14.7326	0.000
$a_{84,K}^{DIET}$	-0.00145893	-24.1034	0.000
Daito Bank (*i*=85)			
$a_{85,K}^{DIE}$	-4.88639	-928.320	0.000
$a_{85,K}^{DIEE}$	-0.171693	-7.64690	0.000
$a_{85,K,L}^{DIEH}$	-0.225100	-13.7326	0.000
$a_{85,K}^{DIET}$	-0.000194658	-4.04514	0.000
Towa Bank (*i*=86)			
$a_{86,K}^{DIE}$	-5.44547	-249.201	0.000
$a_{86,K}^{DIEE}$	0.604744	21.0770	0.000
$a_{86,K,L}^{DIEH}$	0.564648	12.4266	0.000
$a_{86,K}^{DIET}$	0.00197243	9.57335	0.000
Tochigi Bank (*i*=87)			
$a_{87,K}^{DIE}$	-4.96627	-1278.80	0.000
$a_{87,K}^{DIEE}$	0.074875	6.90999	0.000
$a_{87,K,L}^{DIEH}$	-0.015066	-10.1422	0.000

$a^{DIET}_{87,K}$	0.00447743	42.9578	0.000
Keiyo Bank (*i*=88)			
$a^{DIE}_{88,K}$	-4.69321	-953.290	0.000
$a^{DIEE}_{88,K}$	0.059108	5.50508	0.000
$a^{DIEH}_{88,K,L}$	-0.448909	-40.0172	0.000
$a^{DIET}_{88,K}$	0.00414588	37.2131	0.000
Taiheiyo Bank (*i*=89)			
$a^{DIE}_{89,K}$	-5.26762	-613.318	0.000
$a^{DIEE}_{89,K}$	0.303384	28.0707	0.000
$a^{DIET}_{89,K}$	-0.00218420	-12.7089	0.000
Higashi-Nippon Bank (*i*=90)			
$a^{DIE}_{90,K}$	-4.96408	-1179.13	0.000
$a^{DIEE}_{90,K}$	0.159542	10.6252	0.000
$a^{DIEH}_{90,K,L}$	-0.125992	-23.4395	0.000
$a^{DIET}_{90,K}$	0.00120423	11.8727	0.000
Tokyo Sowa Bank (*i*=91)			
$a^{DIE}_{91,K}$	-5.26091	-265.729	0.000
$a^{DIEE}_{91,K}$	1.40885	20.7011	0.000

$a_{91,K}^{DIET}$	0.000297879	2.93993	0.003
Heiwa Sogo Bank (*i*=92)			
$a_{91,K}^{DIE}$	-4.90786	-6374.13	0.000
$a_{91,K}^{DIET}$	-0.00248651	-47.4641	0.000
Kanagawa Bank (*i*=93)			
$a_{93,K}^{DIE}$	-5.08660	-878.803	0.000
$a_{93,K}^{DIEE}$	0.855799	97.3924	0.000
$a_{93,K,L}^{DIEH}$	-0.564961	-67.2201	0.000
$a_{93,K}^{DIET}$	-0.000579413	-65.1080	0.000
Niigata Chuo Bank (*i*=94)			
$a_{94,K}^{DIE}$	-4.99493	-1683.94	0.000
$a_{94,K}^{DIEE}$	0.138525	15.5502	0.000
$a_{94,K}^{DIET}$	-0.00224458	-41.9028	0.000
Taiko Bank (*i*=95)			
$a_{95,K}^{DIE}$	-5.08448	-870.641	0.000
$a_{95,K}^{DIEE}$	0.158880	12.3808	0.000
$a_{95,K,L}^{DIEH}$	0.172105	19.4553	0.000
$a_{95,K}^{DIET}$	-0.00244028	-58.4911	0.000
Nagano Bank (*i*=96)			

$a_{96,K}^{DIE}$	-4.89465	-346.299	0.000
$a_{96,K}^{DIEE}$	-0.047741	-1.21140	0.226
$a_{96,K,L}^{DIEH}$	-0.109782	-16.7078	0.000
$a_{96,K}^{DIET}$	-0.00270982	-54.7642	0.000
First Bank of Toyama (i=97)			
$a_{97,K}^{DIE}$	-4.99524	-1706.99	0.000
$a_{97,K}^{DIEE}$	0.259124	40.3623	0.000
$a_{97,K,L}^{DIEH}$	-0.132248	-25.6367	0.000
$a_{97,K}^{DIET}$	-0.00464314	-95.6575	0.000
Fukuho Bank (i=98)			
$a_{98,K}^{DIE}$	-5.50331	-221.140	0.000
$a_{98,K}^{DIEE}$	-0.021817	-12.2697	0.000
$a_{98,K,L}^{DIEH}$	0.665726	19.1974	0.000
$a_{98,K}^{DIET}$	-0.00296608	-121.508	0.000
Shizuokachuo Bank (i=99)			
$a_{99,K}^{DIE}$	-4.85019	-1234.07	0.000
$a_{99,K}^{DIEE}$	-0.023082	-20.5661	0.000
$a_{99,K,L}^{DIEH}$	-0.551457	-59.7202	0.000

$a_{99,K}^{DIET}$	-0.000989628	-71.4324	0.000
Gifu Bank (i=100)			
$a_{100,K}^{DIE}$	-4.80876	-453.725	0.000
$a_{100,K}^{DIEE}$	0.133687	40.1420	0.000
$a_{100,K,L}^{DIEH}$	-0.605860	-23.0729	0.000
$a_{100,K}^{DIET}$	-0.00264225	-64.3236	0.000
Aichi Bank (i=101)			
$a_{101,K}^{DIE}$	-5.52533	-86.1819	0.000
$a_{101,K}^{DIEE}$	-0.098973	-25.4175	0.000
$a_{101,K,L}^{DIEH}$	1.84774	9.96746	0.000
$a_{101,K}^{DIET}$	-0.000818324	-34.5464	0.000
Bank of Nagoya (i=102)			
$a_{102,K}^{DIE}$	-4.40245	-80.6952	0.000
$a_{102,K}^{DIEE}$	0.373301	18.5327	0.000
$a_{102,K,L}^{DIEH}$	-1.63053	-10.4579	0.000
$a_{102,K}^{DIET}$	-0.000948490	-22.3843	0.000
Chukyo Bank (i=103)			
$a_{103,K}^{DIE}$	-5.33882	-94.6100	0.000

$a_{103,K}^{DIEE}$	-0.112803	-11.3678	0.000
$a_{103,K,L}^{DIEH}$	1.26663	7.65224	0.000
$a_{103,K}^{DIET}$	-0.00342022	-85.9004	0.000
Daisan Bank (*i*=104)			
$a_{104,K}^{DIE}$	-5.66871	-451.843	0.000
$a_{104,K}^{DIEE}$	0.633034	18.6153	0.000
$a_{104,K,L}^{DIEH}$	1.49712	51.6308	0.000
$a_{104,K}^{DIET}$	0.000681984	8.84560	0.000
Biwako Bank (*i*=105)			
$a_{105,K}^{DIE}$	-6.23221	-442.745	0.000
$a_{105,K}^{DIEE}$	5.18687	134.463	0.000
$a_{105,K,L}^{DIEH}$	-0.822999	-215.372	0.000
$a_{105,K}^{DIET}$	-0.027170	-159.148	0.000
Bank of Kinki (*i*=106)			
$a_{106,K}^{DIE}$	-4.90196	-1334.64	0.000
$a_{106,K}^{DIEE}$	0.00972302	0.624499	0.532
$a_{106,K}^{DIET}$	-0.00405742	-120.890	0.000
Fukutoku Bank (*i*=107)			

$a^{DIE}_{107,K}$	-4.85907	-1434.87	0.000
$a^{DIEE}_{107,K}$	-0.259316	-21.6592	0.000
$a^{DIET}_{107,K}$	-0.00239939	-46.0821	0.000
Kansai Bank (*i*=108)			
$a^{DIE}_{108,K}$	-4.92825	-2550.95	0.000
$a^{DIEE}_{108,K}$	-0.234937	-43.4301	0.000
$a^{DIET}_{108,K}$	-0.00210710	-61.2230	0.000
Kansai Urban Banking Corporation (*i*=109)			
$a^{DIE}_{109,K}$	-4.96729	-68163.5	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (*i*=110)			
$a^{DIE}_{110,K}$	-4.99779	-15098.9	0.000
Taisho Bank (*i*=111)			
$a^{DIE}_{111,K}$	-5.19826	-96473.8	0.000
Hanwa Bank (*i*=112)			
$a^{DIE}_{112,K}$	-5.68943	-365.807	0.000
$a^{DIEE}_{112,K}$	1.32571	39.3219	0.000
$a^{DIET}_{112,K}$	-0.021960	-52.8671	0.000
Hyogo Bank (*i*=113)			
$a^{DIE}_{113,K}$	-4.05814	-314.081	0.000

$a_{113,K}^{DIEE}$	-2.95054	-63.1834	0.000
$a_{113,K}^{DIET}$	0.00749712	48.3718	0.000
Hanshin Bank (*i*=114)			
$a_{114,K}^{DIE}$	-5.00422	-2860.42	0.000
$a_{114,K}^{DIEE}$	-0.032453	-6.69149	0.000
$a_{114,K}^{DIET}$	-0.00271659	-57.3778	0.000
Minato Bank (*i*=115)			
$a_{115,K}^{DIE}$	-4.89796	-6016.70	0.000
$a_{115,K}^{DIET}$	-0.000659579	-9.94933	0.000
Shimane Bank (*i*=116)			
$a_{116,K}^{DIE}$	-4.99207	-330.700	0.000
$a_{116,K}^{DIEE}$	0.010339	0.300625	0.764
$a_{116,K,L}^{DIEH}$	-0.109823	-16.6440	0.000
$a_{116,K}^{DIET}$	-0.00252436	-21.8477	0.000
Tomato Bank (*i*=117)			
$a_{117,K}^{DIE}$	-5.19739	-237.742	0.000
$a_{117,K}^{DIEE}$	-0.069842	-1.95638	0.050
$a_{117,K,L}^{DIEH}$	0.250680	17.6377	0.000

$a_{117,K}^{DIET}$	-0.00168373	-13.7152	0.000
Setouchi Bank (*i*=118)			
$a_{118,K}^{DIE}$	-4.06609	-30.5434	0.000
$a_{118,K}^{DIEE}$	-2.07571	-7.19178	0.000
$a_{118,K}^{DIET}$	-0.00300698	-11.7435	0.000
Hiroshima Sogo Bank (*i*=119)			
$a_{119,K}^{DIE}$	-5.18280	-360.799	0.000
$a_{119,K}^{DIEE}$	0.870083	17.5716	0.000
$a_{119,K}^{DIET}$	-0.00370122	-47.4856	0.000
Momiji Bank (*i*=120)			
$a_{120,K}^{DIE}$	-4.81997	-13334.3	0.000
$a_{120,K}^{DIET}$	-0.00891766	-312.359	0.000
Saikyo Bank (*i*=121)			
$a_{121,K}^{DIE}$	-4.62098	-316.979	0.000
$a_{121,K}^{DIEE}$	-0.710259	-24.8881	0.000
$a_{121,K,L}^{DIEH}$	-0.091036	-15.9017	0.000
$a_{121,K}^{DIET}$	-0.00191847	-26.4669	0.000
Tokushima Bank (*i*=122)			
$a_{122,K}^{DIE}$	-4.48397	-393.291	0.000

$a_{122,K}^{DIEE}$	-0.049837	-5.41078	0.000
$a_{122,K,L}^{DIEH}$	-0.907401	-41.7673	0.000
$a_{122,K}^{DIET}$	-0.00153580	-35.1250	0.000
Kagawa Bank (*i*=123)			
$a_{123,K}^{DIE}$	-4.93796	-346.786	0.000
$a_{123,K}^{DIEE}$	0.269424	15.4225	0.000
$a_{123,K,L}^{DIEH}$	-0.250250	-13.1344	0.000
$a_{123,K}^{DIET}$	0.000117297	1.80150	0.072
Ehime Bank (*i*=124)			
$a_{124,K}^{DIE}$	-4.99831	-2033.77	0.000
$a_{124,K}^{DIEE}$	0.111526	16.4457	0.000
$a_{124,K,L}^{DIEH}$	0.00197185	3.34863	0.001
$a_{124,K}^{DIET}$	0.00119429	29.5004	0.000
Bank of Kochi (*i*=125)			
$a_{125,K}^{DIE}$	-5.01371	-716.613	0.000
$a_{125,K}^{DIEE}$	-0.093023	-15.6979	0.000
$a_{125,K,L}^{DIEH}$	0.105938	10.3495	0.000
$a_{125,K}^{DIET}$	-0.00314590	-190.043	0.000

Nishi-Nippon Sogo Bank (i=126)			
$a_{126,K}^{DIE}$	-4.82565	-21791.3	0.000
Nishi-Nippon Bank (i=127)			
$a_{127,K}^{DIE}$	-4.82954	-47656.4	0.000
$a_{127,K}^{DIET}$	-0.000858038	-39.1362	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=128)			
$a_{128,K}^{DIE}$	-4.74344	-10545.4	0.000
$a_{128,K}^{DIET}$	-0.00180930	-52.1799	0.000
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129)			
Fukuoka City Bank (i=130)			
$a_{130,K}^{DIE}$	-4.93591	-791.665	0.000
$a_{130,K}^{DIEE}$	0.156599	6.27942	0.000
$a_{130,K}^{DIET}$	0.00117314	8.76886	0.000
Fukuoka Chuo Bank (i=131)			
$a_{131,K}^{DIE}$	-5.57311	-508.050	0.000
$a_{131,K}^{DIEE}$	0.761365	37.7553	0.000
$a_{131,K,L}^{DIEH}$	-0.010256	-4.40799	0.000
$a_{131,K}^{DIET}$	0.00337210	50.7081	0.000
Saga Kyoei Bank (i=132)			

$a_{132,K}^{DIE}$	-5.12095	-430.930	0.000
$a_{132,K}^{DIEE}$	-0.010206	-12.9577	0.000
$a_{132,K,L}^{DIEH}$	-0.081046	-5.21921	0.000
$a_{132,K}^{DIET}$	0.000610867	32.9418	0.000
Bank of Nagasaki (*i*=133)			
$a_{133,K}^{DIE}$	-5.02844	-915.276	0.000
$a_{133,K}^{DIEE}$	-0.205027	-18.8585	0.000
$a_{133,K,L}^{DIEH}$	-0.042504	-19.5231	0.000
$a_{133,K}^{DIET}$	0.000346046	4.71279	0.000
Kyushu Bank (*i*=134)			
$a_{134,K}^{DIE}$	-4.85055	-1323.66	0.000
$a_{134,K}^{DIEE}$	-0.444274	-48.0857	0.000
$a_{134,K}^{DIET}$	-0.000275724	-7.55101	0.000
Kumamoto Bank (*i*=135)			
$a_{135,K}^{DIE}$	-5.09456	-6989.02	0.000
$a_{135,K}^{DIET}$	0.00101313	19.0344	0.000
Kumamoto Family Bank (*i*=136)			
$a_{136,K}^{DIE}$	-5.72113	-253.597	0.000

$a_{136,K}^{DIEE}$	2.47157	33.0599	0.000
$a_{136,K}^{DIET}$	-0.00770993	-61.1659	0.000
Higo Family Bank (*i*=137)			
$a_{137,K}^{DIE}$	-5.05107	-5853.84	0.000
$a_{137,K}^{DIET}$	-0.00398134	-76.5631	0.000
Howa Bank (*i*=138)			
$a_{138,K}^{DIE}$	-4.50440	-488.797	0.000
$a_{138,K}^{DIEE}$	-0.056482	-11.3830	0.000
$a_{138,K,L}^{DIEH}$	-0.826006	-63.6537	0.000
$a_{138,K}^{DIET}$	-0.00148717	-114.156	0.000
Miyazaki Taiyo Bank (*i*=139)			
$a_{139,K}^{DIE}$	-4.80561	-1024.04	0.000
$a_{139,K}^{DIEE}$	-0.147845	-30.2910	0.000
$a_{139,K,L}^{DIEH}$	-0.377340	-55.0022	0.000
$a_{139,K}^{DIET}$	0.00138399	59.2971	0.000
Minami-Nippon Bank (*i*=140)			
$a_{140,K}^{DIE}$	-5.26848	-441.338	0.000
$a_{140,K}^{DIEE}$	0.187613	22.6109	0.000

$a^{DIEH}_{140,K,L}$	0.270878	18.1328	0.000
$a^{DIET}_{140,K}$	-0.00487077	-77.4060	0.000
Okinawa Kaiho Bank (*i*=141)			
$a^{DIE}_{141,K}$	-5.45510	-459.825	0.000
$a^{DIEE}_{141,K}$	-0.302280	-22.7329	0.000
$a^{DIEH}_{141,K,L}$	1.19159	37.3097	0.000
$a^{DIET}_{141,K}$	0.00225796	192.149	0.000
Tokyo Star Bank (*i*=142)			
$a^{DIE}_{142,K}$	-5.11498	-25578.4	0.000
$a^{DIET}_{142,K}$	0.018171	1006.65	0.000
Saitama Resona Bank (*i*=143)			
$a^{DIE}_{143,K}$	-4.83216	-9018.32	0.000
$a^{DIET}_{143,K}$	0.00345164	89.9636	0.000
Number of Observations	4536		
Order of MA for the Error Term	5		
Test for Overidentification [*p*-value]	609.429 [0.589]		
Value Function	0.134354		

Note: 1. Tables 4.2.3 to 4.2.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.2.1.2), respectively.

2. The details of $a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right)$ in Eq. (3.1.2.2.2a) are as follows:

$a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = a_{i,K}^{DIE} + a_{i,K}^{DIEE} \cdot EF_{i,t-1}^{S} + a_{i,K,L}^{DIEH} \cdot HI_{L,t-1} + a_{i,K}^{DIET} \cdot \tau_t^*$, *i*=2, 3, 5, 6, 9-17, 21-27, 29-31, 33-38, 40-42, 46, 47, 50, 52, 56-60, 63, 64-66, 67, 70-75, 79, 81, 83-88, 90, 93, 95-105, 116, 117, 121-125, 131-133, 138-141,

$a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = a_{i,K}^{DIE} + a_{i,K}^{DIEE} \cdot EF_{i,t-1}^{S} + a_{i,K}^{DIET} \cdot \tau_t^*$, *i*=1, 8, 18, 28, 32, 43, 44, 49, 53, 55, 62, 68, 76, 78, 82, 89, 91, 94, 106-108, 112-114, 118, 119, 130, 134, 136,

$a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = a_{i,K}^{DIE} + a_{i,K}^{DIET} \cdot \tau_t^*$, *i*=7, 51, 54, 61, 69, 80, 92, 115, 120, 127, 128, 135, 137, 142, 143,

$a_{i,K}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = a_{i,K}^{DIE}$, *i*=19, 20, 39, 45, 48, 77, 109, 110, 111, 126,

where $EF_{i,t-1}^{S}$ is the static cost unneutral efficiency in the previous period, $HI_{L,t-1}$ is the Herfindahl index of loans (i.e., the sum of the short-term and long-term loans) in the previous period, and τ_t^* is the normalized time trend.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, the products of these dummies and the normalized time trend, the products of these dummies and the estimate of the static cost share of the physical capital, the products of these dummies, the normalized time trend, and this estimate, the products of these dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period.
4. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
5. The Seiwa Bank (*i*=4) is added to the Michinoku Bank (*i*=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129) is added to the Nishi-Nippon City Bank (*i*=128).

Table 4.2.4 Estimation Results for Eq. (3.2.1.2) Composing Eq. (3.1.2.1.2)

Parameter	Estimate	t-statistic	p-value
Yachiyo Bank (The present Kiraboshi Bank) (i=1)			
$b_{1,L}^{DIE}$	-5.13698	-221.005	0.000
$b_{1,L}^{DIEE}$	0.828266	11.5281	0.000
$b_{1,L}^{DIET}$	0.00774860	19.5323	0.000
Hokkaido Bank (i=2)			
$b_{2,L}^{DIE}$	-5.02678	-646.681	0.000
$b_{2,L}^{DIEE}$	0.652243	18.7883	0.000
$b_{2,L,L}^{DIEH}$	-0.054769	-62.1526	0.000
$b_{2,L}^{DIET}$	-0.00547755	-80.5588	0.000
Aomori Bank (i=3)			
$b_{3,L}^{DIE}$	-4.80573	-545.795	0.000
$b_{3,L}^{DIEE}$	-0.455192	-16.0236	0.000
$b_{3,L,L}^{DIEH}$	0.043381	18.2136	0.000
$b_{3,L}^{DIET}$	-0.00116795	-33.5823	0.000
Seiwa Bank (i=4)			
Seiwa Bank and Michinoku Bank (i=5)			
$b_{5,L}^{DIE}$	-6.90828	-24.3959	0.000

$b^{DIEE}_{5,L}$	-0.072604	-2.04230	0.041
$b^{DIEH}_{5,L,L}$	3.96654	7.24167	0.000
$b^{DIET}_{5,L}$	-0.00285477	-25.2463	0.000
Akita Bank (i=6)			
$b^{DIE}_{6,L}$	-4.89803	-520.561	0.000
$b^{DIEE}_{6,L}$	-0.142742	-5.65483	0.000
$b^{DIEH}_{6,L,L}$	0.033615	7.22467	0.000
$b^{DIET}_{6,L}$	-0.00187162	-38.8666	0.000
Ugo Bank (i=7)			
$b^{DIE}_{7,L}$	-5.02663	-5456.48	0.000
$b^{DIET}_{7,L}$	0.000393377	5.80996	0.000
Hokuto Bank (i=8)			
$b^{DIE}_{8,L}$	-5.19097	-947.182	0.000
$b^{DIEE}_{8,L}$	0.709670	41.2843	0.000
$b^{DIET}_{8,L}$	-0.015037	-57.9755	0.000
Shonai Bank (i=9)			
$b^{DIE}_{9,L}$	-5.09668	-494.710	0.000
$b^{DIEE}_{9,L}$	0.061812	3.53026	0.000

$b_{9,L,L}^{DIEH}$	0.047318	18.9177	0.000
$b_{9,L}^{DIET}$	0.0000155219	0.359422	0.719
Yamagata Bank (*i*=10)			
$b_{10,L}^{DIE}$	-4.73579	-200.017	0.000
$b_{10,L}^{DIEE}$	-0.572438	-8.11899	0.000
$b_{10,L,L}^{DIEH}$	-0.058704	-14.7556	0.000
$b_{10,L}^{DIET}$	-0.00113837	-12.2403	0.000
Bank of Iwate (*i*=11)			
$b_{11,L}^{DIE}$	-4.71518	-372.626	0.000
$b_{11,L}^{DIEE}$	-0.151593	-6.08125	0.000
$b_{11,L,L}^{DIEH}$	-0.437555	-9.19717	0.000
$b_{11,L}^{DIET}$	-0.00116132	-32.1978	0.000
Tohoku Bank (*i*=12)			
$b_{12,L}^{DIE}$	-5.11764	-386.746	0.000
$b_{12,L}^{DIEE}$	-0.106471	-14.5616	0.000
$b_{12,L,L}^{DIEH}$	0.344308	12.5268	0.000
$b_{12,L}^{DIET}$	0.000414767	5.05487	0.000
77 Bank (*i*=13)			

$b_{13,L}^{DIE}$	-4.87290	-684.580	0.000
$b_{13,L}^{DIEE}$	-0.297982	-19.2428	0.000
$b_{13,L,L}^{DIEH}$	0.117999	14.0498	0.000
$b_{13,L}^{DIET}$	-0.00487893	-54.4937	0.000
Toho Bank (*i*=14)			
$b_{14,L}^{DIE}$	-4.81359	-545.315	0.000
$b_{14,L}^{DIEE}$	0.054278	1.42799	0.153
$b_{14,L,L}^{DIEH}$	-0.196066	-10.0508	0.000
$b_{14,L}^{DIET}$	-0.0000166662	-0.133742	0.894
Gunma Bank (*i*=15)			
$b_{15,L}^{DIE}$	-4.93630	-200.362	0.000
$b_{15,L}^{DIEE}$	-0.064939	-1.95277	0.051
$b_{15,L,L}^{DIEH}$	0.175077	4.22586	0.000
$b_{15,L}^{DIET}$	0.000648063	4.27933	0.000
Ashikaga Bank (*i*=16)			
$b_{16,L}^{DIE}$	-5.06758	-363.383	0.000
$b_{16,L}^{DIEE}$	-0.584108	-13.1644	0.000
$b_{16,L,L}^{DIEH}$	0.481620	32.1522	0.000

$b_{16,L}^{DIET}$	0.000648521	3.87236	0.000
Joyo Bank (i=17)			
$b_{17,L}^{DIE}$	-4.66650	-640.182	0.000
$b_{17,L}^{DIEE}$	-1.11559	-18.6992	0.000
$b_{17,L,L}^{DIEH}$	-0.035184	-8.81825	0.000
$b_{17,L}^{DIET}$	-0.00203597	-14.2700	0.000
Kanto Bank (i=18)			
$b_{18,L}^{DIE}$	-5.80109	-110.080	0.000
$b_{18,L}^{DIEE}$	1.40060	15.3484	0.000
$b_{18,L}^{DIET}$	0.00744803	16.6903	0.000
Kanto Tsukuba Bank (i=19)			
$b_{19,L}^{DIE}$	-4.93097	-85308.0	0.000
Tsukuba Bank (i=20)			
$b_{20,L}^{DIE}$	-4.83649	-10205.5	0.000
Musashino Bank (i=21)			
$b_{21,L}^{DIE}$	-4.82257	-565.095	0.000
$b_{21,L}^{DIEE}$	-0.250942	-12.1833	0.000
$b_{21,L,L}^{DIEH}$	-0.000533693	-0.144046	0.885
$b_{21,L}^{DIET}$	0.000316237	1.40300	0.161

Chiba Bank (*i*=22)			
$b^{DIE}_{22,L}$	-4.76796	-355.122	0.000
$b^{DIEE}_{22,L}$	0.173955	4.23003	0.000
$b^{DIEH}_{22,L,L}$	-0.088044	-3.13075	0.002
$b^{DIET}_{22,L}$	0.00291702	20.3736	0.000
Chiba Kogyo Bank (*i*=23)			
$b^{DIE}_{23,L}$	-4.77608	-354.394	0.000
$b^{DIEE}_{23,L}$	-0.283159	-22.0457	0.000
$b^{DIEH}_{23,L,L}$	-0.111707	-3.20776	0.001
$b^{DIET}_{23,L}$	-0.00129099	-12.6831	0.000
Tokyo Tomin Bank (*i*=24)			
$b^{DIE}_{24,L}$	-4.88411	-553.237	0.000
$b^{DIEE}_{24,L}$	-0.099121	-2.95855	0.003
$b^{DIEH}_{24,L,L}$	0.011541	1.14380	0.253
$b^{DIET}_{24,L}$	-0.000346986	-1.92978	0.054
Bank of Yokohama (*i*=25)			
$b^{DIE}_{25,L}$	-6.14380	-403.916	0.000
$b^{DIEE}_{25,L}$	-0.958245	-15.5057	0.000

$b^{DIEH}_{25,L,L}$	1.57190	92.5473	0.000
$b^{DIET}_{25,L}$	-0.00139653	-15.4492	0.000
Daishi Bank (i=26)			
$b^{DIE}_{26,L}$	-5.46941	-248.592	0.000
$b^{DIEE}_{26,L}$	2.76160	24.9405	0.000
$b^{DIEH}_{26,L,L}$	0.109320	6.67300	0.000
$b^{DIET}_{26,L}$	0.000377143	2.82721	0.005
Hokuetsu Bank (i=27)			
$b^{DIE}_{27,L}$	-4.82903	-406.453	0.000
$b^{DIEE}_{27,L}$	-0.289831	-13.3060	0.000
$b^{DIEH}_{27,L,L}$	-0.00604224	-0.324934	0.745
$b^{DIET}_{27,L}$	-0.00278111	-40.0639	0.000
Yamanashi Chuo Bank (i=28)			
$b^{DIE}_{28,L}$	-4.91475	-951.332	0.000
$b^{DIEE}_{28,L}$	0.058593	3.24337	0.001
$b^{DIET}_{28,L}$	-0.00279706	-40.4487	0.000
Hachijuni Bank (i=29)			
$b^{DIE}_{29,L}$	-4.50833	-302.046	0.000

$b^{DIEE}_{29,L}$	-0.079095	-1.47198	0.141
$b^{DIEH}_{29,L,L}$	-0.377664	-25.0729	0.000
$b^{DIET}_{29,L}$	-0.00447183	-99.0584	0.000
Hokuriku Bank (*i*=30)			
$b^{DIE}_{30,L}$	-4.95945	-797.474	0.000
$b^{DIEE}_{30,L}$	0.662412	17.6175	0.000
$b^{DIEH}_{30,L,L}$	0.029412	2.92779	0.003
$b^{DIET}_{30,L}$	-0.00584992	-66.6399	0.000
Bank of Toyama (*i*=31)			
$b^{DIE}_{31,L}$	-5.12372	-853.477	0.000
$b^{DIEE}_{31,L}$	0.076658	14.9878	0.000
$b^{DIEH}_{31,L,L}$	-0.039570	-7.79857	0.000
$b^{DIET}_{31,L}$	-0.00190245	-22.3611	0.000
Hokkoku Bank (*i*=32)			
$b^{DIE}_{32,L}$	-4.93994	-514.827	0.000
$b^{DIEE}_{32,L}$	0.260166	6.40825	0.000
$b^{DIET}_{32,L}$	-0.00453045	-78.4586	0.000
Fukui Bank (*i*=33)			

$b_{33,L}^{DIE}$	-5.07167	-158.357	0.000
$b_{33,L}^{DIEE}$	0.529440	7.57185	0.000
$b_{33,L,L}^{DIEH}$	0.023788	0.514708	0.607
$b_{33,L}^{DIET}$	-0.00434482	-29.3543	0.000
Shizuoka Bank (*i*=34)			
$b_{34,L}^{DIE}$	-4.70600	-311.301	0.000
$b_{34,L}^{DIEE}$	0.868338	15.1011	0.000
$b_{34,L,L}^{DIEH}$	-0.451916	-17.8742	0.000
$b_{34,L}^{DIET}$	-0.00352002	-84.5996	0.000
Suruga Bank (*i*=35)			
$b_{35,L}^{DIE}$	-4.64556	-149.513	0.000
$b_{35,L}^{DIEE}$	-0.992636	-8.69437	0.000
$b_{35,L,L}^{DIEH}$	-0.010896	-0.614091	0.539
$b_{35,L}^{DIET}$	-0.00158248	-7.14748	0.000
Shimizu Bank (*i*=36)			
$b_{36,L}^{DIE}$	-4.96203	-803.262	0.000
$b_{36,L}^{DIEE}$	0.061064	2.59880	0.009
$b_{36,L,L}^{DIEH}$	-0.165321	-5.70941	0.000

$b_{36,L}^{DIET}$	-0.000281926	-4.71653	0.000
Ogaki Kyoritsu Bank (*i*=37)			
$b_{37,L}^{DIE}$	-4.91354	-389.497	0.000
$b_{37,L}^{DIEE}$	0.186597	3.16179	0.002
$b_{37,L,L}^{DIEH}$	-0.031364	-10.5514	0.000
$b_{37,L}^{DIET}$	0.00146178	7.52171	0.000
Juroku Bank (*i*=38)			
$b_{38,L}^{DIE}$	-4.26506	-71.0446	0.000
$b_{38,L}^{DIEE}$	-2.31804	-18.2176	0.000
$b_{38,L,L}^{DIEH}$	-0.280831	-2.21664	0.027
$b_{38,L}^{DIET}$	-0.00241438	-10.9010	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
$b_{39,L}^{DIE}$	-4.88649	-122645.0	0.000
Mie Bank (*i*=40)			
$b_{40,L}^{DIE}$	-5.19328	-117.042	0.000
$b_{40,L}^{DIEE}$	0.212009	7.24540	0.000
$b_{40,L,L}^{DIEH}$	0.243506	2.64206	0.008
$b_{40,L}^{DIET}$	0.00143812	13.3421	0.000
Hyakugo Bank (*i*=41)			

$b_{41,L}^{DIE}$	-4.73228	-467.002	0.000
$b_{41,L}^{DIEE}$	0.143348	4.83771	0.000
$b_{41,L,L}^{DIEH}$	-0.493435	-16.6489	0.000
$b_{41,L}^{DIET}$	-0.000470590	-8.43349	0.000
Shiga Bank (*i*=42)			
$b_{42,L}^{DIE}$	-4.80555	-457.801	0.000
$b_{42,L}^{DIEE}$	-0.274264	-4.56497	0.000
$b_{42,L,L}^{DIEH}$	-0.028011	-10.1773	0.000
$b_{42,L}^{DIET}$	-0.00166006	-29.2018	0.000
Bank of Kyoto (*i*=43)			
$b_{43,L}^{DIE}$	-4.71841	-128.017	0.000
$b_{43,L}^{DIEE}$	-0.672848	-3.02077	0.003
$b_{43,L}^{DIET}$	-0.000576292	-1.30220	0.193
Osaka Bank (*i*=44)			
$b_{44,L}^{DIE}$	-4.74395	-560.956	0.000
$b_{44,L}^{DIEE}$	-0.690838	-22.0345	0.000
$b_{44,L}^{DIET}$	-0.00251050	-13.3550	0.000
Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			

$b_{45,L}^{DIE}$	-4.84197	-7940.53	0.000
Senshu Bank (*i*=46)			
$b_{46,L}^{DIE}$	-5.01733	-835.527	0.000
$b_{46,L}^{DIEE}$	0.00838054	0.613512	0.540
$b_{46,L,L}^{DIEH}$	0.068511	20.4306	0.000
$b_{46,L}^{DIET}$	0.00114771	30.2844	0.000
Ikeda Bank (*i*=47)			
$b_{47,L}^{DIE}$	-4.99003	-2894.91	0.000
$b_{47,L}^{DIEE}$	-0.071320	-15.3534	0.000
$b_{47,L,L}^{DIEH}$	0.140374	33.8935	0.000
$b_{47,L}^{DIET}$	-0.000260279	-4.14045	0.000
Senshu Ikeda Bank (*i*=48)			
$b_{48,L}^{DIE}$	-4.88349	-14410.5	0.000
Nanto Bank (*i*=49)			
$b_{49,L}^{DIE}$	-4.75902	-1002.20	0.000
$b_{49,L}^{DIEE}$	-0.532944	-18.8434	0.000
$b_{49,L}^{DIET}$	-0.00132483	-24.8112	0.000
Kiyo Bank (*i*=50)			
$b_{50,L}^{DIE}$	-4.83782	-1708.29	0.000

$b_{50,L}^{DIEE}$	0.239379	17.1683	0.000
$b_{50,L,L}^{DIEH}$	-0.128069	-77.6697	0.000
$b_{50,L}^{DIET}$	0.000815624	19.1355	0.000
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
$b_{51,L}^{DIE}$	-4.92230	-2591.22	0.000
$b_{51,L}^{DIET}$	0.00166747	13.9061	0.000
Tajima Bank (*i*=52)			
$b_{52,L}^{DIE}$	-4.94428	-524.711	0.000
$b_{52,L}^{DIEE}$	-0.151554	-17.6684	0.000
$b_{52,L,L}^{DIEH}$	-0.033550	-4.81171	0.000
$b_{52,L}^{DIET}$	0.00300337	27.0020	0.000
Tottori Bank (*i*=53)			
$b_{53,L}^{DIE}$	-5.13570	-370.857	0.000
$b_{53,L}^{DIEE}$	0.185744	8.09921	0.000
$b_{53,L}^{DIET}$	-0.00366018	-24.0961	0.000
San-in Godo Bank (*i*=54)			
$b_{54,L}^{DIE}$	-4.94463	-6467.75	0.000
$b_{54,L}^{DIET}$	-0.00675677	-132.056	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			

$b_{55,L}^{DIE}$	-4.59408	-625.236	0.000
$b_{55,L}^{DIEE}$	-1.62117	-36.9604	0.000
$b_{55,L}^{DIET}$	0.000631137	4.43079	0.000
Chugoku Bank (i=56)			
$b_{56,L}^{DIE}$	-4.89518	-291.118	0.000
$b_{56,L}^{DIEE}$	1.64859	12.3737	0.000
$b_{56,L,L}^{DIEH}$	-0.165447	-10.1417	0.000
$b_{56,L}^{DIET}$	-0.00248543	-12.4747	0.000
Hiroshima Bank (i=57)			
$b_{57,L}^{DIE}$	-4.63438	-699.839	0.000
$b_{57,L}^{DIEE}$	-1.47522	-25.5242	0.000
$b_{57,L,L}^{DIEH}$	0.012737	4.47984	0.000
$b_{57,L}^{DIET}$	-0.00486394	-49.2621	0.000
Yamaguchi Bank (i=58)			
$b_{58,L}^{DIE}$	-4.63180	-255.955	0.000
$b_{58,L}^{DIEE}$	-0.986228	-46.9194	0.000
$b_{58,L,L}^{DIEH}$	-0.032586	-1.60709	0.108
$b_{58,L}^{DIET}$	-0.00464561	-93.8041	0.000

Awa Bank (i=59)			
$b_{59,L}^{DIE}$	-4.65481	-309.077	0.000
$b_{59,L}^{DIEE}$	-0.172013	-9.39521	0.000
$b_{59,L,L}^{DIEH}$	-0.407844	-15.1616	0.000
$b_{59,L}^{DIET}$	-0.00186583	-22.6933	0.000
Hyakujushi Bank (i=60)			
$b_{60,L}^{DIE}$	-4.71400	-294.935	0.000
$b_{60,L}^{DIEE}$	0.132461	4.84673	0.000
$b_{60,L,L}^{DIEH}$	-0.330764	-11.1409	0.000
$b_{60,L}^{DIET}$	-0.000647618	-11.7951	0.000
Iyo Bank (i=61)			
$b_{61,L}^{DIE}$	-4.86000	-3919.96	0.000
$b_{61,L}^{DIET}$	0.000429205	4.28094	0.000
Iyo Bank (merged with the Toho Sogo Bank) (i=62)			
$b_{62,L}^{DIE}$	-5.29525	-152.215	0.000
$b_{62,L}^{DIEE}$	2.62802	12.6612	0.000
$b_{62,L}^{DIET}$	0.00467323	10.3916	0.000
Shikoku Bank (i=63)			
$b_{63,L}^{DIE}$	-4.95851	-469.888	0.000

$b_{63,L}^{DIEE}$	-0.146136	-21.7224	0.000
$b_{63,L,L}^{DIEH}$	0.161443	7.73343	0.000
$b_{63,L}^{DIET}$	-0.00225935	-181.297	0.000
Bank of Fukuoka (*i*=64)			
$b_{64,L}^{DIE}$	-4.79627	-771.430	0.000
$b_{64,L}^{DIEE}$	0.213494	3.70828	0.000
$b_{64,L,L}^{DIEH}$	-0.00737487	-2.32218	0.020
$b_{64,L}^{DIET}$	-0.000978939	-11.1557	0.000
Chikuho Bank (*i*=65)			
$b_{65,L}^{DIE}$	-5.25514	-564.945	0.000
$b_{65,L}^{DIEE}$	0.134416	15.0555	0.000
$b_{65,L,L}^{DIEH}$	-0.032384	-15.5694	0.000
$b_{65,L}^{DIET}$	0.00233679	46.9723	0.000
Bank of Saga (*i*=66)			
$b_{66,L}^{DIE}$	-4.46377	-66.6775	0.000
$b_{66,L}^{DIEE}$	-0.019258	-1.25773	0.208
$b_{66,L,L}^{DIEH}$	-0.607267	-6.60947	0.000
$b_{66,L}^{DIET}$	0.000369562	3.29155	0.001

Eighteenth Bank (*i*=67)			
$b_{67,L}^{DIE}$	-4.82779	-1080.66	0.000
$b_{67,L}^{DIEE}$	-0.266450	-15.5068	0.000
$b_{67,L,L}^{DIEH}$	-0.030847	-10.1488	0.000
$b_{67,L}^{DIET}$	-0.000671785	-10.8682	0.000
Shinwa Bank (*i*=68)			
$b_{68,L}^{DIE}$	-4.99256	-88.3900	0.000
$b_{68,L}^{DIEE}$	0.257308	1.27108	0.204
$b_{68,L}^{DIET}$	0.000417284	0.665308	0.506
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
$b_{69,L}^{DIE}$	-4.87040	-3582.46	0.000
$b_{69,L}^{DIET}$	-0.00440835	-42.6862	0.000
Higo Bank (*i*=70)			
$b_{70,L}^{DIE}$	-4.86812	-1319.36	0.000
$b_{70,L}^{DIEE}$	-0.213938	-11.6060	0.000
$b_{70,L,L}^{DIEH}$	0.058930	22.4317	0.000
$b_{70,L}^{DIET}$	-0.000675465	-8.69400	0.000
Oita Bank (*i*=71)			
$b_{71,L}^{DIE}$	-4.56328	-149.102	0.000

$b^{DIEE}_{71,L}$	-0.043797	-2.11017	0.035
$b^{DIEH}_{71,L,L}$	-0.476504	-10.0137	0.000
$b^{DIET}_{71,L}$	-0.00213796	-57.6644	0.000
Miyazaki Bank (*i*=72)			
$b^{DIE}_{72,L}$	-4.61720	-549.148	0.000
$b^{DIEE}_{72,L}$	0.167523	12.6898	0.000
$b^{DIEH}_{72,L,L}$	-0.608030	-50.8275	0.000
$b^{DIET}_{72,L}$	0.00271932	32.7610	0.000
Kagoshima Bank (*i*=73)			
$b^{DIE}_{73,L}$	-4.82039	-367.012	0.000
$b^{DIEE}_{73,L}$	-0.342030	-17.6900	0.000
$b^{DIEH}_{73,L,L}$	0.024947	1.49342	0.135
$b^{DIET}_{73,L}$	-0.00156385	-19.0051	0.000
Bank of Ryukyu (*i*=74)			
$b^{DIE}_{74,L}$	-5.03743	-299.584	0.000
$b^{DIEE}_{74,L}$	-0.159199	-6.31937	0.000
$b^{DIEH}_{74,L,L}$	0.362379	9.39383	0.000
$b^{DIET}_{74,L}$	0.000880753	26.3536	0.000

Bank of Okinawa (i=75)			
$b^{DIE}_{75,L}$	-5.05929	-273.558	0.000
$b^{DIEE}_{75,L}$	-0.168019	-16.3720	0.000
$b^{DIEH}_{75,L,L}$	0.375960	8.37832	0.000
$b^{DIET}_{75,L}$	0.00168503	76.6460	0.000
North Pacific Bank (i=76)			
$b^{DIE}_{76,L}$	-4.86115	-1753.86	0.000
$b^{DIEE}_{76,L}$	-0.132303	-11.2638	0.000
$b^{DIET}_{76,L}$	-0.00588699	-125.719	0.000
North Pacific Bank (merged with the Sapporo Bank) (i=77)			
$b^{DIE}_{77,L}$	-4.96597	-16114.7	0.000
Sapporo Bank (i=78)			
$b^{DIE}_{78,L}$	-4.95729	-503.748	0.000
$b^{DIEE}_{78,L}$	0.153435	4.12033	0.000
$b^{DIET}_{78,L}$	-0.00745543	-30.2875	0.000
Syokusan Bank (i=79)			
$b^{DIE}_{79,L}$	-4.88439	-219.401	0.000
$b^{DIEE}_{79,L}$	-0.034108	-3.77640	0.000
$b^{DIEH}_{79,L,L}$	-0.380996	-5.93233	0.000

$b_{79,L}^{DIET}$	-0.00263813	-53.3177	0.000
Kirayaka Bank (*i*=80)			
$b_{80,L}^{DIE}$	-5.14307	-1833.62	0.000
$b_{80,L}^{DIET}$	0.00657854	41.3321	0.000
Kita-Nippon Bank (*i*=81)			
$b_{81,L}^{DIE}$	-4.90048	-463.891	0.000
$b_{81,L}^{DIEE}$	0.121495	4.29514	0.000
$b_{81,L,L}^{DIEH}$	-0.347482	-14.4310	0.000
$b_{81,L}^{DIET}$	-0.00339840	-42.3772	0.000
Tokuyo City Bank (*i*=82)			
$b_{82,L}^{DIE}$	-4.05013	-98.7343	0.000
$b_{82,L}^{DIEE}$	-2.49146	-23.9912	0.000
$b_{82,L}^{DIET}$	0.012722	15.9884	0.000
Sendai Bank (*i*=83)			
$b_{83,L}^{DIE}$	-5.15335	-298.266	0.000
$b_{83,L}^{DIEE}$	0.060110	1.61862	0.106
$b_{83,L,L}^{DIEH}$	0.155715	17.2545	0.000
$b_{83,L}^{DIET}$	-0.00291559	-15.1579	0.000
Fukushima Bank (*i*=84)			

$b_{84,L}^{DIE}$	-4.91100	-635.459	0.000
$b_{84,L}^{DIEE}$	-0.101898	-9.73394	0.000
$b_{84,L,L}^{DIEH}$	-0.185493	-10.2657	0.000
$b_{84,L}^{DIET}$	-0.00149018	-17.7330	0.000
Daito Bank (*i*=85)			
$b_{85,L}^{DIE}$	-4.88743	-641.379	0.000
$b_{85,L}^{DIEE}$	-0.161623	-4.84666	0.000
$b_{85,L,L}^{DIEH}$	-0.230819	-10.2046	0.000
$b_{85,L}^{DIET}$	-0.000211690	-2.91095	0.004
Towa Bank (*i*=86)			
$b_{86,L}^{DIE}$	-5.41496	-136.660	0.000
$b_{86,L}^{DIEE}$	0.643445	11.0486	0.000
$b_{86,L,L}^{DIEH}$	0.497757	5.81154	0.000
$b_{86,L}^{DIET}$	0.00226598	5.60959	0.000
Tochigi Bank (*i*=87)			
$b_{87,L}^{DIE}$	-4.96659	-713.665	0.000
$b_{87,L}^{DIEE}$	0.075698	3.87623	0.000
$b_{87,L,L}^{DIEH}$	-0.015388	-8.22263	0.000

$b_{87,L}^{DIET}$	0.00450708	22.5111	0.000
Keiyo Bank (*i*=88)			
$b_{88,L}^{DIE}$	-4.69449	-379.451	0.000
$b_{88,L}^{DIEE}$	0.041534	2.02683	0.043
$b_{88,L,L}^{DIEH}$	-0.436998	-13.7976	0.000
$b_{88,L}^{DIET}$	0.00395147	19.2386	0.000
Taiheiyo Bank (*i*=89)			
$b_{89,L}^{DIE}$	-5.27000	-473.867	0.000
$b_{89,L}^{DIEE}$	0.306479	22.1185	0.000
$b_{89,L}^{DIET}$	-0.00221625	-9.78738	0.000
Higashi-Nippon Bank (*i*=90)			
$b_{90,L}^{DIE}$	-4.96649	-794.423	0.000
$b_{90,L}^{DIEE}$	0.165206	5.51329	0.000
$b_{90,L,L}^{DIEH}$	-0.124594	-7.90875	0.000
$b_{90,L}^{DIET}$	0.00124418	5.94214	0.000
Tokyo Sowa Bank (*i*=91)			
$b_{91,L}^{DIE}$	-5.26759	-171.557	0.000
$b_{91,L}^{DIEE}$	1.43334	13.5482	0.000

$b^{DIET}_{91,L}$	0.000292905	2.41045	0.016
Heiwa Sogo Bank (*i*=92)			
$b^{DIE}_{92,L}$	-4.90785	-4195.94	0.000
$b^{DIET}_{92,L}$	-0.00249284	-32.4911	0.000
Kanagawa Bank (*i*=93)			
$b^{DIE}_{93,L}$	-5.08721	-357.402	0.000
$b^{DIEE}_{93,L}$	0.885788	39.5236	0.000
$b^{DIEH}_{93,L,L}$	-0.582224	-24.5660	0.000
$b^{DIET}_{93,L}$	-0.000574979	-31.6402	0.000
Niigata Chuo Bank (*i*=94)			
$b^{DIE}_{94,L}$	-4.99714	-1424.06	0.000
$b^{DIEE}_{94,L}$	0.145838	13.1656	0.000
$b^{DIET}_{94,L}$	-0.00227826	-35.0960	0.000
Taiko Bank (*i*=95)			
$b^{DIE}_{95,L}$	-5.08440	-468.776	0.000
$b^{DIEE}_{95,L}$	0.160875	5.96630	0.000
$b^{DIEH}_{95,L,L}$	0.169721	13.7181	0.000
$b^{DIET}_{95,L}$	-0.00243924	-40.9577	0.000
Nagano Bank (*i*=96)			

$b_{96,L}^{DIE}$	-4.88737	-230.565	0.000
$b_{96,L}^{DIEE}$	-0.055227	-1.04200	0.297
$b_{96,L,L}^{DIEH}$	-0.116157	-8.97753	0.000
$b_{96,L}^{DIET}$	-0.00270996	-42.6332	0.000
First Bank of Toyama (*i*=97)			
$b_{97,L}^{DIE}$	-4.99940	-1198.01	0.000
$b_{97,L}^{DIEE}$	0.265773	17.7492	0.000
$b_{97,L,L}^{DIEH}$	-0.129500	-18.1164	0.000
$b_{97,L}^{DIET}$	-0.00466120	-44.7358	0.000
Fukuho Bank (*i*=98)			
$b_{98,L}^{DIE}$	-5.43327	-157.370	0.000
$b_{98,L}^{DIEE}$	-0.028552	-6.55082	0.000
$b_{98,L,L}^{DIEH}$	0.572305	12.1801	0.000
$b_{98,L}^{DIET}$	-0.00311404	-60.0117	0.000
Shizuokachuo Bank (*i*=99)			
$b_{99,L}^{DIE}$	-4.85168	-863.590	0.000
$b_{99,L}^{DIEE}$	-0.024068	-7.61403	0.000
$b_{99,L,L}^{DIEH}$	-0.547098	-40.9033	0.000

$b_{99,L}^{DIET}$	-0.000985218	-39.4501	0.000
Gifu Bank (*i*=100)			
$b_{100,L}^{DIE}$	-4.81939	-346.846	0.000
$b_{100,L}^{DIEE}$	0.135310	40.1349	0.000
$b_{100,L,L}^{DIEH}$	-0.581155	-16.9109	0.000
$b_{100,L}^{DIET}$	-0.00268530	-58.3697	0.000
Aichi Bank (*i*=101)			
$b_{101,L}^{DIE}$	-5.47753	-58.0492	0.000
$b_{101,L}^{DIEE}$	-0.102969	-17.0924	0.000
$b_{101,L,L}^{DIEH}$	1.71298	6.27005	0.000
$b_{101,L}^{DIET}$	-0.000810207	-20.3621	0.000
Bank of Nagoya (*i*=102)			
$b_{102,L}^{DIE}$	-4.35939	-42.2953	0.000
$b_{102,L}^{DIEE}$	0.378837	14.7488	0.000
$b_{102,L,L}^{DIEH}$	-1.75867	-5.94788	0.000
$b_{102,L}^{DIET}$	-0.000923762	-14.5137	0.000
Chukyo Bank (*i*=103)			
$b_{103,L}^{DIE}$	-5.34042	-58.3749	0.000

$b^{DIEE}_{103,L}$	-0.113330	-9.53511	0.000
$b^{DIEH}_{103,L,L}$	1.27198	4.74936	0.000
$b^{DIET}_{103,L}$	-0.00342446	-57.7577	0.000
Daisan Bank (*i*=104)			
$b^{DIE}_{104,L}$	-5.67157	-248.698	0.000
$b^{DIEE}_{104,L}$	0.598119	14.3224	0.000
$b^{DIEH}_{104,L,L}$	1.52767	25.3935	0.000
$b^{DIET}_{104,L}$	0.000608305	6.40566	0.000
Biwako Bank (*i*=105)			
$b^{DIE}_{105,L}$	-6.51785	-81.7760	0.000
$b^{DIEE}_{105,L}$	5.95912	27.0849	0.000
$b^{DIEH}_{105,L,L}$	-0.774506	-55.1602	0.000
$b^{DIET}_{105,L}$	-0.030751	-30.2159	0.000
Bank of Kinki (*i*=106)			
$b^{DIE}_{106,L}$	-4.90423	-1302.14	0.000
$b^{DIEE}_{106,L}$	0.021712	1.35504	0.175
$b^{DIET}_{106,L}$	-0.00402895	-84.9595	0.000
Fukutoku Bank (*i*=107)			

$b_{107,L}^{DIE}$	-4.85665	-975.701	0.000
$b_{107,L}^{DIEE}$	-0.267683	-15.0484	0.000
$b_{107,L}^{DIET}$	-0.00236756	-35.4627	0.000
Kansai Bank (*i*=108)			
$b_{108,L}^{DIE}$	-4.92892	-1074.98	0.000
$b_{108,L}^{DIEE}$	-0.232617	-19.0048	0.000
$b_{108,L}^{DIET}$	-0.00211727	-44.9719	0.000
Kansai Urban Banking Corporation (*i*=109)			
$b_{109,L}^{DIE}$	-4.96721	-36269.0	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (*i*=110)			
$b_{110,L}^{DIE}$	-4.99782	-10520.7	0.000
Taisho Bank (*i*=111)			
$b_{111,L}^{DIE}$	-5.19835	-78668.9	0.000
Hanwa Bank (*i*=112)			
$b_{112,L}^{DIE}$	-5.69190	-358.031	0.000
$b_{112,L}^{DIEE}$	1.33105	38.9537	0.000
$b_{112,L}^{DIET}$	-0.022029	-50.8630	0.000
Hyogo Bank (*i*=113)			
$b_{113,L}^{DIE}$	-4.05672	-148.704	0.000

$b^{DIEE}_{113,L}$	-2.95487	-30.2740	0.000
$b^{DIET}_{113,L}$	0.00752938	20.4885	0.000
Hanshin Bank (*i*=114)			
$b^{DIE}_{114,L}$	-5.00232	-600.046	0.000
$b^{DIEE}_{114,L}$	-0.036489	-1.57932	0.114
$b^{DIET}_{114,L}$	-0.00270069	-30.8789	0.000
Minato Bank (*i*=115)			
$b^{DIE}_{115,L}$	-4.89866	-6358.41	0.000
$b^{DIET}_{115,L}$	-0.000623022	-8.77885	0.000
Shimane Bank (*i*=116)			
$b^{DIE}_{116,L}$	-4.98920	-293.147	0.000
$b^{DIEE}_{116,L}$	-0.00892578	-0.251005	0.802
$b^{DIEH}_{116,L,L}$	-0.103839	-9.39540	0.000
$b^{DIET}_{116,L}$	-0.00247523	-19.8965	0.000
Tomato Bank (*i*=117)			
$b^{DIE}_{117,L}$	-5.19299	-137.242	0.000
$b^{DIEE}_{117,L}$	-0.075965	-1.30295	0.193
$b^{DIEH}_{117,L,L}$	0.248309	8.69467	0.000

$b_{117,L}^{DIET}$	-0.00173037	-7.95150	0.000
Setouchi Bank (*i*=118)			
$b_{118,L}^{DIE}$	-4.19572	-24.9893	0.000
$b_{118,L}^{DIEE}$	-1.79476	-4.92607	0.000
$b_{118,L}^{DIET}$	-0.00276033	-7.55985	0.000
Hiroshima Sogo Bank (*i*=119)			
$b_{119,L}^{DIE}$	-5.16513	-196.525	0.000
$b_{119,L}^{DIEE}$	0.810381	9.10848	0.000
$b_{119,L}^{DIET}$	-0.00374776	-43.7112	0.000
Momiji Bank (*i*=120)			
$b_{120,L}^{DIE}$	-4.81955	-5950.91	0.000
$b_{120,L}^{DIET}$	-0.00894391	-141.761	0.000
Saikyo Bank (*i*=121)			
$b_{121,L}^{DIE}$	-4.62557	-259.379	0.000
$b_{121,L}^{DIEE}$	-0.704958	-21.0551	0.000
$b_{121,L,L}^{DIEH}$	-0.088262	-10.9516	0.000
$b_{121,L}^{DIET}$	-0.00191997	-20.2929	0.000
Tokushima Bank (*i*=122)			
$b_{122,L}^{DIE}$	-4.48571	-335.498	0.000

$b^{DIEE}_{122,L}$	-0.049901	-3.95358	0.000
$b^{DIEH}_{122,L,L}$	-0.904482	-34.2353	0.000
$b^{DIET}_{122,L}$	-0.00153114	-25.7377	0.000
Kagawa Bank (*i*=123)			
$b^{DIE}_{123,L}$	-4.93858	-234.725	0.000
$b^{DIEE}_{123,L}$	0.288114	11.9933	0.000
$b^{DIEH}_{123,L,L}$	-0.259406	-9.05276	0.000
$b^{DIET}_{123,L}$	0.000168846	1.50944	0.131
Ehime Bank (*i*=124)			
$b^{DIE}_{124,L}$	-4.99592	-1200.04	0.000
$b^{DIEE}_{124,L}$	0.104209	8.88239	0.000
$b^{DIEH}_{124,L,L}$	0.00161887	1.67935	0.093
$b^{DIET}_{124,L}$	0.00115123	15.9940	0.000
Bank of Kochi (*i*=125)			
$b^{DIE}_{125,L}$	-5.01144	-659.899	0.000
$b^{DIEE}_{125,L}$	-0.093282	-15.2735	0.000
$b^{DIEH}_{125,L,L}$	0.101936	9.06745	0.000
$b^{DIET}_{125,L}$	-0.00313086	-141.229	0.000

Nishi-Nippon Sogo Bank (*i*=126)			
$b_{126,L}^{DIE}$	-4.82556	-17595.4	0.000
Nishi-Nippon Bank (*i*=127)			
$b_{127,L}^{DIE}$	-4.82957	-39283.2	0.000
$b_{127,L}^{DIET}$	-0.000844299	-30.1274	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128)			
$b_{128,L}^{DIE}$	-4.74319	-11533.2	0.000
$b_{128,L}^{DIET}$	-0.00182736	-62.4371	0.000
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129)			
Fukuoka City Bank (*i*=130)			
$b_{130,L}^{DIE}$	-4.94035	-460.852	0.000
$b_{130,L}^{DIEE}$	0.174631	3.97800	0.000
$b_{130,L}^{DIET}$	0.00125416	4.78945	0.000
Fukuoka Chuo Bank (*i*=131)			
$b_{131,L}^{DIE}$	-5.56801	-302.459	0.000
$b_{131,L}^{DIEE}$	0.751376	22.1077	0.000
$b_{131,L,L}^{DIEH}$	-0.00892313	-3.46543	0.001
$b_{131,L}^{DIET}$	0.00332911	26.9910	0.000
Saga Kyoei Bank (*i*=132)			

$b_{132,L}^{DIE}$	-5.11296	-280.595	0.000
$b_{132,L}^{DIEE}$	-0.011234	-9.78147	0.000
$b_{132,L,L}^{DIEH}$	-0.090328	-3.87857	0.000
$b_{132,L}^{DIET}$	0.000599811	25.1015	0.000
Bank of Nagasaki (*i*=133)			
$b_{133,L}^{DIE}$	-5.03201	-571.838	0.000
$b_{133,L}^{DIEE}$	-0.197873	-11.1849	0.000
$b_{133,L,L}^{DIEH}$	-0.043167	-13.0219	0.000
$b_{133,L}^{DIET}$	0.000392177	3.24997	0.001
Kyushu Bank (*i*=134)			
$b_{134,L}^{DIE}$	-4.85153	-692.173	0.000
$b_{134,L}^{DIEE}$	-0.441043	-25.2063	0.000
$b_{134,L}^{DIET}$	-0.000258707	-5.10573	0.000
Kumamoto Bank (*i*=135)			
$b_{135,L}^{DIE}$	-5.09425	-5268.36	0.000
$b_{135,L}^{DIET}$	0.00102290	13.9011	0.000
Kumamoto Family Bank (*i*=136)			
$b_{136,L}^{DIE}$	-5.71671	-198.732	0.000

$b^{DIEE}_{136,L}$	2.45710	25.8361	0.000
$b^{DIET}_{136,L}$	-0.00770244	-49.5003	0.000
Higo Family Bank (*i*=137)			
$b^{DIE}_{137,L}$	-5.04993	-4254.66	0.000
$b^{DIET}_{137,L}$	-0.00391025	-48.1069	0.000
Howa Bank (*i*=138)			
$b^{DIE}_{138,L}$	-4.51060	-328.323	0.000
$b^{DIEE}_{138,L}$	-0.056255	-7.39427	0.000
$b^{DIEH}_{138,L,L}$	-0.817432	-41.8109	0.000
$b^{DIET}_{138,L}$	-0.00149555	-40.3158	0.000
Miyazaki Taiyo Bank (*i*=139)			
$b^{DIE}_{139,L}$	-4.80825	-671.569	0.000
$b^{DIEE}_{139,L}$	-0.146429	-11.9378	0.000
$b^{DIEH}_{139,L,L}$	-0.374154	-22.3457	0.000
$b^{DIET}_{139,L}$	0.00138115	31.9613	0.000
Minami-Nippon Bank (*i*=140)			
$b^{DIE}_{140,L}$	-5.28637	-277.968	0.000
$b^{DIEE}_{140,L}$	0.199409	20.4213	0.000

$b_{140,L,L}^{DIEH}$	0.291999	11.6878	0.000
$b_{140,L}^{DIET}$	-0.00496440	-56.8272	0.000
Okinawa Kaiho Bank (*i*=141)			
$b_{141,L}^{DIE}$	-5.45404	-361.200	0.000
$b_{141,L}^{DIEE}$	-0.301316	-20.5658	0.000
$b_{141,L,L}^{DIEH}$	1.18888	31.1418	0.000
$b_{141,L}^{DIET}$	0.00227188	127.500	0.000
Tokyo Star Bank (*i*=142)			
$b_{142,L}^{DIE}$	-5.11476	-15763.8	0.000
$b_{142,L}^{DIET}$	0.018164	720.872	0.000
Saitama Resona Bank (*i*=143)			
$b_{143,L}^{DIE}$	-4.83194	-5123.53	0.000
$b_{143,L}^{DIET}$	0.00344092	53.3163	0.000
Number of Observations	4536		
Order of MA for the Error Term	9		
Test for Overidentification [*p*-value]	439.264 [0.198]		
Value Function	0.096840		

Note: 1. Tables 4.2.3 to 4.2.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.2.1.2), respectively.

2. The details of $b_{i,L}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right)$ in Eqs. (3.1.2.2.2b) and (3.1.2.2.2c) are as follows:

$b_{i,L}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,L}^{DIE} + b_{i,L}^{DIEE} \cdot EF_{i,t-1}^{S} + b_{i,L,L}^{DIEH} \cdot HI_{L,t-1} + b_{i,L}^{DIET} \cdot \tau_t^*$, *i*=2, 3, 5, 6, 9-17, 21-27, 29-31, 33-38, 40-42, 46, 47, 50, 52, 56-60, 63-66, 67, 70-75, 79, 81, 83-88, 90, 93, 95-105, 116, 117, 121-125, 131-133, 138-141,

$b_{i,L}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,L}^{DIE} + b_{i,L}^{DIEE} \cdot EF_{i,t-1}^{S} + b_{i,L}^{DIET} \cdot \tau_t^*$, *i*=1, 8, 18, 28, 32, 43, 44, 49, 53, 55, 62, 68, 76, 78, 82, 89, 91, 94, 106-108, 112-114, 118, 119, 130, 134, 136,

$b_{i,L}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,L}^{DIE} + b_{i,L}^{DIET} \cdot \tau_t^*$, *i*=7, 51, 54, 61, 69, 80, 92, 115, 120, 127, 128, 135, 137, 142, 143,

$b_{i,L}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,L}^{DIE}$, *i*=19, 20, 39, 45, 48, 77, 109, 110, 111, 126,

where $EF_{i,t-1}^{S}$ is the static cost unneutral efficiency in the previous period, $HI_{L,t-1}$ is the Herfindahl index of loans (i.e., the sum of the short-term and long-term loans) in the previous period, and τ_t^* is the normalized time trend.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, the products of these dummies and the normalized time trend, the products of these dummies and the estimate of the static cost share of the labor, the products of these dummies, the normalized time trend, and this estimate, the products of these dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period
4. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
5. The Seiwa Bank (*i*=4) is added to the Michinoku Bank (*i*=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=129) is added to the Nishi-Nippon City Bank (*i*=128).

Table 4.2.5 Estimation Results for Eq. (3.2.1.3) Composing Eq. (3.1.2.1.2)

Parameter	Estimate	*t*-statistic	*p*-value
Yachiyo Bank (The present Kiraboshi Bank) (*i*=1)			
$b_{1,V}^{DIE}$	-5.11449	-171.331	0.000
$b_{1,V}^{DIEE}$	0.758644	8.19497	0.000
$b_{1,V}^{DIET}$	0.00738140	14.8073	0.000
Hokkaido Bank (*i*=2)			
$b_{2,V}^{DIE}$	-5.02577	-358.075	0.000
$b_{2,V}^{DIEE}$	0.648431	10.4370	0.000
$b_{2,V,L}^{DIEH}$	-0.054608	-37.0787	0.000
$b_{2,V}^{DIET}$	-0.00548665	-48.8085	0.000
Aomori Bank (*i*=3)			
$b_{3,V}^{DIE}$	-4.81299	-267.733	0.000
$b_{3,V}^{DIEE}$	-0.423677	-7.51761	0.000
$b_{3,V,L}^{DIEH}$	0.038786	8.83805	0.000
$b_{3,V}^{DIET}$	-0.00122982	-18.1115	0.000
Seiwa Bank (*i*=4)			
Seiwa Bank and Michinoku Bank (*i*=5)			
$b_{5,V}^{DIE}$	-7.09674	-15.9438	0.000

$b_{5,V}^{DIEE}$	-0.00519632	-0.077753	0.938
$b_{5,V,L}^{DIEH}$	4.29778	4.98549	0.000
$b_{5,V}^{DIET}$	-0.00303316	-14.4156	0.000
Akita Bank (i=6)			
$b_{6,V}^{DIE}$	-4.90286	-348.596	0.000
$b_{6,V}^{DIEE}$	-0.135853	-3.62084	0.000
$b_{6,V,L}^{DIEH}$	0.038705	5.78826	0.000
$b_{6,V}^{DIET}$	-0.00185841	-21.3966	0.000
Ugo Bank (i=7)			
$b_{7,V}^{DIE}$	-5.02709	-2381.85	0.000
$b_{7,V}^{DIET}$	0.000373191	2.20674	0.027
Hokuto Bank (i=8)			
$b_{8,V}^{DIE}$	-5.19138	-642.937	0.000
$b_{8,V}^{DIEE}$	0.711143	28.3287	0.000
$b_{8,V}^{DIET}$	-0.015065	-40.1310	0.000
Shonai Bank (i=9)			
$b_{9,V}^{DIE}$	-5.09183	-280.252	0.000
$b_{9,V}^{DIEE}$	0.053792	1.72456	0.085

$b_{9,V,L}^{DIEH}$	0.046666	9.38065	0.000
$b_{9,V}^{DIET}$	0.0000333092	0.469011	0.639
Yamagata Bank (*i*=10)			
$b_{10,V}^{DIE}$	-4.74886	-115.374	0.000
$b_{10,V}^{DIEE}$	-0.529450	-4.34623	0.000
$b_{10,V,L}^{DIEH}$	-0.061543	-7.35394	0.000
$b_{10,V}^{DIET}$	-0.00113642	-6.99094	0.000
Bank of Iwate (*i*=11)			
$b_{11,V}^{DIE}$	-4.72663	-193.611	0.000
$b_{11,V}^{DIEE}$	-0.178506	-3.33255	0.001
$b_{11,V,L}^{DIEH}$	-0.388553	-4.05237	0.000
$b_{11,V}^{DIET}$	-0.00116333	-13.8559	0.000
Tohoku Bank (*i*=12)			
$b_{12,V}^{DIE}$	-5.11871	-243.817	0.000
$b_{12,V}^{DIEE}$	-0.109409	-9.52120	0.000
$b_{12,V,L}^{DIEH}$	0.352775	7.10663	0.000
$b_{12,V}^{DIET}$	0.000426714	3.19542	0.001
77 Bank (*i*=13)			

$b^{DIE}_{13,V}$	-4.87136	-421.656	0.000
$b^{DIEE}_{13,V}$	-0.287884	-10.9233	0.000
$b^{DIEH}_{13,V,L}$	0.112501	8.99820	0.000
$b^{DIET}_{13,V}$	-0.00478595	-36.6111	0.000
Toho Bank (i=14)			
$b^{DIE}_{14,V}$	-4.82213	-405.303	0.000
$b^{DIEE}_{14,V}$	0.065975	1.06423	0.287
$b^{DIEH}_{14,V,L}$	-0.182774	-6.38272	0.000
$b^{DIET}_{14,V}$	-0.0000534135	-0.253485	0.800
Gunma Bank (i=15)			
$b^{DIE}_{15,V}$	-4.87720	-109.694	0.000
$b^{DIEE}_{15,V}$	-0.025868	-0.362967	0.717
$b^{DIEH}_{15,V,L}$	0.070254	0.901366	0.367
$b^{DIET}_{15,V}$	0.000991334	3.04398	0.002
Ashikaga Bank (i=16)			
$b^{DIE}_{16,V}$	-5.05690	-262.574	0.000
$b^{DIEE}_{16,V}$	-.571133	-6.63679	0.000
$b^{DIEH}_{16,V,L}$	0.462934	18.7573	0.000

$b_{16,V}^{DIET}$	0.000562673	2.63586	0.008
Joyo Bank (i=17)			
$b_{17,V}^{DIE}$	-4.66882	-339.274	0.000
$b_{17,V}^{DIEE}$	-1.08169	-8.61031	0.000
$b_{17,V,L}^{DIEH}$	-0.036762	-6.12142	0.000
$b_{17,V}^{DIET}$	-0.00197974	-8.82257	0.000
Kanto Bank (i=18)			
$b_{18,V}^{DIE}$	-5.79602	-46.1934	0.000
$b_{18,V}^{DIEE}$	1.39116	6.40207	0.000
$b_{18,V}^{DIET}$	0.00739407	6.94397	0.000
Kanto Tsukuba Bank (i=19)			
$b_{19,V}^{DIE}$	-4.93117	-94436.9	0.000
Tsukuba Bank (i=20)			
$b_{20,V}^{DIE}$	-4.83645	-7541.04	0.000
Musashino Bank (i=21)			
$b_{21,V}^{DIE}$	-4.83648	-323.771	0.000
$b_{21,V}^{DIEE}$	-0.218498	-5.45832	0.000
$b_{21,V,L}^{DIEH}$	0.00395853	0.732579	0.464
$b_{21,V}^{DIET}$	0.000737497	1.85033	0.064

Chiba Bank (*i*=22)			
$b_{22,V}^{DIE}$	-4.77630	-205.072	0.000
$b_{22,V}^{DIEE}$	0.290853	3.30996	0.001
$b_{22,V,L}^{DIEH}$	-0.092775	-2.07665	0.038
$b_{22,V}^{DIET}$	0.00327447	11.8368	0.000
Chiba Kogyo Bank (*i*=23)			
$b_{23,V}^{DIE}$	-4.76036	-262.963	0.000
$b_{23,V}^{DIEE}$	-0.262997	-15.0481	0.000
$b_{23,V,L}^{DIEH}$	-0.160151	-3.55717	0.000
$b_{23,V}^{DIET}$	-0.00113220	-8.38327	0.000
Tokyo Tomin Bank (*i*=24)			
$b_{24,V}^{DIE}$	-4.87202	-305.625	0.000
$b_{24,V}^{DIEE}$	-0.133352	-2.21220	0.027
$b_{24,V,L}^{DIEH}$	0.00680020	0.381602	0.703
$b_{24,V}^{DIET}$	-0.000498260	-1.58346	0.113
Bank of Yokohama (*i*=25)			
$b_{25,V}^{DIE}$	-6.14353	-210.069	0.000
$b_{25,V}^{DIEE}$	-0.964482	-8.15195	0.000

$b_{25,V,L}^{DIEH}$	1.57198	49.4684	0.000
$b_{25,V}^{DIET}$	-0.00139593	-7.89936	0.000
Daishi Bank (*i*=26)			
$b_{26,V}^{DIE}$	-5.48276	-108.408	0.000
$b_{26,V}^{DIEE}$	2.80121	11.5471	0.000
$b_{26,V,L}^{DIEH}$	0.123560	4.05943	0.000
$b_{26,V}^{DIET}$	0.000395764	1.50682	0.132
Hokuetsu Bank (*i*=27)			
$b_{27,V}^{DIE}$	-4.82905	-184.739	0.000
$b_{27,V}^{DIEE}$	-0.293130	-6.06805	0.000
$b_{27,V,L}^{DIEH}$	-0.00409599	-0.104543	0.917
$b_{27,V}^{DIET}$	-0.00275018	-20.2494	0.000
Yamanashi Chuo Bank (*i*=28)			
$b_{28,V}^{DIE}$	-4.92177	-411.838	0.000
$b_{28,V}^{DIEE}$	0.082506	1.92295	0.054
$b_{28,V}^{DIET}$	-0.00274751	-20.7696	0.000
Hachijuni Bank (*i*=29)			
$b_{29,V}^{DIE}$	-4.52904	-178.672	0.000

$b_{29,V}^{DIEE}$	0.026642	0.258462	0.796
$b_{29,V,L}^{DIEH}$	-0.371377	-14.2835	0.000
$b_{29,V}^{DIET}$	-0.00437410	-54.9696	0.000
Hokuriku Bank (*i*=30)			
$b_{30,V}^{DIE}$	-4.95053	-386.118	0.000
$b_{30,V}^{DIEE}$	0.646447	9.76151	0.000
$b_{30,V,L}^{DIEH}$	0.021485	1.35227	0.176
$b_{30,V}^{DIET}$	-0.00584541	-33.0302	0.000
Bank of Toyama (*i*=31)			
$b_{31,V}^{DIE}$	-5.11672	-346.847	0.000
$b_{31,V}^{DIEE}$	0.073184	6.26449	0.000
$b_{31,V,L}^{DIEH}$	-0.046235	-3.50982	0.000
$b_{31,V}^{DIET}$	-0.00190600	-10.4628	0.000
Hokkoku Bank (*i*=32)			
$b_{32,V}^{DIE}$	-4.93406	-253.219	0.000
$b_{32,V}^{DIEE}$	0.233553	2.79935	0.005
$b_{32,V}^{DIET}$	-0.00451791	-52.5973	0.000
Fukui Bank (*i*=33)			

$b_{33,V}^{DIE}$	-5.16154	-71.3312	0.000
$b_{33,V}^{DIEE}$	0.464955	3.50302	0.000
$b_{33,V,L}^{DIEH}$	0.176205	1.68941	0.091
$b_{33,V}^{DIET}$	-0.00418933	-14.8433	0.000
Shizuoka Bank (*i*=34)			
$b_{34,V}^{DIE}$	-4.68642	-158.790	0.000
$b_{34,V}^{DIEE}$	0.844538	7.15372	0.000
$b_{34,V,L}^{DIEH}$	-0.489213	-10.1750	0.000
$b_{34,V}^{DIET}$	-0.00353002	-43.5262	0.000
Suruga Bank (*i*=35)			
$b_{35,V}^{DIE}$	-4.59615	-68.2046	0.000
$b_{35,V}^{DIEE}$	-1.08209	-4.56760	0.000
$b_{35,V,L}^{DIEH}$	-0.071276	-1.81651	0.069
$b_{35,V}^{DIET}$	-0.00141890	-3.01326	0.003
Shimizu Bank (*i*=36)			
$b_{36,V}^{DIE}$	-4.94367	-266.807	0.000
$b_{36,V}^{DIEE}$	0.014713	0.324092	0.746
$b_{36,V,L}^{DIEH}$	-0.158179	-2.85945	0.004

$b_{36,V}^{DIET}$	-0.000172972	-1.55062	0.121
Ogaki Kyoritsu Bank (*i*=37)			
$b_{37,V}^{DIE}$	-4.90979	-248.416	0.000
$b_{37,V}^{DIEE}$	0.170213	1.86990	0.061
$b_{37,V,L}^{DIEH}$	-0.031050	-8.46918	0.000
$b_{37,V}^{DIET}$	0.00142410	5.38833	0.000
Juroku Bank (*i*=38)			
$b_{38,V}^{DIE}$	-4.36226	-33.9729	0.000
$b_{38,V}^{DIEE}$	-2.27670	-7.70008	0.000
$b_{38,V,L}^{DIEH}$	-0.066269	-0.285280	0.775
$b_{38,V}^{DIET}$	-0.00269734	-6.39609	0.000
Juroku Bank (merged with the Gifu Bank) (*i*=39)			
$b_{39,V}^{DIE}$	-4.88649	-97888.7	0.000
Mie Bank (*i*=40)			
$b_{40,V}^{DIE}$	-5.16998	-65.2067	0.000
$b_{40,V}^{DIEE}$	0.218248	4.21411	0.000
$b_{40,V,L}^{DIEH}$	0.175922	1.08795	0.277
$b_{40,V}^{DIET}$	0.00145765	7.90413	0.000
Hyakugo Bank (*i*=41)			

$b_{41,V}^{DIE}$	-4.77047	-188.212	0.000
$b_{41,V}^{DIEE}$	0.117308	2.17413	0.030
$b_{41,V,L}^{DIEH}$	-0.378356	-6.17505	0.000
$b_{41,V}^{DIET}$	-0.000499257	-4.91177	0.000
Shiga Bank (*i*=42)			
$b_{42,V}^{DIE}$	-4.81350	-235.583	0.000
$b_{42,V}^{DIEE}$	-0.232472	-1.97546	0.048
$b_{42,V,L}^{DIEH}$	-0.028451	-4.86385	0.000
$b_{42,V}^{DIET}$	-0.00165664	-12.4560	0.000
Bank of Kyoto (*i*=43)			
$b_{43,V}^{DIE}$	-4.68111	-86.9432	0.000
$b_{43,V}^{DIEE}$	-0.896717	-2.74903	0.006
$b_{43,V}^{DIET}$	-0.00104950	-1.59636	0.110
Osaka Bank (*i*=44)			
$b_{44,V}^{DIE}$	-4.76576	-241.439	0.000
$b_{44,V}^{DIEE}$	-0.612934	-8.31273	0.000
$b_{44,V}^{DIET}$	-0.00214064	-4.86696	0.000
Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=45)			

$b^{DIE}_{45,V}$	-4.84249	-6083.88	0.000
Senshu Bank (*i*=46)			
$b^{DIE}_{46,V}$	-5.02731	-333.434	0.000
$b^{DIEE}_{46,V}$	0.030492	0.898155	0.369
$b^{DIEH}_{46,V,L}$	0.069663	9.04206	0.000
$b^{DIET}_{46,V}$	0.00114506	12.5757	0.000
Ikeda Bank (*i*=47)			
$b^{DIE}_{47,V}$	-4.99403	-1208.89	0.000
$b^{DIEE}_{47,V}$	-0.063244	-5.71364	0.000
$b^{DIEH}_{47,V,L}$	0.144154	17.5159	0.000
$b^{DIET}_{47,V}$	-0.000248816	-1.76761	0.077
Senshu Ikeda Bank (*i*=48)			
$b^{DIE}_{48,V}$	-4.88345	-11441.5	0.000
Nanto Bank (*i*=49)			
$b^{DIE}_{49,V}$	-4.76600	-415.872	0.000
$b^{DIEE}_{49,V}$	-0.497725	-7.37197	0.000
$b^{DIET}_{49,V}$	-0.00126757	-12.2001	0.000
Kiyo Bank (*i*=50)			
$b^{DIE}_{50,V}$	-4.84152	-728.891	0.000

$b_{50,V}^{DIEE}$	0.249562	8.03030	0.000
$b_{50,V,L}^{DIEH}$	-0.126482	-39.6699	0.000
$b_{50,V}^{DIET}$	0.000799515	8.87675	0.000
Kiyo Bank (merged with the Wakayama Bank) (*i*=51)			
$b_{51,V}^{DIE}$	-4.92279	-2408.21	0.000
$b_{51,V}^{DIET}$	0.00170058	13.5032	0.000
Tajima Bank (*i*=52)			
$b_{52,V}^{DIE}$	-4.93776	-311.634	0.000
$b_{52,V}^{DIEE}$	-0.159149	-10.0419	0.000
$b_{52,V,L}^{DIEH}$	-0.036196	-3.46786	0.001
$b_{52,V}^{DIET}$	0.00308546	14.3357	0.000
Tottori Bank (*i*=53)			
$b_{53,V}^{DIE}$	-5.15788	-186.932	0.000
$b_{53,V}^{DIEE}$	0.222309	4.84274	0.000
$b_{53,V}^{DIET}$	-0.00388932	-11.6285	0.000
San-in Godo Bank (*i*=54)			
$b_{54,V}^{DIE}$	-4.94540	-2570.57	0.000
$b_{54,V}^{DIET}$	-0.00680660	-49.3124	0.000
San-in Godo Bank (merged with the Fuso Bank) (*i*=55)			

$b_{55,V}^{DIE}$	-4.59938	-430.975	0.000
$b_{55,V}^{DIEE}$	-1.58991	-24.9760	0.000
$b_{55,V}^{DIET}$	0.000563394	2.74928	0.006
Chugoku Bank (*i*=56)			
$b_{56,V}^{DIE}$	-4.86384	-153.426	0.000
$b_{56,V}^{DIEE}$	1.71643	5.86213	0.000
$b_{56,V,L}^{DIEH}$	-0.220524	-6.99297	0.000
$b_{56,V}^{DIET}$	-0.00242544	-5.78158	0.000
Hiroshima Bank (*i*=57)			
$b_{57,V}^{DIE}$	-4.63593	-335.066	0.000
$b_{57,V}^{DIEE}$	-1.46020	-12.8151	0.000
$b_{57,V,L}^{DIEH}$	0.012923	3.00215	0.003
$b_{57,V}^{DIET}$	-0.00487421	-36.6639	0.000
Yamaguchi Bank (*i*=58)			
$b_{58,V}^{DIE}$	-4.63928	-127.591	0.000
$b_{58,V}^{DIEE}$	-0.968362	-20.7462	0.000
$b_{58,V,L}^{DIEH}$	-0.026740	-0.681578	0.496
$b_{58,V}^{DIET}$	-0.00468153	-46.2106	0.000

Awa Bank (i=59)			
$b_{59,V}^{DIE}$	-4.66492	-128.630	0.000
$b_{59,V}^{DIEE}$	-0.161760	-3.46566	0.001
$b_{59,V,L}^{DIEH}$	-0.395921	-5.85418	0.000
$b_{59,V}^{DIET}$	-0.00180405	-9.53638	0.000
Hyakujushi Bank (i=60)			
$b_{60,V}^{DIE}$	-4.75387	-97.3264	0.000
$b_{60,V}^{DIEE}$	0.174493	2.58583	0.010
$b_{60,V,L}^{DIEH}$	-0.281274	-3.36765	0.001
$b_{60,V}^{DIET}$	-0.000469677	-3.01703	0.003
Iyo Bank (i=61)			
$b_{61,V}^{DIE}$	-4.86164	-1859.94	0.000
$b_{61,V}^{DIET}$	0.000313363	1.35065	0.177
Iyo Bank (merged with the Toho Sogo Bank) (i=62)			
$b_{62,V}^{DIE}$	-5.27717	-151.261	0.000
$b_{62,V}^{DIEE}$	2.51995	12.1027	0.000
$b_{62,V}^{DIET}$	0.00447769	9.83502	0.000
Shikoku Bank (i=63)			
$b_{63,V}^{DIE}$	-4.96006	-231.356	0.000

$b^{DIEE}_{63,V}$	-0.146077	-12.4373	0.000
$b^{DIEH}_{63,V,L}$	0.164188	3.93337	0.000
$b^{DIET}_{63,V}$	-0.00225477	-106.241	0.000
Bank of Fukuoka (*i*=64)			
$b^{DIE}_{64,V}$	-4.79789	-476.121	0.000
$b^{DIEE}_{64,V}$	0.233051	2.54504	0.011
$b^{DIEH}_{64,V,L}$	-0.00813213	-1.68799	0.091
$b^{DIET}_{64,V}$	-0.000964334	-6.76596	0.000
Chikuho Bank (*i*=65)			
$b^{DIE}_{65,V}$	-5.25870	-383.751	0.000
$b^{DIEE}_{65,V}$	0.137663	10.5577	0.000
$b^{DIEH}_{65,V,L}$	-0.031414	-7.99577	0.000
$b^{DIET}_{65,V}$	0.00233710	21.5352	0.000
Bank of Saga (*i*=66)			
$b^{DIE}_{66,V}$	-4.45656	-33.7333	0.000
$b^{DIEE}_{66,V}$	-0.00939025	-0.283046	0.777
$b^{DIEH}_{66,V,L}$	-0.620894	-3.38906	0.001
$b^{DIET}_{66,V}$	0.000399218	1.71188	0.087

Eighteenth Bank (*i*=67)			
$b_{67,V}^{DIE}$	-4.83019	-661.456	0.000
$b_{67,V}^{DIEE}$	-0.259967	-9.63276	0.000
$b_{67,V,L}^{DIEH}$	-0.029192	-5.18630	0.000
$b_{67,V}^{DIET}$	-0.000673235	-8.34231	0.000
Shinwa Bank (*i*=68)			
$b_{68,V}^{DIE}$	-4.97800	-44.1164	0.000
$b_{68,V}^{DIEE}$	0.204995	0.507119	0.612
$b_{68,V}^{DIET}$	0.000259804	0.208868	0.835
Shinwa Bank (merged with the Kyushu Bank) (*i*=69)			
$b_{69,V}^{DIE}$	-4.87080	-3513.20	0.000
$b_{69,V}^{DIET}$	-0.00437896	-40.6694	0.000
Higo Bank (*i*=70)			
$b_{70,V}^{DIE}$	-4.86870	-568.462	0.000
$b_{70,V}^{DIEE}$	-0.211717	-5.46553	0.000
$b_{70,V,L}^{DIEH}$	0.059140	11.4623	0.000
$b_{70,V}^{DIET}$	-0.000617280	-5.34963	0.000
Oita Bank (*i*=71)			
$b_{71,V}^{DIE}$	-4.58370	-75.6869	0.000

$b^{DIEE}_{71,V}$	-0.047601	-1.21668	0.224
$b^{DIEH}_{71,V,L}$	-0.445804	-4.92878	0.000
$b^{DIET}_{71,V}$	-0.00215342	-27.6875	0.000
Miyazaki Bank (*i*=72)			
$b^{DIE}_{72,V}$	-4.61996	-363.868	0.000
$b^{DIEE}_{72,V}$	0.184877	9.18401	0.000
$b^{DIEH}_{72,V,L}$	-0.613181	-37.6491	0.000
$b^{DIET}_{72,V}$	0.00283012	22.3362	0.000
Kagoshima Bank (*i*=73)			
$b^{DIE}_{73,V}$	-4.84482	-249.767	0.000
$b^{DIEE}_{73,V}$	-0.318955	-11.8894	0.000
$b^{DIEH}_{73,V,L}$	0.055883	2.34274	0.019
$b^{DIET}_{73,V}$	-0.00157451	-15.8754	0.000
Bank of Ryukyu (*i*=74)			
$b^{DIE}_{74,V}$	-5.03502	-188.517	0.000
$b^{DIEE}_{74,V}$	-0.144203	-2.99352	0.003
$b^{DIEH}_{74,V,L}$	0.344568	5.11202	0.000
$b^{DIET}_{74,V}$	0.000886584	14.6617	0.000

Bank of Okinawa (*i*=75)			
$b_{75,V}^{DIE}$	-5.05274	-178.048	0.000
$b_{75,V}^{DIEE}$	-0.159707	-9.15888	0.000
$b_{75,V,L}^{DIEH}$	0.352309	4.90442	0.000
$b_{75,V}^{DIET}$	0.00170444	40.3403	0.000
North Pacific Bank (*i*=76)			
$b_{76,V}^{DIE}$	-4.85745	-889.068	0.000
$b_{76,V}^{DIEE}$	-0.152403	-6.49127	0.000
$b_{76,V}^{DIET}$	-0.00590748	-59.5373	0.000
North Pacific Bank (merged with the Sapporo Bank) (*i*=77)			
$b_{77,V}^{DIE}$	-4.96597	-13798.1	0.000
Sapporo Bank (*i*=78)			
$b_{78,V}^{DIE}$	-4.94264	-256.751	0.000
$b_{78,V}^{DIEE}$	0.096590	1.33325	0.182
$b_{78,V}^{DIET}$	-0.00716785	-14.7426	0.000
Syokusan Bank (*i*=79)			
$b_{79,V}^{DIE}$	-4.87491	-118.132	0.000
$b_{79,V}^{DIEE}$	-0.024613	-1.43926	0.150
$b_{79,V,L}^{DIEH}$	-0.415046	-3.47663	0.001

$b_{79,V}^{DIET}$	-0.00268346	-32.0381	0.000
Kirayaka Bank (*i*=80)			
$b_{80,V}^{DIE}$	-5.14406	-1426.18	0.000
$b_{80,V}^{DIET}$	0.00663424	32.7546	0.000
Kita-Nippon Bank (*i*=81)			
$b_{81,V}^{DIE}$	-4.89246	-262.016	0.000
$b_{81,V}^{DIEE}$	0.118877	2.20873	0.027
$b_{81,V,L}^{DIEH}$	-0.366433	-8.80752	0.000
$b_{81,V}^{DIET}$	-0.00338395	-22.7129	0.000
Tokuyo City Bank (*i*=82)			
$b_{82,V}^{DIE}$	-4.00714	-74.6682	0.000
$b_{82,V}^{DIEE}$	-2.60075	-19.3296	0.000
$b_{82,V}^{DIET}$	0.013563	12.5197	0.000
Sendai Bank (*i*=83)			
$b_{83,V}^{DIE}$	-5.13468	-170.877	0.000
$b_{83,V}^{DIEE}$	0.010836	0.159240	0.873
$b_{83,V,L}^{DIEH}$	0.152447	10.4986	0.000
$b_{83,V}^{DIET}$	-0.00275343	-8.33286	0.000
Fukushima Bank (*i*=84)			

$b_{84,V}^{DIE}$	-4.91265	-347.168	0.000
$b_{84,V}^{DIEE}$	-0.120287	-6.79949	0.000
$b_{84,V,L}^{DIEH}$	-0.168209	-5.24545	0.000
$b_{84,V}^{DIET}$	-0.00148737	-9.08760	0.000
Daito Bank (*i*=85)			
$b_{85,V}^{DIE}$	-4.88738	-321.630	0.000
$b_{85,V}^{DIEE}$	-0.195986	-3.02969	0.002
$b_{85,V,L}^{DIEH}$	-0.204285	-4.93841	0.000
$b_{85,V}^{DIET}$	-0.000260754	-1.60228	0.109
Towa Bank (*i*=86)			
$b_{86,V}^{DIE}$	-5.43084	-61.8843	0.000
$b_{86,V}^{DIEE}$	0.632815	5.01822	0.000
$b_{86,V,L}^{DIEH}$	0.528683	2.79242	0.005
$b_{86,V}^{DIET}$	0.00214816	2.44775	0.014
Tochigi Bank (*i*=87)			
$b_{87,V}^{DIE}$	-4.97262	-310.800	0.000
$b_{87,V}^{DIEE}$	0.092617	2.13959	0.032
$b_{87,V,L}^{DIEH}$	-0.013973	-3.80275	0.000

$b_{87,V}^{DIET}$	0.00462704	10.7473	0.000
Keiyo Bank (*i*=88)			
$b_{88,V}^{DIE}$	-4.68174	-234.936	0.000
$b_{88,V}^{DIEE}$	0.096256	2.65097	0.008
$b_{88,V,L}^{DIEH}$	-0.490924	-10.0769	0.000
$b_{88,V}^{DIET}$	0.00446232	12.9707	0.000
Taiheiyo Bank (*i*=89)			
$b_{89,V}^{DIE}$	-5.27535	-120.335	0.000
$b_{89,V}^{DIEE}$	0.312564	5.73768	0.000
$b_{89,V}^{DIET}$	-0.00239199	-2.70549	0.007
Higashi-Nippon Bank (*i*=90)			
$b_{90,V}^{DIE}$	-4.96565	-387.318	0.000
$b_{90,V}^{DIEE}$	0.171096	3.33405	0.001
$b_{90,V,L}^{DIEH}$	-0.134259	-5.35874	0.000
$b_{90,V}^{DIET}$	0.00128193	3.39673	0.001
Tokyo Sowa Bank (*i*=91)			
$b_{91,V}^{DIE}$	-5.24750	-66.2078	0.000
$b_{91,V}^{DIEE}$	1.36102	4.98888	0.000

$b_{91,V}^{DIET}$	0.000232375	0.747625	0.455
Heiwa Sogo Bank (*i*=92)			
$b_{92,V}^{DIE}$	-4.90764	-1154.06	0.000
$b_{92,V}^{DIET}$	-0.00248488	-8.86489	0.000
Kanagawa Bank (*i*=93)			
$b_{93,V}^{DIE}$	-5.06980	-158.136	0.000
$b_{93,V}^{DIEE}$	0.848506	18.3940	0.000
$b_{93,V,L}^{DIEH}$	-0.578507	-11.0325	0.000
$b_{93,V}^{DIET}$	-0.000586750	-17.5734	0.000
Niigata Chuo Bank (*i*=94)			
$b_{94,V}^{DIE}$	-4.99767	-612.237	0.000
$b_{94,V}^{DIEE}$	0.144974	5.62571	0.000
$b_{94,V}^{DIET}$	-0.00233428	-15.7506	0.000
Taiko Bank (*i*=95)			
$b_{95,V}^{DIE}$	-5.09040	-281.870	0.000
$b_{95,V}^{DIEE}$	0.168269	4.70782	0.000
$b_{95,V,L}^{DIEH}$	0.180828	6.76003	0.000
$b_{95,V}^{DIET}$	-0.00246822	-20.8488	0.000
Nagano Bank (*i*=96)			

$b_{96,V}^{DIE}$	-4.90110	-123.032	0.000
$b_{96,V}^{DIEE}$	-0.046642	-0.433308	0.665
$b_{96,V,L}^{DIEH}$	-0.102102	-4.16943	0.000
$b_{96,V}^{DIET}$	-0.00271432	-20.1630	0.000
First Bank of Toyama (i=97)			
$b_{97,V}^{DIE}$	-4.99324	-534.195	0.000
$b_{97,V}^{DIEE}$	0.248350	7.84698	0.000
$b_{97,V,L}^{DIEH}$	-0.130250	-7.74321	0.000
$b_{97,V}^{DIET}$	-0.00458488	-19.8859	0.000
Fukuho Bank (i=98)			
$b_{98,V}^{DIE}$	-5.56977	-53.0771	0.000
$b_{98,V}^{DIEE}$	-0.014499	-2.00951	0.044
$b_{98,V,L}^{DIEH}$	0.750817	5.13369	0.000
$b_{98,V}^{DIET}$	-0.00272049	-27.8375	0.000
Shizuokachuo Bank (i=99)			
$b_{99,V}^{DIE}$	-4.83515	-251.302	0.000
$b_{99,V}^{DIEE}$	-0.019093	-2.86025	0.004
$b_{99,V,L}^{DIEH}$	-0.588624	-13.2348	0.000

$b_{99,V}^{DIET}$	-0.000981080	-14.0710	0.000
Gifu Bank (i=100)			
$b_{100,V}^{DIE}$	-4.82145	-168.859	0.000
$b_{100,V}^{DIEE}$	0.130203	15.5282	0.000
$b_{100,V,L}^{DIEH}$	-0.572531	-7.90156	0.000
$b_{100,V}^{DIET}$	-0.00267669	-26.2807	0.000
Aichi Bank (i=101)			
$b_{101,V}^{DIE}$	-5.61812	-29.4912	0.000
$b_{101,V}^{DIEE}$	-0.091824	-7.16422	0.000
$b_{101,V,L}^{DIEH}$	2.11020	3.84249	0.000
$b_{101,V}^{DIET}$	-0.000864569	-8.65884	0.000
Bank of Nagoya (i=102)			
$b_{102,V}^{DIE}$	-4.43321	-23.2548	0.000
$b_{102,V}^{DIEE}$	0.379187	6.33612	0.000
$b_{102,V,L}^{DIEH}$	-1.54548	-2.82114	0.005
$b_{102,V}^{DIET}$	-0.000974051	-6.94376	0.000
Chukyo Bank (i=103)			
$b_{103,V}^{DIE}$	-5.42910	-29.6514	0.000

$b_{103,V}^{DIEE}$	-0.117137	-5.97599	0.000
$b_{103,V,L}^{DIEH}$	1.52986	2.85323	0.004
$b_{103,V}^{DIET}$	-0.00345925	-30.0865	0.000
Daisan Bank (*i*=104)			
$b_{104,V}^{DIE}$	-5.69277	-126.494	0.000
$b_{104,V}^{DIEE}$	0.642615	7.45101	0.000
$b_{104,V,L}^{DIEH}$	1.55388	12.8491	0.000
$b_{104,V}^{DIET}$	0.000703862	3.60836	0.000
Biwako Bank (*i*=105)			
$b_{105,V}^{DIE}$	-5.96501	-91.6655	0.000
$b_{105,V}^{DIEE}$	4.47978	25.9268	0.000
$b_{105,V,L}^{DIEH}$	-0.876443	-58.8393	0.000
$b_{105,V}^{DIET}$	-0.023919	-30.9680	0.000
Bank of Kinki (*i*=106)			
$b_{106,V}^{DIE}$	-4.90362	-673.293	0.000
$b_{106,V}^{DIEE}$	0.012776	0.408808	0.683
$b_{106,V}^{DIET}$	-0.00412791	-54.9462	0.000
Fukutoku Bank (*i*=107)			

$b_{107,V}^{DIE}$	-4.86071	-474.756	0.000
$b_{107,V}^{DIEE}$	-0.254755	-6.89113	0.000
$b_{107,V}^{DIET}$	-0.00242463	-17.6911	0.000
Kansai Bank (*i*=108)			
$b_{108,V}^{DIE}$	-4.92519	-633.538	0.000
$b_{108,V}^{DIEE}$	-0.244588	-11.4991	0.000
$b_{108,V}^{DIET}$	-0.00212463	-19.8933	0.000
Kansai Urban Banking Corporation (*i*=109)			
$b_{109,V}^{DIE}$	-4.96745	-40720.2	0.000
Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (*i*=110)			
$b_{110,V}^{DIE}$	-4.99775	-8494.66	0.000
Taisho Bank (*i*=111)			
$b_{111,V}^{DIE}$	-5.19831	-29654.5	0.000
Hanwa Bank (*i*=112)			
$b_{112,V}^{DIE}$	-5.68297	-128.621	0.000
$b_{112,V}^{DIEE}$	1.31007	13.8781	0.000
$b_{112,V}^{DIET}$	-0.021805	-18.0704	0.000
Hyogo Bank (*i*=113)			
$b_{113,V}^{DIE}$	-4.04636	-70.6185	0.000

$b_{113,V}^{DIEE}$	-2.99508	-14.6858	0.000
$b_{113,V}^{DIET}$	0.00760551	9.50233	0.000
Hanshin Bank (*i*=114)			
$b_{114,V}^{DIE}$	-5.00668	-265.292	0.000
$b_{114,V}^{DIEE}$	-0.027855	-0.528705	0.597
$b_{114,V}^{DIET}$	-0.00277837	-16.5355	0.000
Minato Bank (*i*=115)			
$b_{115,V}^{DIE}$	-4.89812	-4329.00	0.000
$b_{115,V}^{DIET}$	-0.000645699	-6.90522	0.000
Shimane Bank (*i*=116)			
$b_{116,V}^{DIE}$	-4.99181	-151.817	0.000
$b_{116,V}^{DIEE}$	0.013621	0.215820	0.829
$b_{116,V,L}^{DIEH}$	-0.111895	-4.65723	0.000
$b_{116,V}^{DIET}$	-0.00253819	-10.7996	0.000
Tomato Bank (*i*=117)			
$b_{117,V}^{DIE}$	-5.19613	-68.9890	0.000
$b_{117,V}^{DIEE}$	-0.042176	-0.333258	0.739
$b_{117,V,L}^{DIEH}$	0.232063	4.17954	0.000

$b_{117,V}^{DIET}$	-0.00156037	-3.41188	0.001
Setouchi Bank (*i*=118)			
$b_{118,V}^{DIE}$	-4.07422	-9.92791	0.000
$b_{118,V}^{DIEE}$	-2.05847	-2.31128	0.021
$b_{118,V}^{DIET}$	-0.00304546	-3.57126	0.000
Hiroshima Sogo Bank (*i*=119)			
$b_{119,V}^{DIE}$	-5.20234	-89.3153	0.000
$b_{119,V}^{DIEE}$	0.935120	4.76816	0.000
$b_{119,V}^{DIET}$	-0.00374916	-18.9816	0.000
Momiji Bank (*i*=120)			
$b_{120,V}^{DIE}$	-4.82032	-4259.51	0.000
$b_{120,V}^{DIET}$	-0.00889082	-99.6262	0.000
Saikyo Bank (*i*=121)			
$b_{121,V}^{DIE}$	-4.63236	-102.063	0.000
$b_{121,V}^{DIEE}$	-0.692680	-7.98325	0.000
$b_{121,V,L}^{DIEH}$	-0.086825	-6.37821	0.000
$b_{121,V}^{DIET}$	-0.00188440	-7.84936	0.000
Tokushima Bank (*i*=122)			
$b_{122,V}^{DIE}$	-4.48489	-120.955	0.000

$b_{122,V}^{DIEE}$	-0.048575	-1.97076	0.049
$b_{122,V,L}^{DIEH}$	-0.906957	-13.0273	0.000
$b_{122,V}^{DIET}$	-0.00152464	-9.75519	0.000
Kagawa Bank (*i*=123)			
$b_{123,V}^{DIE}$	-4.95980	-87.0946	0.000
$b_{123,V}^{DIEE}$	0.303721	4.76070	0.000
$b_{123,V,L}^{DIEH}$	-0.233244	-3.06920	0.002
$b_{123,V}^{DIET}$	0.000231028	0.776403	0.438
Ehime Bank (*i*=124)			
$b_{124,V}^{DIE}$	-4.99953	-576.398	0.000
$b_{124,V}^{DIEE}$	0.115414	4.77415	0.000
$b_{124,V,L}^{DIEH}$	0.00203071	0.993747	0.320
$b_{124,V}^{DIET}$	0.00121263	8.35022	0.000
Bank of Kochi (*i*=125)			
$b_{125,V}^{DIE}$	-5.01175	-287.189	0.000
$b_{125,V}^{DIEE}$	-0.097036	-7.72936	0.000
$b_{125,V,L}^{DIEH}$	0.104775	4.04636	0.000
$b_{125,V}^{DIET}$	-0.00315536	-73.6956	0.000

Nishi-Nippon Sogo Bank (i=126)			
$b^{DIE}_{126,V}$	-4.82549	-6734.91	0.000
Nishi-Nippon Bank (i=127)			
$b^{DIE}_{127,V}$	-4.82955	-22996.1	0.000
$b^{DIET}_{127,V}$	-0.000848304	-19.0322	0.000
Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=128)			
$b^{DIE}_{128,V}$	-4.74340	-6828.98	0.000
$b^{DIET}_{128,V}$	-0.00181388	-36.3131	0.000
Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129)			
Fukuoka City Bank (i=130)			
$b^{DIE}_{130,V}$	-4.92911	-303.954	0.000
$b^{DIEE}_{130,V}$	0.129177	1.94535	0.052
$b^{DIET}_{130,V}$	0.00102288	2.70318	0.007
Fukuoka Chuo Bank (i=131)			
$b^{DIE}_{131,V}$	-5.59380	-115.653	0.000
$b^{DIEE}_{131,V}$	0.799309	8.86773	0.000
$b^{DIEH}_{131,V,L}$	-0.010184	-1.79389	0.073
$b^{DIET}_{131,V}$	0.00346879	11.2152	0.000
Saga Kyoei Bank (i=132)			

$b_{132,V}^{DIE}$	-5.13184	-190.787	0.000
$b_{132,V}^{DIEE}$	-0.012161	-7.44124	0.000
$b_{132,V,L}^{DIEH}$	-0.065727	-1.91188	0.056
$b_{132,V}^{DIET}$	0.000594293	13.7832	0.000
Bank of Nagasaki (*i*=133)			
$b_{133,V}^{DIE}$	-5.03274	-248.467	0.000
$b_{133,V}^{DIEE}$	-0.197308	-4.71843	0.000
$b_{133,V,L}^{DIEH}$	-0.041736	-5.74073	0.000
$b_{133,V}^{DIET}$	0.000391002	1.33703	0.181
Kyushu Bank (*i*=134)			
$b_{134,V}^{DIE}$	-4.84320	-381.874	0.000
$b_{134,V}^{DIEE}$	-0.463100	-14.6394	0.000
$b_{134,V}^{DIET}$	-0.000273595	-2.55312	0.011
Kumamoto Bank (*i*=135)			
$b_{135,V}^{DIE}$	-5.09474	-2372.37	0.000
$b_{135,V}^{DIET}$	0.000986661	6.12847	0.000
Kumamoto Family Bank (*i*=136)			
$b_{136,V}^{DIE}$	-5.71545	-142.914	0.000

$b^{DIEE}_{136,V}$	2.45264	18.5446	0.000
$b^{DIET}_{136,V}$	-0.00766364	-34.2060	0.000
Higo Family Bank (*i*=137)			
$b^{DIE}_{137,V}$	-5.05168	-2465.24	0.000
$b^{DIET}_{137,V}$	-0.00401985	-26.8861	0.000
Howa Bank (*i*=138)			
$b^{DIE}_{138,V}$	-4.50073	-226.930	0.000
$b^{DIEE}_{138,V}$	-0.052049	-3.40506	0.001
$b^{DIEH}_{138,V,L}$	-0.834464	-28.1718	0.000
$b^{DIET}_{138,V}$	-0.00148449	-27.8424	0.000
Miyazaki Taiyo Bank (*i*=139)			
$b^{DIE}_{139,V}$	-4.80826	-377.420	0.000
$b^{DIEE}_{139,V}$	-0.140531	-5.94516	0.000
$b^{DIEH}_{139,V,L}$	-0.378271	-11.8491	0.000
$b^{DIET}_{139,V}$	0.00139823	15.7674	0.000
Minami-Nippon Bank (*i*=140)			
$b^{DIE}_{140,V}$	-5.28144	-271.455	0.000
$b^{DIEE}_{140,V}$	0.191283	23.0387	0.000

$b^{DIEH}_{140,V,L}$	0.289425	10.7626	0.000
$b^{DIET}_{140,V}$	-0.00493655	-54.9734	0.000
Okinawa Kaiho Bank (i=141)			
$b^{DIE}_{141,V}$	-5.44959	-217.896	0.000
$b^{DIEE}_{141,V}$	-0.298686	-11.5166	0.000
$b^{DIEH}_{141,V,L}$	1.17453	19.9784	0.000
$b^{DIET}_{141,V}$	0.00226933	59.8354	0.000
Tokyo Star Bank (i=142)			
$b^{DIE}_{142,V}$	-5.11501	-8634.88	0.000
$b^{DIET}_{142,V}$	0.018173	425.200	0.000
Saitama Resona Bank (i=143)			
$b^{DIE}_{143,V}$	-4.83230	-4365.84	0.000
$b^{DIET}_{143,V}$	0.00346294	46.4687	0.000
Number of Observations	4536		
Order of MA for the Error Term	9		
Test for Overidentification [p-value]	425.838 [0.346]		
Value Function	0.093880		

Note: 1. Tables 4.2.3 to 4.2.5 show the results for the GMM estimations of Eqs. (3.2.1.1) to (3.2.1.3) composing Eq. (3.1.2.1.2), respectively.

2. The details of $b_{i,V}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right)$ in Eqs. (3.1.2.2.2b) and (3.1.2.2.2c) are as follows:

$b_{i,V}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,V}^{DIE} + b_{i,V}^{DIEE} \cdot EF_{i,t-1}^{S} + b_{i,V,L}^{DIEH} \cdot HI_{L,t-1} + b_{i,V}^{DIET} \cdot \tau_t^*$, i=2, 3, 5, 6, 9-17, 21-27, 29, 30, 33-38, 40-42, 46, 47, 50, 52, 56-60, 63-66, 67, 70-75, 79, 81, 83-88, 90, 93, 95-98, 100-105, 116, 117, 121-125, 131-133, 138-141,

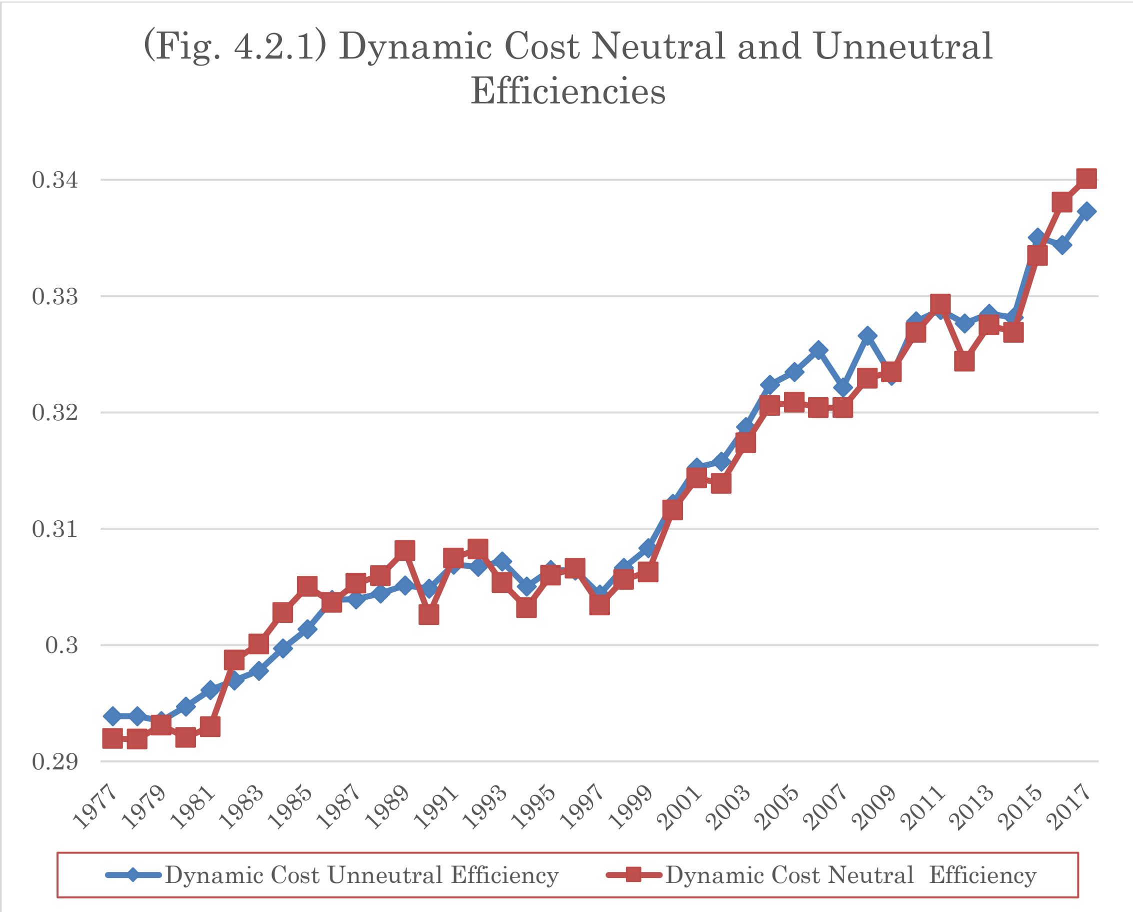
$b_{i,V}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,V}^{DIE} + b_{i,V}^{DIEE} \cdot EF_{i,t-1}^{S} + b_{i,V}^{DIET} \cdot \tau_t^*$, i=1, 8, 18, 28, 32, 43, 44, 49, 53, 55, 62, 68, 76, 78, 82, 89, 91, 94, 99, 106-108, 112-114, 118, 119, 130, 134, 136,

$b_{i,V}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,V}^{DIE} + b_{i,V}^{DIET} \cdot \tau_t^*$, i=7, 31, 51, 54, 61, 69, 80, 92, 115, 120, 127, 128, 135, 137, 142, 143,

$b_{i,V}^{DIE}\left(EF_{i,t-1}^{S}, HI_{L,t-1}, \tau_t^*\right) = b_{i,V}^{DIE}$, i=19, 20, 39, 45, 48, 77, 109, 110, 111, 126,

where $EF_{i,t-1}^{S}$ is the static cost unneutral efficiency in the previous period, $HI_{L,t-1}$ is the Herfindahl index of loans (i.e., the sum of the short-term and long-term loans) in the previous period, and τ_t^* is the normalized time trend.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the estimate of the static cost share of the current goods, the products of these dummies and the normalized time trend, the products of these dummies and this estimate, the products of these dummies, the normalized time trend, and this estimate, the products of these dummies and the static cost unneutral efficiency in the previous period, and the products of these dummies and the Herfindahl index of loans in the previous period.
4. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
5. The Seiwa Bank (i=4) is added to the Michinoku Bank (i=5) because of a lack of samples. For the same reason, the Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=129) is added to the Nishi-Nippon City Bank (i=128).



(Fig. 4.2.1) Dynamic Cost Neutral and Unneutral Efficiencies

Table 4.3.1 Estimation Results for the Parameters Other Than the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Short-Term Loans

Parameter	Estimate	t-statistic	p-value
$\rho_{SL,1}$ (1976-1986)	0.382765	6.85787	0.000
$\rho_{SL,2}$ (1987-1989)	0.577666	11.8464	0.000
$\rho_{SL,3}$ (1990-1995)	0.551897	12.5087	0.000
$\rho_{SL,4}$ (1996-2001)	0.497380	10.4551	0.000
$\rho_{SL,5}$ (2002-2007)	0.424005	5.79806	0.000
$\rho_{SL,6}$ (2008-2010)	0.461378	5.52383	0.000
$\rho_{SL,7}$ (2011-2016)	0.524681	6.21624	0.000
a_{SL}^{CVE}	299730	2.73299	0.006
a_{SL}^{CVH}	-0.120416×10^{7}	-14.0678	0.000
$a_{SL,1}^{CVZ}$	313918	1.00457	0.315
$a_{SL,2}^{CVZ}$	0.609899×10^{7}	2.04021	0.041
$a_{SL,3}^{CVZ}$	-160211	-6.38637	0.000
$a_{SL,4}^{CVZ}$	232161	2.80165	0.005
Adjusted R-squared	0.754024		
Number of Observations	4395		
Order of MA for	8		

the Error Term	
Test for Overidentification [*p*-value]	295.155 [0.255]
Value Function	0.067157

Note: 1. Tables 4.3.1 and 4.3.2 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for short-term loans ($j = SL$). Table 4.3.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.2 shows the estimates of these coefficients.

2. The details of Eq. (3.1.3.2.13) for short-term loans ($j = SL$) are as follows:

$$Q_{SL,-i,t} = \sum_i a_{i,SL}^{CVI} \cdot D_i^B + \left(\sum_{s=1}^{7} \rho_{SL,s} \cdot D_s^Y \right) \cdot q_{SL,i,t} + a_{SL}^{CVE} \cdot EF_{i,t-1}^S + a_{SL}^{CVH} \cdot HI_{SL,t-1}$$

$$+ \sum_{h=1}^{4} a_{SL,h}^{CVZ} \cdot z_{h,i,t}^Q + \varepsilon_{SL,i,t}^{CV},$$

where $\rho_{SL,s}$ ($s = 1,\ldots,7$) are the conjectural derivative parameters in the 1976-1986 ($s = 1$), 1987-1989 ($s = 2$), 1990-1995 ($s = 3$), 1996-2001 ($s = 4$), 2002-2007 ($s = 5$), 2008-2010 ($s = 6$), and 2011-2016 ($s = 7$) periods, respectively. Furthermore, $z_{h,i,t}^Q$ ($h = 1,\ldots,4$) are the certain or predictable component of the SDEHRR of short-term loans ($h = 1$), the loan loss provision rate ($h = 2$), the logarithm of the loan per case ($h = 3$), and the proportion of loans for small and medium firms ($h = 4$), respectively. All others are as per Eq. (3.1.3.2.13).

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and the Herfindahl index of short-term loans in the previous period, the static cost unneutral efficiency in the previous period, the Herfindahl index of short-term loans in the previous period, the short-term loans in the previous period, the certain or predictable component of the SDEHRR of short-term loans in the current period, the loan loss provision rate in the previous period, the logarithm of the loan per case in the previous period, the proportion of loans for small and medium firms

in the previous period, and the products of period dummies and the short-term loans in the previous period.

Table 4.3.2 Estimation Results for the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Short-Term Loans

Parameter	Estimate	t-statistic	p-value
$a_{1,SL}^{CVI}$	0.104513×10^{7}	6.76117	0.000
$a_{2,SL}^{CVI}$	0.109340×10^{7}	6.87663	0.000
$a_{3,SL}^{CVI}$	848981	7.96395	0.000
$a_{5,SL}^{CVI}$	773740	6.52948	0.000
$a_{6,SL}^{CVI}$	749506	6.23320	0.000
$a_{7,SL}^{CVI}$	990880	7.02156	0.000
$a_{8,SL}^{CVI}$	867597	6.86467	0.000
$a_{9,SL}^{CVI}$	738530	5.53991	0.000
$a_{10,SL}^{CVI}$	667522	6.30182	0.000
$a_{11,SL}^{CVI}$	703234	7.00243	0.000
$a_{12,SL}^{CVI}$	870485	5.58397	0.000
$a_{13,SL}^{CVI}$	707131	5.40586	0.000
$a_{14,SL}^{CVI}$	718500	6.49009	0.000
$a_{15,SL}^{CVI}$	778555	6.11435	0.000
$a_{16,SL}^{CVI}$	662840	4.26882	0.000
$a_{17,SL}^{CVI}$	698329	4.68194	0.000

$a_{18,SL}^{CVI}$	0.226201×10^7	8.94758	0.000
$a_{21,SL}^{CVI}$	0.119119×10^7	8.87845	0.000
$a_{22,SL}^{CVI}$	868121	7.42564	0.000
$a_{23,SL}^{CVI}$	0.221385×10^7	6.40173	0.000
$a_{24,SL}^{CVI}$	0.130462×10^7	6.13399	0.000
$a_{25,SL}^{CVI}$	675883	3.29152	0.001
$a_{26,SL}^{CVI}$	990252	8.02516	0.000
$a_{27,SL}^{CVI}$	0.135197×10^7	8.60308	0.000
$a_{28,SL}^{CVI}$	0.115147×10^7	8.16726	0.000
$a_{29,SL}^{CVI}$	708884	4.86485	0.000
$a_{30,SL}^{CVI}$	710596	4.81987	0.000
$a_{31,SL}^{CVI}$	0.224460×10^7	10.7390	0.000
$a_{32,SL}^{CVI}$	0.105045×10^7	6.94361	0.000
$a_{33,SL}^{CVI}$	901998	7.34135	0.000
$a_{34,SL}^{CVI}$	941289	7.91852	0.000
$a_{35,SL}^{CVI}$	0.205662×10^7	15.0696	0.000
$a_{36,SL}^{CVI}$	0.234844×10^7	15.3798	0.000

$a_{37,SL}^{CVI}$	0.129832×10^{7}	9.59545	0.000
$a_{38,SL}^{CVI}$	0.101529×10^{7}	8.30934	0.000
$a_{40,SL}^{CVI}$	0.135512×10^{7}	9.61071	0.000
$a_{41,SL}^{CVI}$	836417	7.86235	0.000
$a_{42,SL}^{CVI}$	866111	6.96091	0.000
$a_{43,SL}^{CVI}$	989992	6.68108	0.000
$a_{44,SL}^{CVI}$	0.190706×10^{7}	7.53068	0.000
$a_{46,SL}^{CVI}$	0.173423×10^{7}	7.22751	0.000
$a_{47,SL}^{CVI}$	0.162776×10^{7}	6.68044	0.000
$a_{49,SL}^{CVI}$	0.104214×10^{7}	6.81162	0.000
$a_{50,SL}^{CVI}$	843668	7.08326	0.000
$a_{51,SL}^{CVI}$	0.121180×10^{7}	8.80455	0.000
$a_{52,SL}^{CVI}$	0.125290×10^{7}	6.07012	0.000
$a_{53,SL}^{CVI}$	0.110529×10^{7}	7.50407	0.000
$a_{54,SL}^{CVI}$	796711	6.38401	0.000
$a_{55,SL}^{CVI}$	871307	6.82007	0.000
$a_{56,SL}^{CVI}$	863040	6.46692	0.000

$a_{57,SL}^{CVI}$	777234	6.64223	0.000
$a_{58,SL}^{CVI}$	770110	5.58061	0.000
$a_{59,SL}^{CVI}$	787075	6.21834	0.000
$a_{60,SL}^{CVI}$	876018	7.14807	0.000
$a_{61,SL}^{CVI}$	829696	7.18663	0.000
$a_{62,SL}^{CVI}$	832981	7.22703	0.000
$a_{63,SL}^{CVI}$	763052	6.19386	0.000
$a_{64,SL}^{CVI}$	0.134362×10^{7}	9.37393	0.000
$a_{65,SL}^{CVI}$	0.265623×10^{7}	9.78255	0.000
$a_{66,SL}^{CVI}$	942350	7.07166	0.000
$a_{67,SL}^{CVI}$	817141	6.56200	0.000
$a_{68,SL}^{CVI}$	933932	7.68203	0.000
$a_{69,SL}^{CVI}$	832351	6.47171	0.000
$a_{70,SL}^{CVI}$	762953	7.05283	0.000
$a_{71,SL}^{CVI}$	745076	5.52631	0.000
$a_{72,SL}^{CVI}$	805586	6.31778	0.000
$a_{73,SL}^{CVI}$	784136	6.52173	0.000

$a_{74,SL}^{CVI}$	706944	6.01636	0.000
$a_{75,SL}^{CVI}$	692220	5.83478	0.000
$a_{76,SL}^{CVI}$	0.126761×10^{7}	8.40712	0.000
$a_{78,SL}^{CVI}$	0.204422×10^{7}	15.3688	0.000
$a_{79,SL}^{CVI}$	779330	6.43688	0.000
$a_{80,SL}^{CVI}$	766923	6.11968	0.000
$a_{81,SL}^{CVI}$	877555	6.79216	0.000
$a_{82,SL}^{CVI}$	0.166326×10^{7}	7.49384	0.000
$a_{83,SL}^{CVI}$	0.175818×10^{7}	12.1249	0.000
$a_{84,SL}^{CVI}$	944518	6.74091	0.000
$a_{85,SL}^{CVI}$	0.108536×10^{7}	7.73037	0.000
$a_{86,SL}^{CVI}$	0.167709×10^{7}	10.1453	0.000
$a_{87,SL}^{CVI}$	0.191525×10^{7}	7.06970	0.000
$a_{88,SL}^{CVI}$	0.209904×10^{7}	6.86214	0.000
$a_{89,SL}^{CVI}$	0.205776×10^{7}	10.0851	0.000
$a_{90,SL}^{CVI}$	0.155962×10^{7}	6.38102	0.000
$a_{91,SL}^{CVI}$	0.140142×10^{7}	10.3997	0.000

$a_{92,SL}^{CVI}$	0.142704×10^{7}	10.7156	0.000
$a_{93,SL}^{CVI}$	0.302478×10^{7}	8.12481	0.000
$a_{94,SL}^{CVI}$	0.196389×10^{7}	9.24593	0.000
$a_{95,SL}^{CVI}$	0.155413×10^{7}	6.99961	0.000
$a_{96,SL}^{CVI}$	0.197035×10^{7}	9.93468	0.000
$a_{97,SL}^{CVI}$	0.224327×10^{7}	10.7485	0.000
$a_{98,SL}^{CVI}$	0.127586×10^{7}	8.26838	0.000
$a_{99,SL}^{CVI}$	0.254354×10^{7}	15.0493	0.000
$a_{100,SL}^{CVI}$	0.184644×10^{7}	10.9702	0.000
$a_{101,SL}^{CVI}$	0.119415×10^{7}	9.48963	0.000
$a_{102,SL}^{CVI}$	967134	7.66760	0.000
$a_{103,SL}^{CVI}$	0.116008×10^{7}	8.33213	0.000
$a_{104,SL}^{CVI}$	0.121891×10^{7}	9.35791	0.000
$a_{105,SL}^{CVI}$	0.135742×10^{7}	8.70006	0.000
$a_{106,SL}^{CVI}$	0.198716×10^{7}	8.03266	0.000
$a_{107,SL}^{CVI}$	0.218187×10^{7}	7.82775	0.000
$a_{108,SL}^{CVI}$	0.177431×10^{7}	7.71072	0.000

$a_{111,SL}^{CVI}$	0.177830×10^7	8.62676	0.000
$a_{112,SL}^{CVI}$	0.144551×10^7	7.93826	0.000
$a_{113,SL}^{CVI}$	705230	6.08041	0.000
$a_{114,SL}^{CVI}$	0.131121×10^7	7.14419	0.000
$a_{115,SL}^{CVI}$	914498	7.28678	0.000
$a_{116,SL}^{CVI}$	0.127996×10^7	8.43490	0.000
$a_{117,SL}^{CVI}$	0.167700×10^7	10.2959	0.000
$a_{118,SL}^{CVI}$	0.244537×10^7	9.99867	0.000
$a_{119,SL}^{CVI}$	0.207066×10^7	9.84758	0.000
$a_{120,SL}^{CVI}$	0.141609×10^7	11.1872	0.000
$a_{121,SL}^{CVI}$	0.189884×10^7	10.9232	0.000
$a_{122,SL}^{CVI}$	940985	6.86959	0.000
$a_{123,SL}^{CVI}$	0.143049×10^7	9.50622	0.000
$a_{124,SL}^{CVI}$	0.138292×10^7	10.9800	0.000
$a_{125,SL}^{CVI}$	997798	6.86466	0.000
$a_{127,SL}^{CVI}$	0.231261×10^7	12.6168	0.000
$a_{128,SL}^{CVI}$	0.153371×10^7	14.0537	0.000

$a_{130,SL}^{CVI}$	0.279242×10^{7}	12.8517	0.000
$a_{131,SL}^{CVI}$	0.272250×10^{7}	10.3541	0.000
$a_{132,SL}^{CVI}$	0.108900×10^{7}	6.49762	0.000
$a_{133,SL}^{CVI}$	0.116920×10^{7}	7.17914	0.000
$a_{134,SL}^{CVI}$	0.112855×10^{7}	7.96580	0.000
$a_{135,SL}^{CVI}$	0.100929×10^{7}	6.78449	0.000
$a_{136,SL}^{CVI}$	0.112924×10^{7}	8.52478	0.000
$a_{137,SL}^{CVI}$	843793	4.03341	0.000
$a_{138,SL}^{CVI}$	0.110427×10^{7}	7.26274	0.000
$a_{139,SL}^{CVI}$	980788	7.21286	0.000
$a_{140,SL}^{CVI}$	0.107547×10^{7}	7.36861	0.000
$a_{141,SL}^{CVI}$	890669	7.23014	0.000
$a_{142,SL}^{CVI}$	967717	7.13093	0.000
$a_{143,SL}^{CVI}$	889433	7.67113	0.000

Note: 1. Tables 4.3.1 and 4.3.2 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for short-term loans ($j = SL$). Table 4.3.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.2 shows the estimates of these coefficients.

2. $a_{i,SL}^{CVI}$ (i=1,2,3,5, … ,18,21, … ,38,40, … ,44,46,47,49, … ,76,78, … ,108,111, … ,125,127,128,130, … ,143) are the coefficients of the Yachiyo Bank (The

present Kiraboshi Bank) (i=1), the Hokkaido Bank (i=2), the Aomori Bank (i=3), the sum of the Seiwa Bank and Michinoku Bank (i=5), the Akita Bank (i=6), the Ugo Bank (i=7), the Hokuto Bank (i=8), the Shonai Bank (i=9), the Yamagata Bank (i=10), the Bank of Iwate (i=11), the Tohoku Bank (i=12), the 77 Bank (i=13), the Toho Bank (i=14), the Gunma Bank (i=15), the Ashikaga Bank (i=16), the Joyo Bank (i=17), the sum of the Kanto Bank, Kanto Tsukuba Bank, and Tsukuba Bank (i=18), the Musashino Bank (i=21), the Chiba Bank (i=22), the Chiba Kogyo Bank (i=23), the Tokyo Tomin Bank (i=24), the Bank of Yokohama (i=25), the Daishi Bank (i=26), the Hokuetsu Bank (i=27), the Yamanashi Chuo Bank (i=28), the Hachijuni Bank (i=29), the Hokuriku Bank (i=30), the Bank of Toyama (i=31), the Hokkoku Bank (i=32), the Fukui Bank (i=33), the Shizuoka Bank (i=34), the Suruga Bank (i=35), the Shimizu Bank (i=36), the Ogaki Kyoritsu Bank (i=37), the sum of the Juroku Bank and Juroku Bank (merged with the Gifu Bank) (i=38), the Mie Bank (i=40), the Hyakugo Bank (i=41), the Shiga Bank (i=42), the Bank of Kyoto (i=43), the sum of the Osaka Bank and Kinki Osaka Bank (The present Kansai Mirai Bank) (i=44), the Senshu Bank (i=46), the sum of the Ikeda Bank and Senshu Ikeda Bank (i=47), the Nanto Bank (i=49), the Kiyo Bank (i=50), the Kiyo Bank (merged with the Wakayama Bank) (i=51), the Tajima Bank (i=52), the Tottori Bank (i=53), the San-in Godo Bank (i=54), the San-in Godo Bank (merged with the Fuso Bank) (i=55), the Chugoku Bank (i=56), the Hiroshima Bank (i=57), the Yamaguchi Bank (i=58), the Awa Bank (i=59), the Hyakujushi Bank (i=60), the Iyo Bank (i=61), the Iyo Bank (merged with the Toho Sogo Bank) (i=62), the Shikoku Bank (i=63), the Bank of Fukuoka (i=64), the Chikuho Bank (i=65), the Bank of Saga (i=66), the Eighteenth Bank (i=67), the Shinwa Bank (i=68), the Shinwa Bank (merged with the Kyushu Bank) (i=69), the Higo Bank (i=70), the Oita Bank (i=71), the Miyazaki Bank (i=72), the Kagoshima Bank (i=73), the Bank of Ryukyu (i=74), the Bank of Okinawa (i=75), the sum of the North Pacific Bank and North Pacific Bank (merged with the Sapporo Bank) (i=76), the Sapporo Bank (i=78), the Syokusan Bank (i=79), the Kirayaka Bank (i=80), the Kita-Nippon Bank (i=81), the Tokuyo City Bank (i=82), the Sendai Bank (i=83), the Fukushima Bank (i=84), the Daito Bank (i=85), the Towa Bank (i=86), the Tochigi Bank (i=87), the Keiyo Bank (i=88), the Taiheiyo Bank (i=89), the Higashi-Nippon Bank (i=90), the Tokyo Sowa Bank (i=91), the Heiwa Sogo Bank (i=92), the Kanagawa Bank (i=93), the Niigata Chuo Bank (i=94), the Taiko Bank (i=95), the Nagano Bank (i=96), the First Bank of Toyama (i=97), the Fukuho Bank (i=98), the Shizuokachuo Bank (i=99), the Gifu Bank

(i=100), the Aichi Bank (i=101), the Bank of Nagoya (i=102), the Chukyo Bank (i=103), the Daisan Bank (i=104), the Biwako Bank (i=105), the Bank of Kinki (i=106), the Fukutoku Bank (i=107), the sum of the Kansai Bank, Kansai Urban Banking Corporation, and Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (i=108), the Taisho Bank (i=111), the Hanwa Bank (i=112), the Hyogo Bank (i=113), the Hanshin Bank (i=114), the Minato Bank (i=115), the Shimane Bank (i=116), the Tomato Bank (i=117), the Setouchi Bank (i=118), the Hiroshima Sogo Bank (i=119), the Momiji Bank (i=120), the Saikyo Bank (i=121), the Tokushima Bank (i=122), the Kagawa Bank (i=123), the Ehime Bank (i=124), the Bank of Kochi (i=125), the Nishi-Nippon Sogo Bank (i=126), the sum of the Nishi-Nippon Bank and Nishi-Nippon City Bank (i=127), the sum of the Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (i=128), the Fukuoka City Bank (i=130), the Fukuoka Chuo Bank (i=131), the Saga Kyoei Bank (i=132), the Bank of Nagasaki (i=133), the Kyushu Bank (i=134), the Kumamoto Bank (i=135), the Kumamoto Family Bank (i=136), the Higo Family Bank (i=137), the Howa Bank (i=138), the Miyazaki Taiyo Bank (i=139), the Minami-Nippon Bank (i=140), the Okinawa Kaiho Bank (i=141), the Tokyo Star Bank (i=142), and the Saitama Resona Bank (i=143).

3. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.

Table 4.3.3 Estimation Results for the Parameters Other Than the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Long-Term Loans

Parameter	Estimate	*t*-statistic	*p*-value
$\rho_{LL,1}$ (1976-1986)	0.090816	0.613403	0.540
$\rho_{LL,2}$ (1987-1989)	0.010846	0.139078	0.889
$\rho_{LL,3}$ (1990-1995)	0.300277	4.90341	0.000
$\rho_{LL,4}$ (1996-2001)	-0.206396	-3.88635	0.000
$\rho_{LL,5}$ (2002-2007)	-0.396236	-6.55521	0.000
$\rho_{LL,6}$ (2008-2010)	0.052746	1.43560	0.151
$\rho_{LL,7}$ (2011-2016)	0.107300	3.95008	0.000
a_{LL}^{CVE}	-0.120168×10^{7}	-7.26937	0.000
a_{LL}^{CVH}	-451091	-3.95489	0.000
$a_{LL,1}^{CVZ}$	-0.277408×10^{8}	-32.9905	0.000
$a_{LL,2}^{CVZ}$	-0.104227×10^{9}	-24.2772	0.000
$a_{LL,3}^{CVZ}$	373820	11.9195	0.000
$a_{LL,4}^{CVZ}$	800339	3.91925	0.000
Adjusted R-squared	0.731067		
Number of Observations	4395		
Order of MA for	15		

the Error Term	
Test for Overidentification [p-value]	299.449 [0.203]
Value Function	0.068134

Note: 1. Tables 4.3.3 and 4.3.4 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for long-term loans ($j = LL$). Table 4.3.3 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.4 shows the estimates of these coefficients.

2. The details of Eq. (3.1.3.2.13) for long-term loans ($j = LL$) are as follows:

$$Q_{LL,-i,t} = \sum_i a_{i,LL}^{CVI} \cdot D_i^B + \left(\sum_{s=1}^{7} \rho_{LL,s} \cdot D_s^Y \right) \cdot q_{LL,i,t} + a_{LL}^{CVE} \cdot EF_{i,t-1}^S + a_{LL}^{CVH} \cdot HI_{LL,t-1}$$

$$+ \sum_{h=1}^{4} a_{LL,h}^{CVZ} \cdot z_{h,i,t}^Q + \varepsilon_{LL,i,t}^{CV},$$

where $\rho_{LL,s}$ ($s = 1, \ldots, 7$) are the conjectural derivative parameters in the 1976-1986 ($s = 1$), 1987-1989 ($s = 2$), 1990-1995 ($s = 3$), 1996-2001 ($s = 4$), 2002-2007 ($s = 5$), 2008-2010 ($s = 6$), and 2011-2016 ($s = 7$) periods, respectively. Furthermore, $z_{h,i,t}^Q$ ($h = 1, \ldots, 4$) are the certain or predictable component of the SDEHRR of long-term loans ($h = 1$), the loan loss provision rate ($h = 2$), the logarithm of the loan per case ($h = 3$), and the proportion of loans for small and medium firms ($h = 4$), respectively. All others are as per Eq. (3.1.3.2.13).

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and the Herfindahl index of long-term loans in the previous period, the static cost unneutral efficiency in the previous period, the Herfindahl index of long-term loans in the previous period, the long-term loans in the previous period, the certain or predictable component of the SDEHRR of long-term loans in the current period, the loan loss provision rate in the previous period, the logarithm of the loan per case in the previous period, the proportion of loans for small and medium firms

in the previous period, and the products of period dummies and the long-term loans in the previous period.

Table 4.3.4 Estimation Results for the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Long-Term Loans

Parameter	Estimate	*t*-statistic	*p*-value
$a_{1,LL}^{CVI}$	0.397562×10^{7}	19.6803	0.000
$a_{2,LL}^{CVI}$	0.213159×10^{7}	7.30926	0.000
$a_{3,LL}^{CVI}$	0.149910×10^{7}	9.05684	0.000
$a_{5,LL}^{CVI}$	0.246277×10^{7}	15.9651	0.000
$a_{6,LL}^{CVI}$	0.194804×10^{7}	8.41142	0.000
$a_{7,LL}^{CVI}$	0.268150×10^{7}	16.5099	0.000
$a_{8,LL}^{CVI}$	0.190591×10^{7}	11.0196	0.000
$a_{9,LL}^{CVI}$	0.234018×10^{7}	11.9646	0.000
$a_{10,LL}^{CVI}$	0.155020×10^{7}	8.78865	0.000
$a_{11,LL}^{CVI}$	0.152148×10^{7}	9.08729	0.000
$a_{12,LL}^{CVI}$	0.288323×10^{7}	16.4914	0.000
$a_{13,LL}^{CVI}$	0.224016×10^{7}	9.74934	0.000
$a_{14,LL}^{CVI}$	0.139392×10^{7}	7.72427	0.000
$a_{15,LL}^{CVI}$	0.156023×10^{7}	6.32390	0.000
$a_{16,LL}^{CVI}$	0.119995×10^{7}	5.61132	0.000
$a_{17,LL}^{CVI}$	0.110047×10^{7}	5.66521	0.000

$a_{18,LL}^{CVI}$	0.461553×10^{7}	28.6135	0.000
$a_{21,LL}^{CVI}$	0.174549×10^{7}	5.45560	0.000
$a_{22,LL}^{CVI}$	0.217221×10^{7}	7.12097	0.000
$a_{23,LL}^{CVI}$	0.498300×10^{7}	10.7305	0.000
$a_{24,LL}^{CVI}$	0.379882×10^{7}	15.2938	0.000
$a_{25,LL}^{CVI}$	900109	2.34841	0.019
$a_{26,LL}^{CVI}$	0.169871×10^{7}	10.5103	0.000
$a_{27,LL}^{CVI}$	0.218380×10^{7}	13.1195	0.000
$a_{28,LL}^{CVI}$	0.123279×10^{7}	3.65055	0.000
$a_{29,LL}^{CVI}$	0.183466×10^{7}	9.39864	0.000
$a_{30,LL}^{CVI}$	875635	3.94491	0.000
$a_{31,LL}^{CVI}$	0.429436×10^{7}	15.0115	0.000
$a_{32,LL}^{CVI}$	0.127444×10^{7}	4.00356	0.000
$a_{33,LL}^{CVI}$	0.127877×10^{7}	4.84243	0.000
$a_{34,LL}^{CVI}$	0.227178×10^{7}	7.93082	0.000
$a_{35,LL}^{CVI}$	0.430093×10^{7}	9.08256	0.000
$a_{36,LL}^{CVI}$	0.472850×10^{7}	7.30883	0.000

$a_{37,LL}^{CVI}$	0.232835×10^{7}	13.2964	0.000
$a_{38,LL}^{CVI}$	0.242628×10^{7}	14.5543	0.000
$a_{40,LL}^{CVI}$	0.211689×10^{7}	13.7783	0.000
$a_{41,LL}^{CVI}$	0.177514×10^{7}	11.0395	0.000
$a_{42,LL}^{CVI}$	0.115930×10^{7}	5.95487	0.000
$a_{43,LL}^{CVI}$	857245	2.52118	0.012
$a_{44,LL}^{CVI}$	0.421865×10^{7}	18.5602	0.000
$a_{46,LL}^{CVI}$	0.356550×10^{7}	16.1016	0.000
$a_{47,LL}^{CVI}$	0.398632×10^{7}	17.4714	0.000
$a_{49,LL}^{CVI}$	740986	2.27706	0.023
$a_{50,LL}^{CVI}$	0.144032×10^{7}	7.70088	0.000
$a_{51,LL}^{CVI}$	154749	0.809534	0.418
$a_{52,LL}^{CVI}$	0.246740×10^{7}	11.9516	0.000
$a_{53,LL}^{CVI}$	0.158007×10^{7}	5.31259	0.000
$a_{54,LL}^{CVI}$	0.276957×10^{7}	14.9507	0.000
$a_{55,LL}^{CVI}$	0.178153×10^{7}	9.74283	0.000
$a_{56,LL}^{CVI}$	0.166649×10^{7}	8.96356	0.000

$a_{57,LL}^{CVI}$	0.166523×10^{7}	8.77159	0.000
$a_{58,LL}^{CVI}$	0.127363×10^{7}	5.98689	0.000
$a_{59,LL}^{CVI}$	0.135163×10^{7}	6.70782	0.000
$a_{60,LL}^{CVI}$	967500	3.81414	0.000
$a_{61,LL}^{CVI}$	0.161829×10^{7}	9.28363	0.000
$a_{62,LL}^{CVI}$	971492	5.37890	0.000
$a_{63,LL}^{CVI}$	0.167332×10^{7}	6.69713	0.000
$a_{64,LL}^{CVI}$	0.442130×10^{7}	16.7404	0.000
$a_{65,LL}^{CVI}$	0.682501×10^{7}	10.0149	0.000
$a_{66,LL}^{CVI}$	0.157367×10^{7}	5.36544	0.000
$a_{67,LL}^{CVI}$	0.285682×10^{7}	12.5970	0.000
$a_{68,LL}^{CVI}$	0.302846×10^{7}	18.7432	0.000
$a_{69,LL}^{CVI}$	0.193647×10^{7}	12.1309	0.000
$a_{70,LL}^{CVI}$	0.153447×10^{7}	6.12349	0.000
$a_{71,LL}^{CVI}$	0.280847×10^{7}	9.77738	0.000
$a_{72,LL}^{CVI}$	0.138416×10^{7}	5.36088	0.000
$a_{73,LL}^{CVI}$	0.178564×10^{7}	8.39420	0.000

$a_{74,LL}^{CVI}$	0.114044×10^{7}	6.08473	0.000
$a_{75,LL}^{CVI}$	0.169925×10^{7}	8.97041	0.000
$a_{76,LL}^{CVI}$	0.253293×10^{7}	14.3815	0.000
$a_{78,LL}^{CVI}$	0.339321×10^{7}	11.3878	0.000
$a_{79,LL}^{CVI}$	0.246219×10^{7}	12.4242	0.000
$a_{80,LL}^{CVI}$	0.212340×10^{7}	13.5173	0.000
$a_{81,LL}^{CVI}$	0.234253×10^{7}	12.7068	0.000
$a_{82,LL}^{CVI}$	0.256301×10^{7}	14.6658	0.000
$a_{83,LL}^{CVI}$	0.307322×10^{7}	14.8705	0.000
$a_{84,LL}^{CVI}$	0.284432×10^{7}	15.3982	0.000
$a_{85,LL}^{CVI}$	0.258365×10^{7}	16.5740	0.000
$a_{86,LL}^{CVI}$	0.281169×10^{7}	12.8707	0.000
$a_{87,LL}^{CVI}$	0.274501×10^{7}	9.30877	0.000
$a_{88,LL}^{CVI}$	0.442157×10^{7}	10.3253	0.000
$a_{89,LL}^{CVI}$	0.391879×10^{7}	8.36161	0.000
$a_{90,LL}^{CVI}$	0.405524×10^{7}	14.6157	0.000
$a_{91,LL}^{CVI}$	0.283751×10^{7}	10.7453	0.000

$a_{92,LL}^{CVI}$	0.299911×10^{7}	15.7870	0.000
$a_{93,LL}^{CVI}$	0.585115×10^{7}	7.22329	0.000
$a_{94,LL}^{CVI}$	0.253862×10^{7}	13.1740	0.000
$a_{95,LL}^{CVI}$	0.266353×10^{7}	12.0731	0.000
$a_{96,LL}^{CVI}$	0.404803×10^{7}	17.2744	0.000
$a_{97,LL}^{CVI}$	0.335623×10^{7}	13.5983	0.000
$a_{98,LL}^{CVI}$	0.285930×10^{7}	15.4694	0.000
$a_{99,LL}^{CVI}$	0.479303×10^{7}	7.79035	0.000
$a_{100,LL}^{CVI}$	0.378713×10^{7}	16.1167	0.000
$a_{101,LL}^{CVI}$	0.179910×10^{7}	10.2212	0.000
$a_{102,LL}^{CVI}$	0.183776×10^{7}	10.3543	0.000
$a_{103,LL}^{CVI}$	0.302338×10^{7}	16.9124	0.000
$a_{104,LL}^{CVI}$	0.226789×10^{7}	14.8142	0.000
$a_{105,LL}^{CVI}$	0.325834×10^{7}	15.6908	0.000
$a_{106,LL}^{CVI}$	0.387462×10^{7}	14.9110	0.000
$a_{107,LL}^{CVI}$	0.411895×10^{7}	19.3296	0.000
$a_{108,LL}^{CVI}$	0.411722×10^{7}	22.2874	0.000

$a^{CVI}_{111,LL}$	0.536462×10^7	18.9885	0.000
$a^{CVI}_{112,LL}$	0.299214×10^7	15.5627	0.000
$a^{CVI}_{113,LL}$	0.201377×10^7	11.1716	0.000
$a^{CVI}_{114,LL}$	0.248412×10^7	14.0145	0.000
$a^{CVI}_{115,LL}$	962405	4.23008	0.000
$a^{CVI}_{116,LL}$	0.325827×10^7	17.4371	0.000
$a^{CVI}_{117,LL}$	0.279504×10^7	15.1860	0.000
$a^{CVI}_{118,LL}$	0.416138×10^7	20.0064	0.000
$a^{CVI}_{119,LL}$	0.392814×10^7	19.1366	0.000
$a^{CVI}_{120,LL}$	0.493427×10^7	28.8817	0.000
$a^{CVI}_{121,LL}$	0.267273×10^7	14.9927	0.000
$a^{CVI}_{122,LL}$	0.273350×10^7	12.0079	0.000
$a^{CVI}_{123,LL}$	0.277569×10^7	13.9919	0.000
$a^{CVI}_{124,LL}$	0.258052×10^7	13.9426	0.000
$a^{CVI}_{125,LL}$	0.377880×10^7	17.6385	0.000
$a^{CVI}_{127,LL}$	0.355500×10^7	16.8657	0.000
$a^{CVI}_{128,LL}$	0.484670×10^7	23.2337	0.000

$a_{130,LL}^{CVI}$	0.480884×10^{7}	7.80895	0.000
$a_{131,LL}^{CVI}$	0.722837×10^{7}	14.1691	0.000
$a_{132,LL}^{CVI}$	0.431652×10^{7}	17.1013	0.000
$a_{133,LL}^{CVI}$	0.270907×10^{7}	13.8239	0.000
$a_{134,LL}^{CVI}$	0.303239×10^{7}	16.7108	0.000
$a_{135,LL}^{CVI}$	0.311912×10^{7}	17.2389	0.000
$a_{136,LL}^{CVI}$	0.236219×10^{7}	12.7936	0.000
$a_{137,LL}^{CVI}$	0.677846×10^{7}	26.5308	0.000
$a_{138,LL}^{CVI}$	0.321555×10^{7}	13.3656	0.000
$a_{139,LL}^{CVI}$	0.236971×10^{7}	10.4623	0.000
$a_{140,LL}^{CVI}$	0.382421×10^{7}	18.3431	0.000
$a_{141,LL}^{CVI}$	0.252202×10^{7}	13.8942	0.000
$a_{142,LL}^{CVI}$	0.547104×10^{7}	16.4379	0.000
$a_{143,LL}^{CVI}$	0.156784×10^{7}	6.59980	0.000

Note: 1. Tables 4.3.3 and 4.3.4 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for long-term loans ($j = LL$). Table 4.3.3 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.4 shows the estimates of these coefficients.

2. $a_{i,LL}^{CVI}$ (i=1,2,3,5, … ,18,21, … ,38,40, … ,44,46,47,49, … ,76,78, … ,108,111, … ,125,127,128,130, … ,143) are similar to $a_{i,SL}^{CVI}$ (i=1,2,3,5, … ,18,21, … ,38,40,

… ,44,46,47,49, … ,76,78, … ,108,111, … ,125,127,128,130, … ,143) in Table 4.3.2.

3. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.

Table 4.3.5. Estimation Results for the Parameters Other Than the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Demand Deposits

Parameter	Estimate	*t*-statistic	*p*-value
$\rho_{DD,1}$ (1992-1995)	-0.162145	-1.45875	0.145
$\rho_{DD,2}$ (1996-2001)	-0.432546	-5.69415	0.000
$\rho_{DD,3}$ (2002-2007)	-0.357909	-5.38180	0.000
$\rho_{DD,4}$ (2008-2010)	-0.203459	-4.23274	0.000
$\rho_{DD,5}$ (2011-2016)	-0.185688	-4.71051	0.000
a_{DD}^{CVE}	-0.272728×10^{7}	-9.28644	0.000
a_{DD}^{CVH}	-627538	-5.96842	0.000
$a_{DD,1}^{CVZ}$	0.325408×10^{9}	14.8101	0.000
$a_{DD,2}^{CVZ}$	-0.107552×10^{9}	-28.7218	0.000
$a_{DD,3}^{CVZ}$	0.852413×10^{8}	19.4043	0.000
$a_{DD,4}^{CVZ}$	447.432	9.78482	0.000
Adjusted R-squared	0.784712		
Number of Observations	2628		
Order of MA for the Error Term	9		
Test for Overidentification [*p*-value]	284.922 [0.180]		

Value Function	0.108418

Note: 1. Tables 4.3.5 and 4.3.6 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for demand deposits ($j = DD$). Table 4.3.5 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.6 shows the estimates of these coefficients.

2. The details of Eq. (3.1.3.2.13) for demand deposits ($j = DD$) are as follows:

$$Q_{DD,-i,t} = \sum_i a^{CVI}_{i,DD} \cdot D^B_i + \left(\sum_{s=1}^{5} \rho_{DD,s} \cdot D^Y_s \right) \cdot q_{DD,i,t} + a^{CVE}_{DD} \cdot EF^S_{i,t-1} + a^{CVH}_{DD} \cdot HI_{DD,t-1}$$

$$+ \sum_{h=1}^{4} a^{CVZ}_{DD,h} \cdot z^Q_{h,i,t} + \varepsilon^{CV}_{DD,i,t},$$

where $\rho_{DD,s}$ ($s = 1,\dots,5$) are the conjectural derivative parameters in the 1992-1995 ($s = 1$), 1996-2001 ($s = 2$), 2002-2007 ($s = 3$), 2008-2010 ($s = 4$), and 2011-2016 ($s = 5$) periods, respectively. Furthermore, $z^Q_{h,i,t}$ ($h = 1,\dots,4$) are the certain or predictable component of the SDEHCR of demand deposits ($h = 1$), the yield on government bonds ($h = 2$), the postal savings interest rate of ordinary savings ($h = 3$), and the TOPIX ($h = 4$), respectively. All others are as per Eq. (3.1.3.2.13).

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and the Herfindahl index of demand deposits in the previous period, the static cost unneutral efficiency in the previous period, the Herfindahl index of demand deposits in the previous period, the demand deposits in the previous period, the certain or predictable component of the SDEHCR of demand deposits in the current period, the yield on government bonds in the current period, the postal savings interest rate of ordinary savings in the current period, the TOPIX in the current period, and the products of period dummies and the demand deposits in the previous period.

Table 4.3.6 Estimation Results for the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Demand Deposits

Parameter	Estimate	*t*-statistic	*p*-value
$a_{1,DD}^{CVI}$	0.393024×10^{7}	11.3127	0.000
$a_{2,DD}^{CVI}$	0.415865×10^{7}	9.68457	0.000
$a_{3,DD}^{CVI}$	0.276142×10^{7}	22.3353	0.000
$a_{5,DD}^{CVI}$	0.295969×10^{7}	23.0437	0.000
$a_{6,DD}^{CVI}$	0.248428×10^{7}	19.6701	0.000
$a_{8,DD}^{CVI}$	0.314507×10^{7}	19.3355	0.000
$a_{9,DD}^{CVI}$	0.367703×10^{7}	19.3690	0.000
$a_{10,DD}^{CVI}$	0.263349×10^{7}	22.3250	0.000
$a_{11,DD}^{CVI}$	0.256198×10^{7}	20.9089	0.000
$a_{12,DD}^{CVI}$	0.435663×10^{7}	16.3854	0.000
$a_{13,DD}^{CVI}$	0.260519×10^{7}	17.4094	0.000
$a_{14,DD}^{CVI}$	0.248969×10^{7}	18.7720	0.000
$a_{15,DD}^{CVI}$	0.255743×10^{7}	17.4717	0.000
$a_{16,DD}^{CVI}$	0.265452×10^{7}	16.9815	0.000
$a_{17,DD}^{CVI}$	0.273680×10^{7}	15.2394	0.000
$a_{18,DD}^{CVI}$	0.517552×10^{7}	35.8509	0.000

$a_{21,DD}^{CVI}$	0.535828×10^{7}	4.43976	0.000
$a_{22,DD}^{CVI}$	0.408555×10^{7}	15.2878	0.000
$a_{23,DD}^{CVI}$	0.705057×10^{7}	8.82447	0.000
$a_{24,DD}^{CVI}$	0.376635×10^{7}	12.4396	0.000
$a_{25,DD}^{CVI}$	0.298575×10^{7}	10.5627	0.000
$a_{26,DD}^{CVI}$	0.301287×10^{7}	24.9349	0.000
$a_{27,DD}^{CVI}$	0.387721×10^{7}	24.6586	0.000
$a_{28,DD}^{CVI}$	0.232874×10^{7}	9.28409	0.000
$a_{29,DD}^{CVI}$	0.251230×10^{7}	14.9208	0.000
$a_{30,DD}^{CVI}$	0.260747×10^{7}	17.0104	0.000
$a_{31,DD}^{CVI}$	0.519163×10^{7}	17.2257	0.000
$a_{32,DD}^{CVI}$	0.228283×10^{7}	9.87992	0.000
$a_{33,DD}^{CVI}$	0.236420×10^{7}	15.9591	0.000
$a_{34,DD}^{CVI}$	0.356270×10^{7}	19.2700	0.000
$a_{35,DD}^{CVI}$	0.531731×10^{7}	17.7053	0.000
$a_{36,DD}^{CVI}$	0.622163×10^{7}	14.2618	0.000
$a_{37,DD}^{CVI}$	0.346196×10^{7}	28.2568	0.000

$a_{38,DD}^{CVI}$	0.330469×10^{7}	27.5801	0.000
$a_{40,DD}^{CVI}$	0.406937×10^{7}	27.4417	0.000
$a_{41,DD}^{CVI}$	0.280283×10^{7}	24.9442	0.000
$a_{42,DD}^{CVI}$	0.232324×10^{7}	17.6302	0.000
$a_{43,DD}^{CVI}$	0.230357×10^{7}	9.35500	0.000
$a_{44,DD}^{CVI}$	0.391462×10^{7}	32.8007	0.000
$a_{46,DD}^{CVI}$	0.402965×10^{7}	18.1870	0.000
$a_{47,DD}^{CVI}$	0.356980×10^{7}	21.9912	0.000
$a_{49,DD}^{CVI}$	0.228293×10^{7}	9.91635	0.000
$a_{50,DD}^{CVI}$	0.257825×10^{7}	17.5095	0.000
$a_{51,DD}^{CVI}$	0.170799×10^{7}	7.76265	0.000
$a_{52,DD}^{CVI}$	0.409469×10^{7}	18.2167	0.000
$a_{53,DD}^{CVI}$	0.326086×10^{7}	13.3194	0.000
$a_{55,DD}^{CVI}$	0.220873×10^{7}	16.3336	0.000
$a_{56,DD}^{CVI}$	0.246789×10^{7}	14.2107	0.000
$a_{57,DD}^{CVI}$	0.281263×10^{7}	18.8096	0.000
$a_{58,DD}^{CVI}$	0.240858×10^{7}	17.9776	0.000

$a_{59,DD}^{CVI}$	0.240203×10^{7}	18.1747	0.000
$a_{60,DD}^{CVI}$	0.243517×10^{7}	13.1396	0.000
$a_{62,DD}^{CVI}$	0.236095×10^{7}	16.8881	0.000
$a_{63,DD}^{CVI}$	0.231009×10^{7}	18.3908	0.000
$a_{64,DD}^{CVI}$	0.474514×10^{7}	14.3249	0.000
$a_{65,DD}^{CVI}$	0.974369×10^{7}	10.0881	0.000
$a_{66,DD}^{CVI}$	0.240330×10^{7}	16.1859	0.000
$a_{67,DD}^{CVI}$	0.282580×10^{7}	18.5354	0.000
$a_{68,DD}^{CVI}$	0.305434×10^{7}	24.1936	0.000
$a_{69,DD}^{CVI}$	0.279918×10^{7}	25.8053	0.000
$a_{70,DD}^{CVI}$	0.241421×10^{7}	12.4676	0.000
$a_{71,DD}^{CVI}$	0.234792×10^{7}	17.2580	0.000
$a_{72,DD}^{CVI}$	0.237887×10^{7}	9.47856	0.000
$a_{73,DD}^{CVI}$	0.229475×10^{7}	17.7818	0.000
$a_{74,DD}^{CVI}$	0.272935×10^{7}	23.4335	0.000
$a_{75,DD}^{CVI}$	0.280067×10^{7}	22.9083	0.000
$a_{76,DD}^{CVI}$	0.400479×10^{7}	23.0097	0.000

$a_{78,DD}^{CVI}$	0.432076×10^{7}	23.7927	0.000
$a_{79,DD}^{CVI}$	0.292005×10^{7}	18.4394	0.000
$a_{80,DD}^{CVI}$	0.280044×10^{7}	20.6593	0.000
$a_{81,DD}^{CVI}$	0.316022×10^{7}	26.0319	0.000
$a_{82,DD}^{CVI}$	0.403533×10^{7}	30.0813	0.000
$a_{83,DD}^{CVI}$	0.451789×10^{7}	13.1106	0.000
$a_{84,DD}^{CVI}$	0.386977×10^{7}	17.1082	0.000
$a_{85,DD}^{CVI}$	0.388286×10^{7}	19.7737	0.000
$a_{86,DD}^{CVI}$	0.399706×10^{7}	30.2145	0.000
$a_{87,DD}^{CVI}$	0.333298×10^{7}	12.7432	0.000
$a_{88,DD}^{CVI}$	0.635599×10^{7}	10.4479	0.000
$a_{89,DD}^{CVI}$	0.467882×10^{7}	21.3690	0.000
$a_{90,DD}^{CVI}$	0.407287×10^{7}	12.7803	0.000
$a_{91,DD}^{CVI}$	0.363983×10^{7}	26.3414	0.000
$a_{93,DD}^{CVI}$	0.763618×10^{7}	16.4355	0.000
$a_{94,DD}^{CVI}$	0.341454×10^{7}	29.1868	0.000
$a_{95,DD}^{CVI}$	0.391617×10^{7}	17.9624	0.000

$a_{96,DD}^{CVI}$	0.399256×10^{7}	26.8448	0.000
$a_{97,DD}^{CVI}$	0.413073×10^{7}	25.0068	0.000
$a_{98,DD}^{CVI}$	0.292924×10^{7}	19.5625	0.000
$a_{99,DD}^{CVI}$	0.616109×10^{7}	13.9886	0.000
$a_{100,DD}^{CVI}$	0.402320×10^{7}	28.0650	0.000
$a_{101,DD}^{CVI}$	0.340322×10^{7}	29.5471	0.000
$a_{102,DD}^{CVI}$	0.322656×10^{7}	29.7015	0.000
$a_{103,DD}^{CVI}$	0.360438×10^{7}	19.3601	0.000
$a_{104,DD}^{CVI}$	0.346139×10^{7}	33.4922	0.000
$a_{105,DD}^{CVI}$	0.325999×10^{7}	26.4139	0.000
$a_{106,DD}^{CVI}$	0.314632×10^{7}	32.1910	0.000
$a_{107,DD}^{CVI}$	0.442185×10^{7}	41.0861	0.000
$a_{108,DD}^{CVI}$	0.389789×10^{7}	29.2088	0.000
$a_{111,DD}^{CVI}$	0.462498×10^{7}	20.2401	0.000
$a_{112,DD}^{CVI}$	0.284836×10^{7}	18.3044	0.000
$a_{113,DD}^{CVI}$	0.304583×10^{7}	26.2668	0.000
$a_{114,DD}^{CVI}$	0.308007×10^{7}	23.4676	0.000

$a_{115,DD}^{CVI}$	0.201005×10^{7}	11.5396	0.000
$a_{116,DD}^{CVI}$	0.340969×10^{7}	22.9554	0.000
$a_{117,DD}^{CVI}$	0.443549×10^{7}	22.4269	0.000
$a_{118,DD}^{CVI}$	0.438359×10^{7}	29.4659	0.000
$a_{119,DD}^{CVI}$	0.405989×10^{7}	32.4797	0.000
$a_{120,DD}^{CVI}$	0.461723×10^{7}	33.5664	0.000
$a_{121,DD}^{CVI}$	0.383233×10^{7}	25.1907	0.000
$a_{122,DD}^{CVI}$	0.286025×10^{7}	23.6434	0.000
$a_{123,DD}^{CVI}$	0.319474×10^{7}	28.3517	0.000
$a_{124,DD}^{CVI}$	0.337253×10^{7}	27.5705	0.000
$a_{125,DD}^{CVI}$	0.281774×10^{7}	23.3861	0.000
$a_{127,DD}^{CVI}$	0.489230×10^{7}	37.6025	0.000
$a_{128,DD}^{CVI}$	0.595813×10^{7}	28.4561	0.000
$a_{130,DD}^{CVI}$	0.530969×10^{7}	46.0567	0.000
$a_{131,DD}^{CVI}$	0.822020×10^{7}	8.56507	0.000
$a_{132,DD}^{CVI}$	0.325331×10^{7}	16.1029	0.000
$a_{133,DD}^{CVI}$	0.391503×10^{7}	25.7383	0.000

$a^{CVI}_{134,DD}$	0.344802×10^{7}	24.6747	0.000
$a^{CVI}_{136,DD}$	0.341660×10^{7}	26.5217	0.000
$a^{CVI}_{138,DD}$	0.346946×10^{7}	21.5115	0.000
$a^{CVI}_{139,DD}$	0.311039×10^{7}	18.0247	0.000
$a^{CVI}_{140,DD}$	0.349202×10^{7}	24.9739	0.000
$a^{CVI}_{141,DD}$	0.293131×10^{7}	28.9200	0.000
$a^{CVI}_{142,DD}$	0.469971×10^{7}	17.1090	0.000
$a^{CVI}_{143,DD}$	0.379576×10^{7}	14.2049	0.000

Note: 1. Tables 4.3.5 and 4.3.6 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for demand deposits ($j = DD$). Table 4.3.5 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.6 shows the estimates of these coefficients.

2. $a^{CVI}_{i,DD}$ (i=1,2,3,5,6,8, … ,18,21, … ,38,40, … ,44,46,47,49, … ,53,55, … ,60,62, … ,76,78, … ,91,93, … ,108,111, … ,125,127,128,130, … ,134,136,138, … ,143) are the coefficients of the Yachiyo Bank (The present Kiraboshi Bank) (i=1), the Hokkaido Bank (i=2), the Aomori Bank (i=3), the sum of the Seiwa Bank and Michinoku Bank (i=5), the Akita Bank (i=6), the Hokuto Bank (i=8), the Shonai Bank (i=9), the Yamagata Bank (i=10), the Bank of Iwate (i=11), the Tohoku Bank (i=12), the 77 Bank (i=13), the Toho Bank (i=14), the Gunma Bank (i=15), the Ashikaga Bank (i=16), the Joyo Bank (i=17), the sum of the Kanto Bank, Kanto Tsukuba Bank, and Tsukuba Bank (i=18), the Musashino Bank (i=21), the Chiba Bank (i=22), the Chiba Kogyo Bank (i=23), the Tokyo Tomin Bank (i=24), the Bank of Yokohama (i=25), the Daishi Bank (i=26), the Hokuetsu Bank (i=27), the Yamanashi Chuo Bank (i=28), the Hachijuni Bank (i=29), the Hokuriku Bank (i=30), the Bank of Toyama (i=31), the Hokkoku Bank (i=32), the Fukui Bank (i=33), the Shizuoka Bank (i=34), the Suruga Bank (i=35), the Shimizu Bank (i=36), the Ogaki Kyoritsu Bank (i=37), the sum of the Juroku Bank and Juroku

Bank (merged with the Gifu Bank) (*i*=38), the Mie Bank (*i*=40), the Hyakugo Bank (*i*=41), the Shiga Bank (*i*=42), the Bank of Kyoto (*i*=43), the sum of the Osaka Bank and Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=44), the Senshu Bank (*i*=46), the sum of the Ikeda Bank and Senshu Ikeda Bank (*i*=47), the Nanto Bank (*i*=49), the Kiyo Bank (*i*=50), the Kiyo Bank (merged with the Wakayama Bank) (*i*=51), the Tajima Bank (*i*=52), the Tottori Bank (*i*=53), the San-in Godo Bank (merged with the Fuso Bank) (*i*=55), the Chugoku Bank (*i*=56), the Hiroshima Bank (*i*=57), the Yamaguchi Bank (*i*=58), the Awa Bank (*i*=59), the Hyakujushi Bank (*i*=60), the Iyo Bank (merged with the Toho Sogo Bank) (*i*=62), the Shikoku Bank (*i*=63), the Bank of Fukuoka (*i*=64), the Chikuho Bank (*i*=65), the Bank of Saga (*i*=66), the Eighteenth Bank (*i*=67), the Shinwa Bank (*i*=68), the Shinwa Bank (merged with the Kyushu Bank) (*i*=69), the Higo Bank (*i*=70), the Oita Bank (*i*=71), the Miyazaki Bank (*i*=72), the Kagoshima Bank (*i*=73), the Bank of Ryukyu (*i*=74), the Bank of Okinawa (*i*=75), the sum of the North Pacific Bank and North Pacific Bank (merged with the Sapporo Bank) (*i*=76), the Sapporo Bank (*i*=78), the Syokusan Bank (*i*=79), the Kirayaka Bank (*i*=80), the Kita-Nippon Bank (*i*=81), the Tokuyo City Bank (*i*=82), the Sendai Bank (*i*=83), the Fukushima Bank (*i*=84), the Daito Bank (*i*=85), the Towa Bank (*i*=86), the Tochigi Bank (*i*=87), the Keiyo Bank (*i*=88), the Taiheiyo Bank (*i*=89), the Higashi-Nippon Bank (*i*=90), the Tokyo Sowa Bank (*i*=91), the Kanagawa Bank (*i*=93), the Niigata Chuo Bank (*i*=94), the Taiko Bank (*i*=95), the Nagano Bank (*i*=96), the First Bank of Toyama (*i*=97), the Fukuho Bank (*i*=98), the Shizuokachuo Bank (*i*=99), the Gifu Bank (*i*=100), the Aichi Bank (*i*=101), the Bank of Nagoya (*i*=102), the Chukyo Bank (*i*=103), the Daisan Bank (*i*=104), the Biwako Bank (*i*=105), the Bank of Kinki (*i*=106), the Fukutoku Bank (*i*=107), the sum of the Kansai Bank, Kansai Urban Banking Corporation, and Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (*i*=108), the Taisho Bank (*i*=111), the Hanwa Bank (*i*=112), the Hyogo Bank (*i*=113), the Hanshin Bank (*i*=114), the Minato Bank (*i*=115), the Shimane Bank (*i*=116), the Tomato Bank (*i*=117), the Setouchi Bank (*i*=118), the Hiroshima Sogo Bank (*i*=119), the Momiji Bank (*i*=120), the Saikyo Bank (*i*=121), the Tokushima Bank (*i*=122), the Kagawa Bank (*i*=123), the Ehime Bank (*i*=124), the Bank of Kochi (*i*=125), the sum of the Nishi-Nippon Bank and Nishi-Nippon City Bank (*i*=127), the sum of the Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128), the Fukuoka City Bank (*i*=130), the Fukuoka Chuo Bank (*i*=131), the Saga Kyoei Bank (*i*=132), the Bank of Nagasaki (*i*=133), the Kyushu Bank (*i*=134), the Kumamoto Family Bank (*i*=136), the Howa Bank (*i*=138), the Miyazaki Taiyo Bank (*i*=139), the Minami-Nippon Bank (*i*=140), the Okinawa Kaiho Bank (*i*=141), the Tokyo Star Bank (*i*=142), and the Saitama Resona Bank (*i*=143).

3. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
4. The Ugo Bank (*i*=7), San-in Godo Bank (*i*=54), Iyo Bank (*i*=61), Heiwa Sogo Bank (*i*=92), Nishi-Nippon Sogo Bank (*i*=126), Kumamoto Bank (*i*=135), and Higo Family Bank (*i*=137) are excluded because of a lack of samples.

Table 4.3.7. Estimation Results for the Parameters Other Than the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Time Deposits

Parameter	Estimate	t-statistic	p-value
$\rho_{TD,1}$ (1985-1989)	-0.495968	-7.38575	0.000
$\rho_{TD,2}$ (1990-1995)	-0.00412006	-0.107848	0.914
$\rho_{TD,3}$ (1996-2001)	-0.075980	-1.53985	0.124
$\rho_{TD,4}$ (2002-2007)	-0.594124	-7.65511	0.000
$\rho_{TD,5}$ (2008-2010)	-0.212478	-3.57658	0.000
$\rho_{TD,6}$ (2011-2016)	-0.060453	-1.15851	0.247
a_{TD}^{CVE}	986025	5.34064	0.000
a_{TD}^{CVH}	-0.199250×10^{7}	-12.2532	0.000
$a_{TD,1}^{CVZ}$	0.124324×10^{8}	7.48197	0.000
$a_{TD,2}^{CVZ}$	-0.318080×10^{7}	-1.48875	0.137
$a_{TD,3}^{CVZ}$	-0.129464×10^{8}	-5.98148	0.000
$a_{TD,4}^{CVZ}$	411.557	21.8738	0.000
Adjusted R-squared	0.860358		
Number of Observations	3447		
Order of MA for the Error Term	8		
Test for	289.029		

Overidentification [p-value]	[0.283]
Value Function	0.083849

Note: 1. Tables 4.3.7 and 4.3.8 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for time deposits ($j = TD$). Table 4.3.7 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.8 shows the estimates of these coefficients.

2. The details of Eq. (3.1.3.2.13) for time deposits ($j = TD$) are as follows:

$$Q_{TD,-i,t} = \sum_i a_{i,TD}^{CVI} \cdot D_i^B + \left(\sum_{s=1}^{6} \rho_{TD,s} \cdot D_s^Y \right) \cdot q_{TD,i,t} + a_{TD}^{CVE} \cdot EF_{i,t-1}^S + a_{TD}^{CVH} \cdot HI_{TD,t-1}$$

$$+ \sum_{h=1}^{4} a_{TD,h}^{CVZ} \cdot z_{h,i,t}^Q + \varepsilon_{TD,i,t}^{CV},$$

where $\rho_{TD,s}$ ($s = 1, \ldots, 6$) are the conjectural derivative parameters in the 1985-1989 ($s = 1$), 1990-1995 ($s = 2$), 1996-2001 ($s = 3$), 2002-2007 ($s = 4$), 2008-2010 ($s = 5$), and 2011-2016 ($s = 6$) periods, respectively. Furthermore, $z_{h,i,t}^Q$ ($h = 1, \ldots, 4$) are the certain or predictable component of the SDEHCR of time deposits ($h = 1$), the yield on government bonds ($h = 2$), the postal savings interest rate of postal savings certificates ($h = 3$), and the TOPIX ($h = 4$), respectively. All others are as per Eq. (3.1.3.2.13).

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies and the normalized time trend, the products of these dummies and the Herfindahl index of time deposits in the previous period, the static cost unneutral efficiency in the previous period, the Herfindahl index of time deposits in the previous period, the time deposits in the previous period, the certain or predictable component of the SDEHCR of time deposits in the current period, the yield on government bonds in the current period, the postal savings interest rate of postal savings certificates in the current period, the TOPIX in the current period, and the products of period dummies and the time deposits in the previous period.

Table 4.3.8 Estimation Results for the Coefficients of the Individual Bank Dummies in Eq. (3.1.3.2.13) for Time Deposits

Parameter	Estimate	*t*-statistic	*p*-value
$a_{1,TD}^{CVI}$	0.349972×10^{7}	9.86702	0.000
$a_{2,TD}^{CVI}$	0.222673×10^{7}	12.4974	0.000
$a_{3,TD}^{CVI}$	0.115138×10^{7}	11.1606	0.000
$a_{5,TD}^{CVI}$	0.117990×10^{7}	11.7195	0.000
$a_{6,TD}^{CVI}$	0.102330×10^{7}	9.71645	0.000
$a_{7,TD}^{CVI}$	898475	7.18001	0.000
$a_{8,TD}^{CVI}$	0.116951×10^{7}	9.79139	0.000
$a_{9,TD}^{CVI}$	826140	5.91321	0.000
$a_{10,TD}^{CVI}$	810116	6.57558	0.000
$a_{11,TD}^{CVI}$	0.107858×10^{7}	11.8391	0.000
$a_{12,TD}^{CVI}$	0.112339×10^{7}	6.66002	0.000
$a_{13,TD}^{CVI}$	0.146612×10^{7}	10.3797	0.000
$a_{14,TD}^{CVI}$	0.103974×10^{7}	12.4615	0.000
$a_{15,TD}^{CVI}$	0.187949×10^{7}	14.2259	0.000
$a_{16,TD}^{CVI}$	0.192871×10^{7}	13.0341	0.000
$a_{17,TD}^{CVI}$	0.276353×10^{7}	21.8594	0.000

$a_{21,TD}^{CVI}$	0.206153×10^7	4.77072	0.000
$a_{22,TD}^{CVI}$	0.312348×10^7	19.9609	0.000
$a_{23,TD}^{CVI}$	0.470767×10^7	16.6260	0.000
$a_{24,TD}^{CVI}$	0.314213×10^7	12.7561	0.000
$a_{25,TD}^{CVI}$	0.222550×10^7	9.09263	0.000
$a_{26,TD}^{CVI}$	0.199564×10^7	18.9739	0.000
$a_{27,TD}^{CVI}$	0.234112×10^7	14.8720	0.000
$a_{28,TD}^{CVI}$	0.139856×10^7	8.49415	0.000
$a_{29,TD}^{CVI}$	0.164496×10^7	9.77585	0.000
$a_{30,TD}^{CVI}$	0.170217×10^7	10.1998	0.000
$a_{31,TD}^{CVI}$	0.319171×10^7	8.10630	0.000
$a_{32,TD}^{CVI}$	0.148760×10^7	8.83006	0.000
$a_{33,TD}^{CVI}$	954960	8.40273	0.000
$a_{34,TD}^{CVI}$	0.301971×10^7	19.1355	0.000
$a_{35,TD}^{CVI}$	0.433057×10^7	15.3909	0.000
$a_{36,TD}^{CVI}$	0.484294×10^7	12.7713	0.000
$a_{37,TD}^{CVI}$	0.261685×10^7	20.0835	0.000

$a_{38,TD}^{CVI}$	0.233431×10^{7}	22.7011	0.000
$a_{40,TD}^{CVI}$	0.232415×10^{7}	16.2105	0.000
$a_{41,TD}^{CVI}$	0.183099×10^{7}	18.3372	0.000
$a_{42,TD}^{CVI}$	0.145557×10^{7}	10.1112	0.000
$a_{43,TD}^{CVI}$	0.169309×10^{7}	8.79169	0.000
$a_{44,TD}^{CVI}$	0.414584×10^{7}	30.9094	0.000
$a_{46,TD}^{CVI}$	0.353157×10^{7}	9.63951	0.000
$a_{47,TD}^{CVI}$	0.360221×10^{7}	19.8126	0.000
$a_{49,TD}^{CVI}$	0.164172×10^{7}	8.67753	0.000
$a_{50,TD}^{CVI}$	0.135441×10^{7}	10.4220	0.000
$a_{51,TD}^{CVI}$	0.145430×10^{7}	8.77251	0.000
$a_{52,TD}^{CVI}$	0.126251×10^{7}	5.81843	0.000
$a_{53,TD}^{CVI}$	949540	5.46052	0.000
$a_{54,TD}^{CVI}$	0.110410×10^{7}	9.00628	0.000
$a_{55,TD}^{CVI}$	0.128807×10^{7}	8.78814	0.000
$a_{56,TD}^{CVI}$	0.158142×10^{7}	10.8576	0.000
$a_{57,TD}^{CVI}$	0.217185×10^{7}	16.5246	0.000

$a_{58,TD}^{CVI}$	0.152311×10^{7}	10.5846	0.000
$a_{59,TD}^{CVI}$	0.104960×10^{7}	9.06689	0.000
$a_{60,TD}^{CVI}$	0.132038×10^{7}	12.1110	0.000
$a_{61,TD}^{CVI}$	0.151645×10^{7}	14.1900	0.000
$a_{62,TD}^{CVI}$	0.171481×10^{7}	12.9196	0.000
$a_{63,TD}^{CVI}$	0.102222×10^{7}	9.80785	0.000
$a_{64,TD}^{CVI}$	0.390479×10^{7}	22.6609	0.000
$a_{65,TD}^{CVI}$	0.508028×10^{7}	11.2518	0.000
$a_{66,TD}^{CVI}$	864755	6.84828	0.000
$a_{67,TD}^{CVI}$	0.142378×10^{7}	12.2608	0.000
$a_{68,TD}^{CVI}$	0.162525×10^{7}	13.6358	0.000
$a_{69,TD}^{CVI}$	0.117971×10^{7}	12.4887	0.000
$a_{70,TD}^{CVI}$	0.135541×10^{7}	12.4262	0.000
$a_{71,TD}^{CVI}$	973813	8.70254	0.000
$a_{72,TD}^{CVI}$	724385	7.25252	0.000
$a_{73,TD}^{CVI}$	0.109260×10^{7}	10.1341	0.000
$a_{74,TD}^{CVI}$	682009	6.67099	0.000

$a_{75,TD}^{CVI}$	737955	8.05800	0.000
$a_{76,TD}^{CVI}$	0.225750×10^{7}	19.6405	0.000
$a_{78,TD}^{CVI}$	0.308199×10^{7}	20.2326	0.000
$a_{79,TD}^{CVI}$	963826	10.2744	0.000
$a_{80,TD}^{CVI}$	0.135519×10^{7}	17.3543	0.000
$a_{81,TD}^{CVI}$	0.133423×10^{7}	14.1429	0.000
$a_{82,TD}^{CVI}$	0.243685×10^{7}	15.2786	0.000
$a_{83,TD}^{CVI}$	0.275971×10^{7}	16.5961	0.000
$a_{84,TD}^{CVI}$	0.148892×10^{7}	12.8163	0.000
$a_{85,TD}^{CVI}$	0.153204×10^{7}	13.0288	0.000
$a_{86,TD}^{CVI}$	0.274505×10^{7}	18.8612	0.000
$a_{87,TD}^{CVI}$	0.274870×10^{7}	6.63972	0.000
$a_{88,TD}^{CVI}$	0.441628×10^{7}	21.2166	0.000
$a_{89,TD}^{CVI}$	0.363930×10^{7}	8.60444	0.000
$a_{90,TD}^{CVI}$	0.333736×10^{7}	11.9199	0.000
$a_{91,TD}^{CVI}$	0.318393×10^{7}	15.6375	0.000
$a_{93,TD}^{CVI}$	0.439905×10^{7}	8.34352	0.000

$a_{94,TD}^{CVI}$	0.325159×10^{7}	14.5453	0.000
$a_{95,TD}^{CVI}$	0.261392×10^{7}	11.2918	0.000
$a_{96,TD}^{CVI}$	0.300804×10^{7}	15.6717	0.000
$a_{97,TD}^{CVI}$	0.321949×10^{7}	9.67908	0.000
$a_{98,TD}^{CVI}$	0132645×10^{7}	9.23889	0.000
$a_{99,TD}^{CVI}$	0.533728×10^{7}	13.4341	0.000
$a_{100,TD}^{CVI}$	0.326765×10^{7}	12.5373	0.000
$a_{101,TD}^{CVI}$	0.202241×10^{7}	22.0889	0.000
$a_{102,TD}^{CVI}$	0.196652×10^{7}	23.0740	0.000
$a_{103,TD}^{CVI}$	0.223527×10^{7}	23.8565	0.000
$a_{104,TD}^{CVI}$	0.231658×10^{7}	19.5093	0.000
$a_{105,TD}^{CVI}$	0.219751×10^{7}	16.7711	0.000
$a_{106,TD}^{CVI}$	0.392951×10^{7}	26.1989	0.000
$a_{107,TD}^{CVI}$	0.429031×10^{7}	14.9966	0.000
$a_{108,TD}^{CVI}$	0.387243×10^{7}	21.7489	0.000
$a_{111,TD}^{CVI}$	0.432077×10^{7}	11.6154	0.000
$a_{112,TD}^{CVI}$	0.214125×10^{7}	12.3268	0.000

$a_{113,TD}^{CVI}$	0.136724×10^{7}	13.3803	0.000
$a_{114,TD}^{CVI}$	0.185334×10^{7}	13.1218	0.000
$a_{115,TD}^{CVI}$	0.119896×10^{7}	12.5261	0.000
$a_{116,TD}^{CVI}$	0.217558×10^{7}	13.8756	0.000
$a_{117,TD}^{CVI}$	0.247588×10^{7}	16.4506	0.000
$a_{118,TD}^{CVI}$	0.369129×10^{7}	11.9180	0.000
$a_{119,TD}^{CVI}$	0.337277×10^{7}	14.2363	0.000
$a_{120,TD}^{CVI}$	0.263541×10^{7}	26.3971	0.000
$a_{121,TD}^{CVI}$	0.254753×10^{7}	13.8845	0.000
$a_{122,TD}^{CVI}$	0.138946×10^{7}	13.4867	0.000
$a_{123,TD}^{CVI}$	0.189794×10^{7}	14.5590	0.000
$a_{124,TD}^{CVI}$	0.234484×10^{7}	17.2799	0.000
$a_{125,TD}^{CVI}$	0.148067×10^{7}	14.1569	0.000
$a_{127,TD}^{CVI}$	0.479401×10^{7}	19.2773	0.000
$a_{128,TD}^{CVI}$	0.361938×10^{7}	27.1456	0.000
$a_{130,TD}^{CVI}$	0.528269×10^{7}	17.3756	0.000
$a_{131,TD}^{CVI}$	0.553086×10^{7}	12.5697	0.000

$a^{CVI}_{132,TD}$	0.120009×10^{7}	8.46543	0.000
$a^{CVI}_{133,TD}$	0.161877×10^{7}	13.4027	0.000
$a^{CVI}_{134,TD}$	0.161780×10^{7}	14.3093	0.000
$a^{CVI}_{135,TD}$	0.136590×10^{7}	11.2841	0.000
$a^{CVI}_{136,TD}$	0.185549×10^{7}	18.5149	0.000
$a^{CVI}_{137,TD}$	0.152699×10^{7}	14.6821	0.000
$a^{CVI}_{138,TD}$	0.127690×10^{7}	8.89787	0.000
$a^{CVI}_{139,TD}$	919963	8.09903	0.000
$a^{CVI}_{140,TD}$	0.148747×10^{7}	12.6283	0.000
$a^{CVI}_{141,TD}$	991405	9.87487	0.000
$a^{CVI}_{142,TD}$	0.347804×10^{7}	8.54122	0.000
$a^{CVI}_{143,TD}$	0.254460×10^{7}	14.5616	0.000

Note: 1. Tables 4.3.7 and 4.3.8 show the results for the GMM estimation of the conjectural derivative parameters in Eq. (3.1.3.2.13) for time deposits ($j = TD$). Table 4.3.7 shows the estimates of the parameters other than the coefficients of the individual bank dummies; Table 4.3.8 shows the estimates of these coefficients.

2. $a^{CVI}_{i,TD}$ (*i*=1,2,3,5,6, … ,17,21, … ,38,40, … ,44,46,47,49, … ,76,78, … ,91,93, … ,108,111, … ,125,127,128,130, … ,143) are the coefficients of the Yachiyo Bank (The present Kiraboshi Bank) (*i*=1), the Hokkaido Bank (*i*=2), the Aomori Bank (*i*=3), the sum of the Seiwa Bank and Michinoku Bank (*i*=5), the Akita Bank (*i*=6), the Ugo Bank (*i*=7), the Hokuto Bank (*i*=8), the Shonai Bank (*i*=9), the Yamagata Bank (*i*=10), the Bank of Iwate (*i*=11), the Tohoku Bank (*i*=12), the 77 Bank

(*i*=13), the Toho Bank (*i*=14), the Gunma Bank (*i*=15), the Ashikaga Bank (*i*=16), the sum of the Joyo Bank, Kanto Bank, Kanto Tsukuba Bank, and Tsukuba Bank (*i*=17), the Musashino Bank (*i*=21), the Chiba Bank (*i*=22), the Chiba Kogyo Bank (*i*=23), the Tokyo Tomin Bank (*i*=24), the Bank of Yokohama (*i*=25), the Daishi Bank (*i*=26), the Hokuetsu Bank (*i*=27), the Yamanashi Chuo Bank (*i*=28), the Hachijuni Bank (*i*=29), the Hokuriku Bank (*i*=30), the Bank of Toyama (*i*=31), the Hokkoku Bank (*i*=32), the Fukui Bank (*i*=33), the Shizuoka Bank (*i*=34), the Suruga Bank (*i*=35), the Shimizu Bank (*i*=36), the Ogaki Kyoritsu Bank (*i*=37), the sum of the Juroku Bank and Juroku Bank (merged with the Gifu Bank) (*i*=38), the Mie Bank (*i*=40), the Hyakugo Bank (*i*=41), the Shiga Bank (*i*=42), the Bank of Kyoto (*i*=43), the sum of the Osaka Bank and Kinki Osaka Bank (The present Kansai Mirai Bank) (*i*=44), the Senshu Bank (*i*=46), the sum of the Ikeda Bank and Senshu Ikeda Bank (*i*=47), the Nanto Bank (*i*=49), the Kiyo Bank (*i*=50), the Kiyo Bank (merged with the Wakayama Bank) (*i*=51), the Tajima Bank (*i*=52), the Tottori Bank (*i*=53), the San-in Godo Bank (*i*=54), the San-in Godo Bank (merged with the Fuso Bank) (*i*=55), the Chugoku Bank (*i*=56), the Hiroshima Bank (*i*=57), the Yamaguchi Bank (*i*=58), the Awa Bank (*i*=59), the Hyakujushi Bank (*i*=60), Iyo Bank (*i*=61), the Iyo Bank (merged with the Toho Sogo Bank) (*i*=62), the Shikoku Bank (*i*=63), the Bank of Fukuoka (*i*=64), the Chikuho Bank (*i*=65), the Bank of Saga (*i*=66), the Eighteenth Bank (*i*=67), the Shinwa Bank (*i*=68), the Shinwa Bank (merged with the Kyushu Bank) (*i*=69), the Higo Bank (*i*=70), the Oita Bank (*i*=71), the Miyazaki Bank (*i*=72), the Kagoshima Bank (*i*=73), the Bank of Ryukyu (*i*=74), the Bank of Okinawa (*i*=75), the sum of the North Pacific Bank and North Pacific Bank (merged with the Sapporo Bank) (*i*=76), the Sapporo Bank (*i*=78), the Syokusan Bank (*i*=79), the Kirayaka Bank (*i*=80), the Kita-Nippon Bank (*i*=81), the Tokuyo City Bank (*i*=82), the Sendai Bank (*i*=83), the Fukushima Bank (*i*=84), the Daito Bank (*i*=85), the Towa Bank (*i*=86), the Tochigi Bank (*i*=87), the Keiyo Bank (*i*=88), the Taiheiyo Bank (*i*=89), the Higashi-Nippon Bank (*i*=90), the Tokyo Sowa Bank (*i*=91), the Kanagawa Bank (*i*=93), the Niigata Chuo Bank (*i*=94), the Taiko Bank (*i*=95), the Nagano Bank (*i*=96), the First Bank of Toyama (*i*=97), the Fukuho Bank (*i*=98), the Shizuokachuo Bank (*i*=99), the Gifu Bank (*i*=100), the Aichi Bank (*i*=101), the Bank of Nagoya (*i*=102), the Chukyo Bank (*i*=103), the Daisan Bank (*i*=104), the Biwako Bank (*i*=105), the Bank of Kinki (*i*=106), the Fukutoku Bank (*i*=107), the sum of the Kansai Bank, Kansai Urban Banking Corporation, and Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai

Bank) (*i*=108), the Taisho Bank (*i*=111), the Hanwa Bank (*i*=112), the Hyogo Bank (*i*=113), the Hanshin Bank (*i*=114), the Minato Bank (*i*=115), the Shimane Bank (*i*=116), the Tomato Bank (*i*=117), the Setouchi Bank (*i*=118), the Hiroshima Sogo Bank (*i*=119), the Momiji Bank (*i*=120), the Saikyo Bank (*i*=121), the Tokushima Bank (*i*=122), the Kagawa Bank (*i*=123), the Ehime Bank (*i*=124), the Bank of Kochi (*i*=125), the sum of the Nishi-Nippon Bank and Nishi-Nippon City Bank (*i*=127), the sum of the Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128), the Fukuoka City Bank (*i*=130), the Fukuoka Chuo Bank (*i*=131), the Saga Kyoei Bank (*i*=132), the Bank of Nagasaki (*i*=133), the Kyushu Bank (*i*=134), the Kumamoto Bank (*i*=135), the Kumamoto Family Bank (*i*=136), the Higo Family Bank (*i*=137), the Howa Bank (*i*=138), the Miyazaki Taiyo Bank (*i*=139), the Minami-Nippon Bank (*i*=140), the Okinawa Kaiho Bank (*i*=141), the Tokyo Star Bank (*i*=142), and the Saitama Resona Bank (*i*=143).

3. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.
4. The Heiwa Sogo Bank (*i*=92) and Nishi-Nippon Sogo Bank (*i*=126) are excluded because of a lack of samples.

Table 4.4.1 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Cost Frontier (1): the parameters other than the coefficients of the individual bank dummies in Eqs. (3.1.3.2.6a) and (3.1.3.2.6b)

Parameter	Estimate	*t*-statistic	*p*-value
γ_1^{F*} (1976-1986)	1.68103	19.7368	0.000
γ_1^{F} (= $\sin^2\left(\gamma_1^{F*}\right)$)	0.987897	53.0379	0.000
γ_2^{F*} (1987-1989)	1.71438	26.7047	0.000
γ_2^{F} (= $\sin^2\left(\gamma_2^{F*}\right)$)	0.979525	53.8703	0.000
γ_3^{F*} (1990-1995)	1.64378	12.7527	0.000
γ_3^{F} (= $\sin^2\left(\gamma_3^{F*}\right)$)	0.994683	53.0589	0.000
γ_4^{F*} (1996-2001)	1.72278	28.4343	0.000
γ_4^{F} (= $\sin^2\left(\gamma_4^{F*}\right)$)	0.977080	53.8812	0.000
γ_5^{F*} (2002-2007)	1.56867	0.352578	0.724
γ_5^{F} (= $\sin^2\left(\gamma_5^{F*}\right)$)	0.999995	52.8398	0.000
γ_6^{F*} (2008-2010)	4.57316	69.2791	0.000
γ_6^{F} (= $\sin^2\left(\gamma_6^{F*}\right)$)	0.980741	54.0527	0.000
γ_7^{F*} (2011-2016)	1.71428	26.5061	0.000
γ_7^{F} (= $\sin^2\left(\gamma_7^{F*}\right)$)	0.979553	53.5090	0.000
$\alpha_{e,1}^{F}$ (1976-1986)	0.406865	18.3310	0.000
$\alpha_{e,2}^{F}$ (1987-1989)	0.803198	81.4229	0.000
$\alpha_{e,3}^{F}$ (1990-1995)	0.647635	247.802	0.000

$\alpha_{e,4}^{F}$ (1996-2001)	0.235809	1.47709	0.140
$\alpha_{e,5}^{F}$ (2002-2007)	0.111346	10.0490	0.000
$\alpha_{e,6}^{F}$ (2008-2010)	0.303870	2.14204	0.032
$\alpha_{e,7}^{F}$ (2011-2016)	0.741625	44.3618	0.000
$\alpha_{\pi e}^{F}$	-0.132753×10^{-5}	-4.27106	0.000
ϕ_{π}^{F}	957891	209.698	0.000
δ^{S}	1.04872	5.06093	0.000
$r_t^D / r_t^{CR} \left(=\sin^2\left(\delta^S\right)\right)$	0.751322	4.19404	0.000
b_{EF}^{MU}	-85.0769	-6.96508	0.000
b_{HI}^{MU}	13.3839	1.58309	0.113
$b_{Q,1}^{MU}$	-3247.24	-8.75510	0.000
$b_{Q,2}^{MU}$	-93.8653	-3.37891	0.001
$b_{Q,3}^{MU}$	996.035	3.42355	0.001
$b_{Q,4}^{MU}$	-11.8777	-4.84445	0.000
$b_{Q,5}^{MU}$	-32.8258	-2.99068	0.003
$b_{Q,6}^{MU}$	-214.481	-8.73831	0.000
$b_{Q,7}^{MU}$	125.666	5.76333	0.000
$b_{Q,8}^{MU}$	83.8631	5.98622	0.000

$b_{Q,9}^{MU}$	96.6301	8.88315	0.000
$b_{Q,10}^{MU}$	-30.4187	-2.51484	0.012
$b_{Q,11}^{MU}$	958.023	3.24929	0.001
$b_{Q,12}^{MU}$	3622.92	8.88211	0.000
$b_{Q,13}^{MU}$	-0.016521	-12.2723	0.000
$b_{R,1}^{MU}$	-697.079	-3.88163	0.000
$b_{R,2}^{MU}$	672.986	16.9989	0.000
$b_{R,3}^{MU}$	-22.7423	-1.60946	0.108
$b_{R,4}^{MU}$	-49.8387	-1.91595	0.055
$b_{R,5}^{MU}$	40.7279	2.95121	0.003
b_{I}^{MU}	-956.908	-0.146775	0.883
b_{K}^{MU}	789.789	2.46604	0.014
Number of Observations	4395		
Order of MA for the Error Term	2		
Test for Overidentification [*p*-value]	1376.31 [1.00]		
Value Function	0.313153		

Note: 1. Tables 4.4.1 and 4.4.2 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the cost frontier in Eq. (3.1.3.2.9) for $j = SL, LL, C, CL, DD, TD$. Table 4.4.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies in Eqs. (3.1.3.2.6a) and (3.1.3.2.6b); Table 4.4.2 shows the estimates of these coefficients.

2. γ_s^{F*} ($s = 1,\ldots,7$) and $\alpha_{e,s}^F$ ($s = 1,\ldots,7$) are the risk attitude parameters to be estimated and the coefficient parameters of the utility function in the 1976-1986 ($s = 1$), 1987-1989 ($s = 2$), 1990-1995 ($s = 3$), 1996-2001 ($s = 4$), 2002-2007 ($s = 5$), 2008-2010 ($s = 6$), and 2011-2016 ($s = 7$) periods, respectively.

3. The details of $\mathbf{b}^{MU\prime} \cdot \mathbf{z}_{i,t}$ in Eqs. (3.1.3.2.6a) and (3.1.3.2.6b) are as follows:

$$\mathbf{b}^{MU\prime} \cdot \mathbf{z}_{i,t} = b_{EF}^{MU} \cdot EF_{i,t-1}^S + b_{HI}^{MU} \cdot HI_{L,t-1} + \sum_{h=1}^{13} b_{Q,h}^{MU} \cdot z_{h,i,t}^Q + \sum_{k=1}^{5} b_{R,k}^{MU} \cdot h_{k,i,t}^R$$

$$+ b_I^{MU} \cdot h_{TD,t-1}^I + b_K^{MU} \cdot h_{TD,t-1}^K,$$

where $EF_{i,t-1}^S$ and $HI_{L,t-1}$ are the static cost unneutral efficiency in the previous period and the Herfindahl index of loans in the previous period, respectively. Moreover, $z_{h,i,t}^Q$ (h=1,…,13) are the long-term prime rate (h=1), the capital ratio of borrower firms (h=2), the default loss rate for long-term loans (h=3), the logarithms of the loan per case (h=4), the proportion of loans for small and medium firms (h=5), the Herfindahl index of loan proportions classified by industry (h=6), the proportion of loans for the real estate business (h=7), the proportion of loans secured by real estate (h=8), the proportion of loans without collateral and without warranty (h=9), the logarithms of the disposable income for workers' households (except farmers) (h=10), the yield on government bonds (h=11), the interest rate of postal savings certificates (h=12), and the TOPIX (h=13), respectively. Furthermore, $h_{k,i,t}^R$ (k=1, … ,5) are the interest rate of securities (k=1), the interest rate due from banks and call loans (k=2), the interest rate of other financial assets (k=3), the interest rate of call money and borrowed money (k=4), and the interest rate of certificates of deposit and other liabilities (k=5), respectively. In addition, $h_{TD,t-1}^I$ and $h_{TD,t-1}^K$ are the insurance rate of time deposits in the previous period and the reserve requirement ratio for time deposits in the previous period, respectively.

4. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. It is assumed that the degree of the moving average is two. For the instrumental variables, the following variables are used: the individual bank dummies, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, the estimates of the dynamic actual variable costs in the current and next periods, the period dummies, the interest rates of some financial goods, some exogenous components of the actual SDEHCR for time deposits, some endogenous quality variables in the previous period, some exogenous quality variables in the current period, and the call rates in the previous and current periods for all stochastic Euler equations, the products of the individual bank dummies and the estimates of the dynamic frontier marginal variable costs with respect to some financial goods, the estimates of the dynamic actual marginal variable costs with respect to some financial goods, the market shares of some financial goods in the previous period, the elasticities of the certain or predictable components of the SDEHRRs and SDEHCRs for some financial goods with respect to the total market balances in the next period, these certain or predictable components in the same period, the uncertainty components of the actual SDEHRRs and SDEHCRs for some financial goods, and some exogenous components of the actual SDEHCRs of demand and time deposits for each stochastic Euler equation.

Table 4.4.2 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Cost Frontier (2): the coefficients of the individual bank dummies in Eqs. (3.1.3.2.6a) and (3.1.3.2.6b)

Parameter	Estimate	*t*-statistic	*p*-value
a_1^{MU}	541.731	3.20438	0.001
a_2^{MU}	529.219	3.02077	0.003
a_3^{MU}	560.057	3.15559	0.002
a_5^{MU}	520.364	3.03212	0.002
a_6^{MU}	532.994	3.09632	0.002
a_7^{MU}	603.870	3.59414	0.000
a_8^{MU}	714.649	4.89036	0.000
a_9^{MU}	565.945	3.25627	0.001
a_{10}^{MU}	509.587	2.95802	0.003
a_{11}^{MU}	529.573	3.07705	0.002
a_{12}^{MU}	532.299	3.00812	0.003
a_{13}^{MU}	498.306	2.85729	0.004
a_{14}^{MU}	544.634	3.03528	0.002
a_{15}^{MU}	476.489	2.81924	0.005
a_{16}^{MU}	497.793	2.85246	0.004

a_{17}^{MU}	511.538	2.92555	0.003
a_{18}^{MU}	609.976	3.59510	0.000
a_{21}^{MU}	543.384	3.11996	0.002
a_{22}^{MU}	484.282	2.76180	0.006
a_{23}^{MU}	515.519	2.99992	0.003
a_{24}^{MU}	586.237	3.48242	0.000
a_{25}^{MU}	446.771	2.55381	0.011
a_{26}^{MU}	580.588	3.20629	0.001
a_{27}^{MU}	569.545	3.33393	0.001
a_{28}^{MU}	485.352	2.81424	0.005
a_{29}^{MU}	490.151	2.70206	0.007
a_{30}^{MU}	549.502	3.03463	0.002
a_{31}^{MU}	813.012	4.56850	0.000
a_{32}^{MU}	545.787	3.08363	0.002
a_{33}^{MU}	525.403	3.01855	0.003
a_{34}^{MU}	514.143	3.10195	0.002
a_{35}^{MU}	532.644	3.10372	0.002

a_{36}^{MU}	550.783	3.15933	0.002
a_{37}^{MU}	530.408	3.05621	0.002
a_{38}^{MU}	579.286	3.31215	0.001
a_{40}^{MU}	543.079	3.17838	0.001
a_{41}^{MU}	521.782	3.01241	0.003
a_{42}^{MU}	550.480	3.20223	0.001
a_{43}^{MU}	998.603	5.15925	0.000
a_{44}^{MU}	821.953	5.02071	0.000
a_{46}^{MU}	589.352	3.42277	0.001
a_{47}^{MU}	649.322	3.69715	0.000
a_{49}^{MU}	507.209	2.90873	0.004
a_{50}^{MU}	598.039	3.39841	0.001
a_{51}^{MU}	691.269	3.92190	0.000
a_{52}^{MU}	524.199	3.02786	0.002
a_{53}^{MU}	561.311	3.28901	0.001
a_{54}^{MU}	582.378	3.28308	0.001
a_{55}^{MU}	504.190	2.90248	0.004

a_{56}^{MU}	517.588	2.93718	0.003
a_{57}^{MU}	485.950	2.77091	0.006
a_{58}^{MU}	491.993	2.78049	0.005
a_{59}^{MU}	529.889	3.06643	0.002
a_{60}^{MU}	519.061	2.97782	0.003
a_{61}^{MU}	544.587	3.06478	0.002
a_{62}^{MU}	497.209	2.87867	0.004
a_{63}^{MU}	529.598	3.10453	0.002
a_{64}^{MU}	468.847	2.70542	0.007
a_{65}^{MU}	580.788	3.38017	0.001
a_{66}^{MU}	551.078	3.22681	0.001
a_{67}^{MU}	547.782	3.17944	0.001
a_{68}^{MU}	633.004	3.73290	0.000
a_{69}^{MU}	577.956	3.37658	0.001
a_{70}^{MU}	501.933	2.94897	0.003
a_{71}^{MU}	541.702	3.27127	0.001
a_{72}^{MU}	551.328	3.35944	0.001

a_{73}^{MU}	514.007	3.00469	0.003
a_{74}^{MU}	721.133	3.88738	0.000
a_{75}^{MU}	429.588	2.55592	0.011
a_{76}^{MU}	575.986	3.39962	0.001
a_{78}^{MU}	524.031	3.07596	0.002
a_{79}^{MU}	536.872	3.15443	0.002
a_{80}^{MU}	643.298	3.71840	0.000
a_{81}^{MU}	548.094	3.21445	0.001
a_{82}^{MU}	623.960	3.79874	0.000
a_{83}^{MU}	563.090	3.20919	0.001
a_{84}^{MU}	530.281	3.15227	0.002
a_{85}^{MU}	539.764	3.19502	0.001
a_{86}^{MU}	514.260	3.02096	0.003
a_{87}^{MU}	574.127	3.27889	0.001
a_{88}^{MU}	371.904	2.21419	0.027
a_{89}^{MU}	603.777	3.53144	0.000
a_{90}^{MU}	521.711	3.14989	0.002

a_{91}^{MU}	538.498	3.15739	0.002
a_{92}^{MU}	1160.18	5.00022	0.000
a_{93}^{MU}	523.414	3.10862	0.002
a_{94}^{MU}	552.526	3.28660	0.001
a_{95}^{MU}	538.485	3.13326	0.002
a_{96}^{MU}	508.551	2.88603	0.004
a_{97}^{MU}	518.818	2.96712	0.003
a_{98}^{MU}	570.880	3.38679	0.001
a_{99}^{MU}	548.222	3.16762	0.002
a_{100}^{MU}	468.119	2.60738	0.009
a_{101}^{MU}	444.398	2.39832	0.016
a_{102}^{MU}	496.769	2.88462	0.004
a_{103}^{MU}	480.149	2.80976	0.005
a_{104}^{MU}	501.826	2.91859	0.004
a_{105}^{MU}	513.555	2.98658	0.003
a_{106}^{MU}	554.913	3.10128	0.002
a_{107}^{MU}	550.240	3.25514	0.001

a_{108}^{MU}	572.210	3.33594	0.001
a_{111}^{MU}	564.758	3.51671	0.000
a_{112}^{MU}	582.451	3.31690	0.001
a_{113}^{MU}	687.068	4.38527	0.000
a_{114}^{MU}	491.644	2.85845	0.004
a_{115}^{MU}	596.865	3.51066	0.000
a_{116}^{MU}	531.046	3.10607	0.002
a_{117}^{MU}	534.782	3.08275	0.002
a_{118}^{MU}	574.640	3.50563	0.000
a_{119}^{MU}	502.039	2.92959	0.003
a_{120}^{MU}	564.854	3.27953	0.001
a_{121}^{MU}	537.777	3.17705	0.001
a_{122}^{MU}	506.187	2.94730	0.003
a_{123}^{MU}	510.439	3.00955	0.003
a_{124}^{MU}	510.431	2.97397	0.003
a_{125}^{MU}	490.731	2.90346	0.004
a_{127}^{MU}	856.082	4.26537	0.000

a_{128}^{MU}	566.831	3.31770	0.001
a_{130}^{MU}	505.402	2.96509	0.003
a_{131}^{MU}	646.982	3.62462	0.000
a_{132}^{MU}	592.304	3.41947	0.001
a_{133}^{MU}	566.912	3.28260	0.001
a_{134}^{MU}	570.085	3.38127	0.001
a_{135}^{MU}	590.520	3.50423	0.000
a_{136}^{MU}	526.297	3.08296	0.002
a_{137}^{MU}	470.471	2.72982	0.006
a_{138}^{MU}	525.996	3.07588	0.002
a_{139}^{MU}	584.372	3.28163	0.001
a_{140}^{MU}	563.955	3.46675	0.001
a_{141}^{MU}	481.521	2.85264	0.004
a_{142}^{MU}	606.981	3.61244	0.000
a_{143}^{MU}	575.167	3.30514	0.001

Note: 1. Tables 4.4.1 and 4.4.2 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the cost frontier in Eq. (3.1.3.2.9) for $j = SL, LL, C, CL, DD, TD$. Table 4.4.1 shows the estimates of the parameters other than the coefficients of the individual bank dummies in Eqs. (3.1.3.2.6a) and (3.1.3.2.6b); Table 4.4.2 shows the estimates of these coefficients.

2. a_i^{MU} (i=1,2,3,5, … ,18,21, … ,38,40, … ,44,46,47,49, … ,76,78, … ,108,111, … ,125,127,128,130, … ,143) are the coefficients of the Yachiyo Bank (The present Kiraboshi Bank) (i=1), the Hokkaido Bank (i=2), the Aomori Bank (i=3), the sum of the Seiwa Bank and Michinoku Bank (i=5), the Akita Bank (i=6), the Ugo Bank (i=7), the Hokuto Bank (i=8), the Shonai Bank (i=9), the Yamagata Bank (i=10), the Bank of Iwate (i=11), the Tohoku Bank (i=12), the 77 Bank (i=13), the Toho Bank (i=14), the Gunma Bank (i=15), the Ashikaga Bank (i=16), the Joyo Bank (i=17), the sum of the Kanto Bank, Kanto Tsukuba Bank, and Tsukuba Bank (i=18), the Musashino Bank (i=21), the Chiba Bank (i=22), the Chiba Kogyo Bank (i=23), the Tokyo Tomin Bank (i=24), the Bank of Yokohama (i=25), the Daishi Bank (i=26), the Hokuetsu Bank (i=27), the Yamanashi Chuo Bank (i=28), the Hachijuni Bank (i=29), the Hokuriku Bank (i=30), the Bank of Toyama (i=31), the Hokkoku Bank (i=32), the Fukui Bank (i=33), the Shizuoka Bank (i=34), the Suruga Bank (i=35), the Shimizu Bank (i=36), the Ogaki Kyoritsu Bank (i=37), the sum of the Juroku Bank and Juroku Bank (merged with the Gifu Bank) (i=38), the Mie Bank (i=40), the Hyakugo Bank (i=41), the Shiga Bank (i=42), the Bank of Kyoto (i=43), the sum of the Osaka Bank and Kinki Osaka Bank (The present Kansai Mirai Bank) (i=44), the Senshu Bank (i=46), the sum of the Ikeda Bank and Senshu Ikeda Bank (i=47), the Nanto Bank (i=49), the Kiyo Bank (i=50), the Kiyo Bank (merged with the Wakayama Bank) (i=51), the Tajima Bank (i=52), the Tottori Bank (i=53), the San-in Godo Bank (i=54), the San-in Godo Bank (merged with the Fuso Bank) (i=55), the Chugoku Bank (i=56), the Hiroshima Bank (i=57), the Yamaguchi Bank (i=58), the Awa Bank (i=59), the Hyakujushi Bank (i=60), the Iyo Bank (i=61), the Iyo Bank (merged with the Toho Sogo Bank) (i=62), the Shikoku Bank (i=63), the Bank of Fukuoka (i=64), the Chikuho Bank (i=65), the Bank of Saga (i=66), the Eighteenth Bank (i=67), the Shinwa Bank (i=68), the Shinwa Bank (merged with the Kyushu Bank) (i=69), the Higo Bank (i=70), the Oita Bank (i=71), the Miyazaki Bank (i=72), the Kagoshima Bank (i=73), the Bank of Ryukyu (i=74), the Bank of Okinawa (i=75), the sum of the North Pacific Bank and North Pacific Bank (merged with the Sapporo Bank) (i=76), the Sapporo Bank (i=78), the Syokusan Bank (i=79), the Kirayaka Bank (i=80), the Kita-Nippon Bank (i=81), the Tokuyo City Bank (i=82), the Sendai Bank (i=83), the Fukushima Bank (i=84), the Daito Bank (i=85), the Towa Bank (i=86), the Tochigi Bank (i=87), the Keiyo Bank (i=88), the Taiheiyo

Bank (*i*=89), the Higashi-Nippon Bank (*i*=90), the Tokyo Sowa Bank (*i*=91), the Heiwa Sogo Bank (*i*=92), the Kanagawa Bank (*i*=93), the Niigata Chuo Bank (*i*=94), the Taiko Bank (*i*=95), the Nagano Bank (*i*=96), the First Bank of Toyama (*i*=97), the Fukuho Bank (*i*=98), the Shizuokachuo Bank (*i*=99), the Gifu Bank (*i*=100), the Aichi Bank (*i*=101), the Bank of Nagoya (*i*=102), the Chukyo Bank (*i*=103), the Daisan Bank (*i*=104), the Biwako Bank (*i*=105), the Bank of Kinki (*i*=106), the Fukutoku Bank (*i*=107), the sum of the Kansai Bank, Kansai Urban Banking Corporation, and Kansai Urban Banking Corporation (merged with the Biwako Bank) (The present Kansai Mirai Bank) (*i*=108), the Taisho Bank (*i*=111), the Hanwa Bank (*i*=112), the Hyogo Bank (*i*=113), the Hanshin Bank (*i*=114), the Minato Bank (*i*=115), the Shimane Bank (*i*=116), the Tomato Bank (*i*=117), the Setouchi Bank (*i*=118), the Hiroshima Sogo Bank (*i*=119), the Momiji Bank (*i*=120), the Saikyo Bank (*i*=121), the Tokushima Bank (*i*=122), the Kagawa Bank (*i*=123), the Ehime Bank (*i*=124), the Bank of Kochi (*i*=125), the Nishi-Nippon Sogo Bank (*i*=126), the sum of the Nishi-Nippon Bank and Nishi-Nippon City Bank (*i*=127), the sum of the Nishi-Nippon City Bank and Nishi-Nippon City Bank (merged with the Bank of Nagasaki) (*i*=128), the Fukuoka City Bank (*i*=130), the Fukuoka Chuo Bank (*i*=131), the Saga Kyoei Bank (*i*=132), the Bank of Nagasaki (*i*=133), the Kyushu Bank (*i*=134), the Kumamoto Bank (*i*=135), the Kumamoto Family Bank (*i*=136), the Higo Family Bank (*i*=137), the Howa Bank (*i*=138), the Miyazaki Taiyo Bank (*i*=139), the Minami-Nippon Bank (*i*=140), the Okinawa Kaiho Bank (*i*=141), the Tokyo Star Bank (*i*=142), and the Saitama Resona Bank (*i*=143).

3. When new banks emerge due to consolidation, we treat the new banks and their predecessors as different entities.

Table 4.5.1 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Actual Cost (1): the Parameters Other Than the Parameters of Eq. (3.1.3.2.8b)

Parameter	Estimate	t-statistic	p-value
γ_1^{DA*} (1976-1986)	-0.088047	-0.884895	0.376
$\gamma_1^{DA}(=\sin^2(\gamma_1^{DA*}))$	0.00773228	0.443595	0.657
γ_2^{DA*} (1987-1989)	0.618348	99.3408	0.000
$\gamma_2^{DA}(=\sin^2(\gamma_2^{DA*}))$	0.336040	57.1465	0.000
γ_3^{DA*} (1990-1995)	0.594367	111.777	0.000
$\gamma_3^{DA}(=\sin^2(\gamma_3^{DA*}))$	0.313583	63.5549	0.000
γ_4^{DA*} (1996-2001)	0.338531	4.15421	0.000
$\gamma_4^{DA}(=\sin^2(\gamma_4^{DA*}))$	0.110292	2.16027	0.031
γ_5^{DA*} (2002-2007)	0.444839	17.7005	0.000
$\gamma_5^{DA}(=\sin^2(\gamma_5^{DA*}))$	0.185169	9.48427	0.000
γ_6^{DA*} (2008-2010)	0.649590	69.1807	0.000
$\gamma_6^{DA}(=\sin^2(\gamma_6^{DA*}))$	0.365856	40.4461	0.000
γ_7^{DA*} (2011-2016)	0.609244	68.7539	0.000
$\gamma_7^{DA}(=\sin^2(\gamma_7^{DA*}))$	0.327468	39.3735	0.000
b^{MUA}	0.019717	7.11492	0.000
$\alpha_{e,1}^{DA}$ (1976-1986)	-0.334888	-12.0903	0.000
$\alpha_{e,2}^{DA}$ (1987-1989)	-0.050136	-4.14427	0.000

$\alpha_{e,3}^{DA}$ (1990-1995)	-0.131081	-15.4670	0.000
$\alpha_{e,4}^{DA}$ (1996-2001)	-0.179376	-7.24611	0.000
$\alpha_{e,5}^{DA}$ (2002-2007)	-0.035274	-2.04906	0.040
$\alpha_{e,6}^{DA}$ (2008-2010)	0.446456	47.7622	0.000
$\alpha_{e,7}^{DA}$ (2011-2016)	-0.109992	-13.7494	0.000
$\alpha_{\pi e}^{DA}$	0.400069×10^{-6}	1.76861	0.077
ϕ_{π}^{A}	998991	20.0766	0.000
Number of Observations	4395		
Order of MA for the Error Term	2		
Test for Overidentification [p-value]	1195.86 [1.00]		
Value Function	0.272095		

Note: 1. Tables 4.5.1 to 4.5.5 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) for $j = SL, LL, DD, TD$, taking the estimated parameters in Tables 4.4.1 and 4.4.2 as given. Table 4.5.1 shows the estimates of the parameters other than the parameters of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b); Tables 4.5.2 to 4.5.5 show the estimates of the rest of the parameters.

2. γ_s^{DA*} ($s = 1,\ldots,7$) and $\alpha_{e,s}^{DA}$ ($s = 1,\ldots,7$) are the difference parameters to be estimated and the additive parameters to $\alpha_{e,s}^{F}$ ($s = 1,\ldots,7$) of the utility function in the 1976-1986 ($s = 1$), 1987-1989 ($s = 2$), 1990-1995 ($s = 3$), 1996-2001

($s=4$), 2002-2007 ($s=5$), 2008-2010 ($s=6$), and 2011-2016 ($s=7$) periods, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, in addition to those in the estimation in Tables 4.4.1 and 4.4.2, the following variables are used: the products of the individual bank dummies and the estimate of the quasi-short-run profit based on the dynamic frontier cost, the estimates of the quasi-short-run profits based on the dynamic actual costs in the current and next periods, the equity capital in the previous period, the estimate of $E\left[\partial u_{i,t+1}^{F} \big/ \partial \pi_{i,t+1}^{QSF} \middle| \mathbf{z}_{i,t}\right]$ in Eq. (3.1.3.2.6a), the estimates of $\partial u_{i,t}^{F} \big/ \partial \pi_{i,t}^{QSF}$, $\partial u_{i,t+1}^{F} \big/ \partial \pi_{i,t+1}^{QSF}$, and $\partial u_{i,t}^{F} \big/ \partial q_{e,i,t}$ in Eqs. (3.1.3.2.14a) to (3.1.3.2.14c), the estimate of $MRS_{e,i,t}^{F\pi}$ in Eq. (3.1.3.2.15a), and the estimate of $\left(\partial u_{i,t+1}^{F} \big/ \partial \pi_{i,t+1}^{QSF}\right) \big/ \left(\partial u_{i,t}^{F} \big/ \partial \pi_{i,t}^{QSF}\right)$ for all stochastic Euler equations, and the Herfindahl indices corresponding to each financial good for each stochastic Euler equation.

Table 4.5.2 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Actual Cost (2): the Parameters of Eq. (3.1.3.2.8b) for *j=SL*

Parameter	Estimate	*t*-statistic	*p*-value
a_{SL}^{PIEE}	0.00307410	1.76091	0.078
a_{SL}^{PIEH}	-0.00155461	-5.14201	0.000
$a_{SL,1}^{PIEZ}$	-0.015695	-3.06179	0.002
$a_{SL,2}^{PIEZ}$	-0.00706636	-2.08262	0.037
$a_{SL,3}^{PIEZ}$	0.032449	1.10185	0.271
$a_{SL,4}^{PIEZ}$	-0.000133349	-1.06778	0.286
$a_{SL,5}^{PIEZ}$	0.000408509	0.869671	0.384
$a_{SL,6}^{PIEZ}$	0.00528091	2.69970	0.007
$a_{SL,7}^{PIEZ}$	-0.00526913	-4.77258	0.000
$a_{SL,8}^{PIEZ}$	-0.000761389	-1.28812	0.198
$a_{SL,9}^{PIEZ}$	0.0000537348	0.143001	0.886
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 92 percent of all parameters (where the number is 132 out of 143).			

Note: 1. Tables 4.5.1 to 4.5.5 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) for $j = SL, LL, DD, TD$, taking the estimated parameters in Tables 4.4.1 and 4.4.2 as given. Table 4.5.1 shows the estimates of the parameters other than the parameters of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b); Tables 4.5.2 to

4.5.5 show the estimates of the rest of the parameters.

2. The details of Eq. (3.1.3.2.8b) for short-term loans ($j = SL$) are as follows:

$$\varepsilon^{P}_{i,SL,t} = \sum_i a^{PIE}_{i,SL} \cdot D^B_i + a^{PIEE}_{SL} \cdot EF^S_{i,t-1} + a^{PIEH}_{SL} \cdot HI_{SL,t-1} + \sum_{h=1}^{9} a^{PIEZ}_{SL,h} \cdot z^Q_{h,i,t} \,,$$

where D^B_i, $EF^S_{i,t-1}$, and $HI_{SL,t-1}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, and the Herfindahl index of short-term loans in the previous period, respectively. Furthermore, $z^Q_{h,i,t}$ (*h*=1, $\ldots$,9) are the short-term prime rate (*h*=1), the capital ratio of borrower firms (*h*=2), the default loss rate for long-term loans (*h*=3), the logarithms of the loan per case (*h*=4), the proportion of loans for small and medium firms (*h*=5), the Herfindahl index of loan proportions classified by industry (*h*=6), the proportion of loans for the real estate business (*h*=7), the proportion of loans secured by real estate (*h*=8), and the proportion of loans without collateral and without warranty (*h*=9), respectively.

Table 4.5.3 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Actual Cost (3): the Parameters of Eq. (3.1.3.2.8b) for *j=LL*

Parameter	Estimate	*t*-statistic	*p*-value
a_{LL}^{PIEE}	0.00388048	2.31678	0.021
a_{LL}^{PIEH}	-0.00226263	-7.62056	0.000
$a_{LL,1}^{PIEZ}$	-0.028941	-5.62493	0.000
$a_{LL,2}^{PIEZ}$	-0.011259	-3.54995	0.000
$a_{LL,3}^{PIEZ}$	0.00736642	0.211633	0.832
$a_{LL,4}^{PIEZ}$	0.000237881	1.59636	0.110
$a_{LL,5}^{PIEZ}$	0.00118261	1.97821	0.048
$a_{LL,6}^{PIEZ}$	-0.000439921	-0.309848	0.757
$a_{LL,7}^{PIEZ}$	-0.00442733	-3.18190	0.001
$a_{LL,8}^{PIEZ}$	-0.000805793	-1.52632	0.127
$a_{LL,9}^{PIEZ}$	-0.00116301	-2.44670	0.014
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 94 percent of all parameters (where the number is 135 out of 143).			

Note: 1. Tables 4.5.1 to 4.5.5 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) for $j = SL, LL, DD, TD$, taking the estimated parameters in Tables 4.4.1 and 4.4.2 as given. Table 4.5.1 shows the estimates of the parameters other than the parameters of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b); Tables 4.5.2 to

4.5.5 show the estimates of the rest of the parameters.

2. The details of Eq. (3.1.3.2.8b) for long-term loans ($j = LL$) are as follows:

$$\varepsilon^{P}_{i,LL,t} = \sum_{i} a^{PIE}_{i,LL} \cdot D^{B}_{i} + a^{PIEE}_{LL} \cdot EF^{S}_{i,t-1} + a^{PIEH}_{LL} \cdot HI_{LL,t-1} + \sum_{h=1}^{9} a^{PIEZ}_{LL,h} \cdot z^{Q}_{h,i,t} ,$$

where D^{B}_{i}, $EF^{S}_{i,t-1}$, and $HI_{LL,t-1}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, and the Herfindahl index of long-term loans in the previous period, respectively. Furthermore, $z^{Q}_{h,i,t}$ (*h*=1, …,9) are the long-term prime rate (*h*=1), the capital ratio of borrower firms (*h*=2), the default loss rate for long-term loans (*h*=3), the logarithms of the loan per case (*h*=4), the proportion of loans for small and medium firms (*h*=5), the Herfindahl index of loan proportions classified by industry (*h*=6), the proportion of loans for the real estate business (*h*=7), the proportion of loans secured by real estate (*h*=8), and the proportion of loans without collateral and without warranty (*h*=9), respectively.

Table 4.5.4 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Actual Cost (4): the Parameters of Eq. (3.1.3.2.8b) for *j=DD*

Parameter	Estimate	*t*-statistic	*p*-value
a_{DD}^{PIEE}	-0.00722283	-8.23513	0.000
a_{DD}^{PIEH}	0.00300281	6.11191	0.000
$a_{DD,1}^{PIEZ}$	0.00414621	3.53774	0.000
$a_{DD,2}^{PIEZ}$	-0.053468	-1.59444	0.111
$a_{DD,3}^{PIEZ}$	0.076109	1.72948	0.084
$a_{DD,4}^{PIEZ}$	0.528493×10^{-6}	2.64998	0.008
$a_{DD,5}^{PIEZ}$	0.640198	1.14583	0.252
$a_{DD,6}^{PIEZ}$	0.030265	1.90340	0.057
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 99 percent of all parameters (where the number is 138 out of 140).			

Note: 1. Tables 4.5.1 to 4.5.5 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) for $j = SL, LL, DD, TD$, taking the estimated parameters in Tables 4.4.1 and 4.4.2 as given. Table 4.5.1 shows the estimates of the parameters other than the parameters of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b); Tables 4.5.2 to 4.5.5 show the estimates of the rest of the parameters.

2. The details of Eq. (3.1.3.2.8b) for demand deposits ($j = DD$) are as follows:

$$\varepsilon_{i,DD,t}^{P} = \sum_{i} a_{i,DD}^{PIE} \cdot D_{i}^{B} + a_{DD}^{PIEE} \cdot EF_{i,t-1}^{S} + a_{DD}^{PIEH} \cdot HI_{DD,t-1} + \sum_{h=1}^{6} a_{DD,h}^{PIEZ} \cdot z_{h,i,t}^{Q} ,$$

where D_{i}^{B}, $EF_{i,t-1}^{S}$, and $HI_{DD,t-1}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, and the Herfindahl index of demand deposits in the previous period, respectively. Furthermore, $z^{Q}_{h,i,t}$ (h=1, …,6) are the logarithms of the disposable income for workers' households (except farmers) (h=1), the yield on government bonds (h=2), the interest rate of ordinary savings (h=3), the TOPIX (h=4), the insurance rate of demand deposits in the previous period (h=5), and the reserve requirement ratio for demand deposits in the previous period (h=6), respectively.

Table 4.5.5 Estimation Results for the Stochastic Euler Equations Using the Utility Functions of Banks on the Actual Cost (5): the Parameters of Eq. (3.1.3.2.8b) for *j=TD*

Parameter	Estimate	*t*-statistic	*p*-value
a_{TD}^{PIEE}	-0.00314273	-1.96392	0.050
a_{TD}^{PIEH}	0.00222257	6.84027	0.000
$a_{TD,1}^{PIEZ}$	-0.00324594	-3.43875	0.001
$a_{TD,2}^{PIEZ}$	-0.106901	-6.80802	0.000
$a_{TD,3}^{PIEZ}$	0.112013	11.9049	0.000
$a_{TD,4}^{PIEZ}$	-0.896810×10^{-6}	-5.04073	0.000
$a_{TD,5}^{PIEZ}$	0.141335	0.181733	0.856
$a_{TD,6}^{PIEZ}$	0.00980552	0.754934	0.450
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 95 percent of all parameters (where the number is 133 out of 140).			

Note: 1. Tables 4.5.1 to 4.5.5 show the results for the simultaneous GMM estimation of the stochastic Euler equations using the utility functions of banks on the actual cost in Eq. (3.1.3.2.10) for $j = SL, LL, DD, TD$, taking the estimated parameters in Tables 4.4.1 and 4.4.2 as given. Table 4.5.1 shows the estimates of the parameters other than the parameters of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b); Tables 4.5.2 to 4.5.5 show the estimates of the rest of the parameters.

2. The details of Eq. (3.1.3.2.8b) for time deposits ($j = TD$) are as follows:

$$\varepsilon_{i,TD,t}^{P} = \sum_i a_{i,TD}^{PIE} \cdot D_i^B + a_{TD}^{PIEE} \cdot EF_{i,t-1}^{S} + a_{TD}^{PIEH} \cdot HI_{TD,t-1} + \sum_{h=1}^{6} a_{TD,h}^{PIEZ} \cdot z_{h,i,t}^{Q} ,$$

where D_i^B, $EF_{i,t-1}^{S}$, and $HI_{TD,t-1}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, and the Herfindahl index of time deposits in the previous period, respectively. Furthermore, $z^{Q}_{h,i,t}$ (h=1,…,6) are the logarithms of the disposable income for workers' households (except farmers) (h=1), the yield on government bonds (h=2), the interest rate of postal savings certificates (h=3), the TOPIX (h=4), the insurance rate of time deposits in the previous period (h=5), and the reserve requirement ratio for time deposits in the previous period (h=6), respectively.

Table 4.5.6 Estimation Results for Eq. (3.1.3.2.8b) for Securities (j=S)

Parameter	Estimate	t-statistic	p-value
a_S^{PIEE}	0.00487494	11.3971	0.000
a_S^{PIEH}	-0.00204643	-3.08815	0.002
a_S^{PIEZ}	0.032248	4.87792	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 97 percent of all parameters (where the number is 131 out of 135).			
Number of Observations	4393		
Order of MA for the Error Term	3		
Test for Overidentification [p-value]	457.922 [0.401]		
Value Function	0.104239		

Note: 1. Tables 4.5.6 shows the results for the GMM estimation of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b) for securities ($j = S$), taking the estimated parameters in Table 4.5.1 as given.

2. The details of Eq. (3.1.3.2.8b) for securities ($j = S$) are as follows:

$$\varepsilon_{i,S,t}^{P} = \sum_i a_{i,S}^{PIE} \cdot D_i^B + a_S^{PIEE} \cdot EF_{i,t-1}^{S} + a_S^{PIEH} \cdot HI_{L,t-1} + a_S^{PIEZ} \cdot z_{i,t}^{Q},$$

where D_i^B, $EF_{i,t-1}^{S}$, $HI_{L,t-1}$, and $z_{i,t}^{Q}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, and the interest rate of securities, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. For the instrumental variables, the following variables are used: the individual bank dummies, the products of these dummies

and the normalized time trend, the products of these dummies and the estimate of the quasi-short-run profit based on the dynamic frontier cost, the products of these dummies and the estimate of the dynamic frontier marginal variable cost with respect to the financial good concerned, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, the estimates of the dynamic actual variable costs in the current and next periods, the estimates of the dynamic actual marginal variable costs with respect to some financial goods, the period dummies, the market shares of some financial goods in the previous period, the elasticities of the certain or predictable components of the SDEHRRs and SDEHCRs for some financial goods with respect to the total market balances in the next period, these certain or predictable components in the same period, the uncertainty components of the actual SDEHRRs and SDEHCRs for some financial goods, some exogenous components of the actual SDEHCRs of demand and time deposits, the interest rates of some financial goods, some exogenous components of the actual SDEHCR for time deposits, some endogenous quality variables in the previous period, some exogenous quality variables in the current period, the call rate, and the Herfindahl indices close to each financial good.

Table 4.5.7 Estimation Results for Eq. (3.1.3.2.8b) for Cash (*j*=*C*)

Parameter	Estimate	*t*-statistic	*p*-value
a_C^{PIEE}	0.00462957	9.35578	0.000
a_C^{PIEH}	-0.00372563	-7.40003	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 100 percent of all parameters (where the number is 135 out of 135).			
Number of Observations	4395		
Order of MA for the Error Term	4		
Test for Overidentification [*p*-value]	521.053 [0.781]		
Value Function	0.118556		

Note: 1. Tables 4.5.7 shows the results for the GMM estimation of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b) for cash ($j = C$), taking the estimated parameters in Table 4.5.1 as given.

2. The details of Eq. (3.1.3.2.8b) for cash ($j = C$) are as follows:

$$\varepsilon_{i,C,t}^{P} = \sum_i a_{i,C}^{PIE} \cdot D_i^B + a_C^{PIEE} \cdot EF_{i,t-1}^{S} + a_C^{PIEH} \cdot HI_{L,t-1},$$

where D_i^B, $EF_{i,t-1}^{S}$, and $HI_{L,t-1}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, and the Herfindahl index of loans in the previous period, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. The instrumental variables are similar to Eq. (3.1.3.2.8b) for securities ($j = S$). For details, see the third note in Table 4.5.6.

Table 4.5.8 Estimation Results for Eq. (3.1.3.2.8b) for Due from Banks and Call Loans (*j=CL*)

Parameter	Estimate	*t*-statistic	*p*-value
a_{CL}^{PIEE}	0.00530412	8.33654	0.000
a_{CL}^{PIEH}	-0.00900420	-17.2320	0.000
a_{CL}^{PIEZ}	0.023215	14.0659	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 100 percent of all parameters (where the number is 134 out of 134).			
Number of Observations	4395		
Order of MA for the Error Term	3		
Test for Overidentification [*p*-value]	426.024 [0.423]		
Value Function	0.096934		

Note: 1. Tables 4.5.8 shows the results for the GMM estimation of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b) for due from banks and call loans ($j = CL$), taking the estimated parameters in Table 4.5.1 as given.

2. The details of Eq. (3.1.3.2.8b) for due from banks and call loans ($j = CL$) are as follows:

$$\varepsilon_{i,CL,t}^{P} = \sum_i a_{i,CL}^{PIE} \cdot D_i^B + a_{CL}^{PIEE} \cdot EF_{i,t-1}^{S} + a_{CL}^{PIEH} \cdot HI_{L,t-1} + a_{CL}^{PIEZ} \cdot z_{i,t}^{Q},$$

where D_i^B, $EF_{i,t-1}^{S}$, $HI_{L,t-1}$, and $z_{i,t}^{Q}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, and the interest rate due from banks and call loans, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. The instrumental variables are similar to Eq. (3.1.3.2.8b) for securities ($j = S$). For details, see the third note in Table 4.5.6.

Table 4.5.9 Estimation Results for Eq. (3.1.3.2.8b) for Other Financial Assets (j=A)

Parameter	Estimate	t-statistic	p-value
a_A^{PIEE}	0.010986	16.3730	0.000
a_A^{PIEH}	-0.000343731	-0.461628	0.644
a_A^{PIEZ}	0.013783	23.9472	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 99 percent of all parameters (where the number is 134 out of 135).			
Number of Observations	4392		
Order of MA for the Error Term	4		
Test for Overidentification [p-value]	475.888 [0.211]		
Value Function	0.108353		

Note: 1. Tables 4.5.9 shows the results for the GMM estimation of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b) for other financial assets ($j = A$), taking the estimated parameters in Table 4.5.1 as given.

2. The details of Eq. (3.1.3.2.8b) for other financial assets ($j = A$) are as follows:

$$\varepsilon_{i,A,t}^{P} = \sum_i a_{i,A}^{PIE} \cdot D_i^B + a_A^{PIEE} \cdot EF_{i,t-1}^{S} + a_A^{PIEH} \cdot HI_{L,t-1} + a_A^{PIEZ} \cdot z_{i,t}^{Q},$$

where D_i^B, $EF_{i,t-1}^{S}$, $HI_{L,t-1}$, and $z_{i,t}^{Q}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, the Herfindahl index of loans in the previous period, and the interest rate of other financial assets, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. The instrumental variables are similar to Eq.

(3.1.3.2.8b) for securities ($j = S$). For details, see the third note in Table 4.5.6.

Table 4.5.10 Estimation Results for Eq. (3.1.3.2.8b) for Call Money and Borrowed Money (*j*=*CM*)

Parameter	Estimate	*t*-statistic	*p*-value
a_{CM}^{PIEE}	-0.012667	-14.0326	0.000
a_{CM}^{PIEH}	0.00350058	5.88304	0.000
a_{CM}^{PIEZ}	-0.00993750	-9.65830	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 99 percent of all parameters (where the number is 134 out of 135).			
Number of Observations	4106		
Order of MA for the Error Term	4		
Test for Overidentification [*p*-value]	440.216 [0.620]		
Value Function	0.107213		

Note: 1. Tables 4.5.10 shows the results for the GMM estimation of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b) for call money and borrowed money ($j = CM$), taking the estimated parameters in Table 4.5.1 as given.

2. The details of Eq. (3.1.3.2.8b) for call money and borrowed money ($j = CM$) are as follows:

$$\varepsilon_{i,CM,t}^{P} = \sum_i a_{i,CM}^{PIE} \cdot D_i^B + a_{CM}^{PIEE} \cdot EF_{i,t-1}^{S} + a_{CM}^{PIEH} \cdot HI_{D,t-1} + a_{CM}^{PIEZ} \cdot z_{i,t}^{Q},$$

where D_i^B, $EF_{i,t-1}^{S}$, $HI_{D,t-1}$, and $z_{i,t}^{Q}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, the Herfindahl index of deposits in the previous period, and the interest rate of call money and borrowed money other financial assets, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. The instrumental variables are similar to Eq. (3.1.3.2.8b) for securities ($j = S$). For details, see the third note in Table 4.5.6.

Table 4.5.11 Estimation Results for Eq. (3.1.3.2.8b) for Certificates of Deposit and Other Liabilities (*j*=*CD*)

Parameter	Estimate	*t*-statistic	*p*-value
a_{CD}^{PIEE}	-0.00651465	-8.97419	0.000
a_{CD}^{PIEH}	0.00765939	11.9100	0.000
a_{CD}^{PIEZ}	-0.012556	-27.9629	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
The parameters that the p-value is less than 0.1 account for 100 percent of all parameters (where the number is 135 out of 135).			
Number of Observations	4334		
Order of MA for the Error Term	2		
Test for Overidentification [*p*-value]	547.362 [0.845]		
Value Function	0.126295		

Note: 1. Tables 4.5.11 shows the results for the GMM estimation of $\varepsilon_{i,j,t}^{P}$ in Eq. (3.1.3.2.8b) for certificates of deposit and other liabilities ($j = CD$), taking the estimated parameters in Table 4.5.1 as given.

2. The details of Eq. (3.1.3.2.8b) for certificates of deposit and other liabilities ($j = CD$) are as follows:

$$\varepsilon_{i,CD,t}^{P} = \sum_i a_{i,CD}^{PIE} \cdot D_i^B + a_{CD}^{PIEE} \cdot EF_{i,t-1}^{S} + a_{CD}^{PIEH} \cdot HI_{D,t-1} + a_{CD}^{PIEZ} \cdot z_{i,t}^{Q},$$

where D_i^B, $EF_{i,t-1}^{S}$, $HI_{D,t-1}$, and $z_{i,t}^{Q}$ are the individual bank dummy variable, the static cost unneutral efficiency in the previous period, the Herfindahl index of deposits in the previous period, and the interest rate of certificates of deposit and other liabilities, respectively.

3. This estimation takes into account the conditional heteroskedasticity and autocorrelation of the error terms. The instrumental variables are similar to Eq. (3.1.3.2.8b) for securities ($j = S$). For details, see the third note in Table 4.5.6.

Table 4.6.1 Risk Attitude and Coefficient Parameters of Utility Functions

Period	$1-\gamma_s^F$	$1-\left(\gamma_s^F-\gamma_s^{DA}\right)$	$\alpha_{e,s}^F$	$\alpha_{e,s}^F+\alpha_{e,s}^{DA}$
1976-1986 (*s*=1)	0.012103 (0.649763) [0.516]	0.019835 (1.13791) [0.255]	0.406865 (18.3310) [0.000]	0.071977 (2.59854) [0.009]
1987-1989 (*s*=2)	0.020475 (1.12603) [0.260]	0.356515 (60.6284) [0.000]	0.803198 (81.4229) [0.000]	0.753062 (62.2485) [0.000]
1990-1995 (*s*=3)	0.00531654 (0.283597) [0.777]	0.318899 (64.6325) [0.000]	0.647635 (247.802) [0.000]	0.516553 (60.9508) [0.000]
1996-2001 (*s*=4)	0.022920 (1.26395) [0.206]	0.133212 (2.60921) [0.009]	0.235809 (1.47709) [0.140]	0.056434 (2.27970) [0.023]
2002-2007 (*s*=5)	0.45234×10^{-5} (0.2390×10^{-3}) [1.00]	0.185173 (9.48451) [0.000]	0.111346 (10.0490) [0.000]	0.076071 (4.41891) [0.000]
2008-2010 (*s*=6)	0.019259 (1.06144) [0.288]	0.385115 (42.5752) [0.000]	0.303870 (2.14204) [0.032]	0.750327 (80.2704) [0.000]
2011-2016 (*s*=7)	0.020447 (1.11696) [0.264]	0.347915 (41.8320) [0.000]	0.741625 (44.3618) [0.000]	0.631633 (78.9564) [0.000]
Period	Standard Deviation of $q_{e,i,t}$	Standard Deviation of $\pi_{i,t}^{QSF}$	Standard Deviation of $\pi_{i,t}^{QSA}$	Growth Rate of Real GDP (GRRG)
1976-1986	129262.96	31739.05	32875.60	0.040144
1987-1989	331482.21	94135.91	100770.08	0.051644
1990-1995	330951.76	84603.07	76125.57	0.020302
1996-2001	198141.27	78767.34	73136.43	0.0076905
2002-2007	216314.78	58206.86	53944.52	0.014894

2008-2010	208932.30	56309.84	51694.35	-0.0089948
2011-2016	331940.50	70390.83	72027.68	0.0097805
Period	Standard Deviation of GRRG	Increase in Stock Price (TOPIX)	Return on Equity of Borrower Firms	Loan Loss Provision Rate
1976-1986	0.0087490	112.51530	0.044658	0.011770
1987-1989	0.0088464	374.27000	0.041621	0.011755
1990-1995	0.019719	-199.51185	0.030876	0.011458
1996-2001	0.014078	-48.05838	0.021984	0.011352
2002-2007	0.0039634	66.60897	0.029747	0.011268
2008-2010	0.029318	-226.37638	0.021828	0.014831
2011-2016	0.0097245	87.72512	0.031693	0.0098749

Note: 1. Table 4.6.1 shows the estimates of the degrees of relative risk-aversions of banks on the cost frontier and the actual cost, and the coefficient parameters of the utility functions of these banks (i.e., α_e^F in Eq. (3.1.3.1.7a) and $\alpha_e^F + \alpha_e^{DA}$ in Eq. (3.1.3.1.14a)).

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

Table 4.7.1 Reference Rates (Risk-Free Rates) on the Cost Frontier and the Actual Cost

Period	$r_{i,t}^{FF}$	Effect on $r_{i,t}^{FF}$		
		Subjective Rate of Time Preference	Quasi-Short-Run Profit,	Equity Capital
1976-2016	0.031911 (6.34962) [0.000]	1.02105 (203.454) [0.000]	1.00001 (93397.9) [0.000]	1.01063 (5327.06) [0.000]
1976-1986	0.067764 (6.05262) [0.000]	1.04842 (90.8106) [0.000]	0.999989 (61586.7) [0.000]	1.01846 (1526.99) [0.000]
1987-1989	0.083345 (10.3872) [0.000]	1.03316 (130.672) [0.000]	1.00028 (3958.58) [0.000]	1.04828 (1205.67) [0.000]
1990-1995	0.00734876 (0.977545) [0.328]	1.03077 (140.477) [0.000]	0.999985 (18467.5) [0.000]	0.977289 (2710.41) [0.000]
1996-2001	-0.010167 (-17.6878) [0.000]	1.00183 (2300.03) [0.000]	0.999918 (15510.1) [0.000]	0.988108 (1302.35) [0.000]
2002-2007	0.000417055 (1.81695) [0.069]	1.00092 (4561.25) [0.000]	1.00000 (10769.8) [0.000]	0.999497 (134436) [0.000]
2008-2010	0.011969 (23.5983) [0.000]	1.00139 (3022.64) [0.000]	0.999926 (14410.0) [0.000]	1.01064 (3612.18) [0.000]
2011-2016	0.041262 (62.9882) [0.000]	1.00040 (10610.6) [0.000]	1.00005 (20879.3) [0.000]	1.04079 (1785.47) [0.000]
Period	$r_{i,t}^{FA}$	Effect on $r_{i,t}^{FA}$		Call Rate
		Quasi-Short-Run Profit,	Equity Capital	
1976-2016	0.021699	1.00007	1.00082	0.028015

	(173.359) [0.000]	(267843) [0.000]	(9524.54) [0.000]	
1976-1986	0.060123 (47.4479) [0.000]	0.999969 (36801.9) [0.000]	1.01668 (268.464) [0.000]	0.064447
1987-1989	0.038160 (125.575) [0.000]	1.00467 (13003.2) [0.000]	1.00052 (26112.1) [0.000]	0.044136
1990-1995	0.029542 (355.475) [0.000]	0.998979 (63299.9) [0.000]	0.999690 (51901.2) [0.000]	0.040960
1996-2001	-0.000437551 (-0.368673) [0.712]	0.999567 (6024.01) [0.000]	0.997312 (569.037) [0.000]	0.0024315
2002-2007	0.00177867 (16.1091) [0.000]	1.00092 (10288.4) [0.000]	0.999961 (103166) [0.000]	0.001225
2008-2010	0.000107718 (1.12222) [0.262]	0.998596 (30300.7) [0.000]	1.00010 (94275.8) [0.000]	0.0018494
2011-2016	0.00159657 (17.1652) [0.000]	1.00093 (44899.4) [0.000]	1.00044 (21480.5) [0.000]	0.00052631

Note: 1. Table 4.7.1 shows the estimates of the reference rates on the cost frontier and the actual cost.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The effect of the subjective rate of time preference on the reference rate on the actual cost is the same as that on the cost frontier.

Table 4.8.1 Dynamic Price Inefficiencies

Period	$PIE_{i,SL,t}$	$PIE_{i,LL,t}$	$PIE_{i,S,t}$	$PIE_{i,C,t}$
1976-2016	0.198740 (8.31596) [0.000]	0.209759 (7.93107) [0.000]	0.238155 (1.64385) [0.100]	0.204106 (354.458) [0.000]
1976-1986	0.015006 (4.22925) [0.000]	0.017691 (3.69829) [0.000]	0.022346 (1.18686) [0.235]	0.017005 (253.632) [0.000]
1987-1989	1.39802 (14.6005) [0.000]	1.73987 (27.5244) [0.000]	2.07686 (1.15058) [0.250]	1.66910 (379.227) [0.000]
1990-1995	1.00140 (36.9227) [0.000]	1.04990 (33.0151) [0.000]	1.25141 (1.10553) [0.269]	1.01234 (372.707) [0.000]
1996-2001	0.084242 (1.48638) [0.137]	0.087199 (1.48440) [0.138]	0.094304 (1.03018) [0.303]	0.079137 (356.715) [0.000]
2002-2007	0.169971 (3.88089) [0.000]	0.162718 (3.76410) [0.000]	0.157177 (11.6966) [0.000]	0.158377 (338.170) [0.000]
2008-2010	2.49838 (21.4945) [0.000]	2.36560 (21.5710) [0.000]	2.41955 (11.2565) [0.000]	2.43560 (298.429) [0.000]
2011-2016	1.42738 (22.6824) [0.000]	1.33282 (26.2697) [0.000]	1.41129 (13.2735) [0.000]	1.43865 (295.697) [0.000]
Period	$PIE_{i,CL,t}$	$PIE_{i,A,t}$	$PIE_{i,DD,t}$	$PIE_{i,TD,t}$
1976-2016	0.204383 (365.979) [0.000]	0.207520 (159.747) [0.000]	-0.132019 (-4.24540) [0.000]	-0.195105 (-4.19466) [0.000]
1976-1986	0.017703 (272.490)	0.017757 (106.111)	-0.00346650 (-0.686455)	-0.014303 (-2.78924)

	[0.000]	[0.000]	[0.492]	[0.005]
1987-1989	1.70186 (354.363) [0.000]	1.63318 (169.662) [0.000]	-0.094654 (-0.182154) [0.855]	-1.64249 (-5.39168) [0.000]
1990-1995	1.03985 (323.464) [0.000]	1.06364 (172.508) [0.000]	-0.819557 (-15.6127) [0.000]	-0.997211 (-5.23543) [0.000]
1996-2001	0.077912 (334.263) [0.000]	0.081580 (166.265) [0.000]	-0.074774 (-1.46308) [0.143]	-0.081947 (-1.41837) [0.156]
2002-2007	0.152891 (304.737) [0.000]	0.156487 (149.488) [0.000]	-0.149762 (-3.72562) [0.000]	-0.159302 (-3.05296) [0.002]
2008-2010	2.34246 (290.903) [0.000]	2.38301 (138.843) [0.000]	-2.34014 (-67.7658) [0.000]	-2.46862 (-5.22504) [0.000]
2011-2016	1.37581 (279.250) [0.000]	1.40660 (143.648) [0.000]	-1.33645 (could not be estimated due to singularity)	-1.35590 (-4.95199) [0.000]
Period	$PIE_{i,CM,t}$		$PIE_{i,CD,t}$	
1976-2016	-0.203481 (-187.159) [0.000]		-0.216022 (-117.849) [0.000]	
1976-1986	-0.018280 (-138.342) [0.000]		-0.020250 (-37.2098) [0.000]	
1987-1989	-1.68214 (-186.129) [0.000]		-1.66483 (-281.432) [0.000]	

1990-1995	-1.00220 (-196.162) [0.000]		-1.05848 (-285.964) [0.000]	
1996-2001	-0.076628 (-189.512) [0.000]		-0.083285 (-278.907) [0.000]	
2002-2007	-0.151078 (-166.758) [0.000]		-0.155773 (-253.272) [0.000]	
2008-2010	-2.30427 (-160.146) [0.000]		-2.38147 (-232.540) [0.000]	
2011-2016	-1.35882 (-153.144) [0.000]		-1.39526 (-237.043) [0.000]	
Period	$MC^{DAV}_{SL,i,t}$	$MC^{DAV}_{LL,i,t}$	$MC^{DAV}_{S,i,t}$	$MC^{DAV}_{C,i,t}$
1976-2016	0.00089317	0.0056840	0.024138	-0.033787
Period	$MC^{DAV}_{CL,i,t}$	$MC^{DAV}_{A,i,t}$	$MC^{DAV}_{DD,i,t}$	$MC^{DAV}_{TD,i,t}$
1976-2016	-0.0070600	-0.0069267	-0.000077426	0.0030703
Period	$MC^{DAV}_{CM,i,t}$		$MC^{DAV}_{CD,i,t}$	
1976-2016	-0.035950		0.0068499	

Note: 1. Table 4.8.1 shows the estimates of the dynamic price inefficiencies (normalized by the marginal utility of quasi-short-run profits based on dynamic actual cost), $PIE_{i,j,t}$ ($j = SL, LL, S, C, CL, A, DD, TD, CM, CD$) in Eq. (3.1.3.2.8a).

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

Table 4.9.1 GURPs on the Cost Frontier Over the Entire Period

Financial Good	$p^{GURF}_{SL,i,t}\left(=MC^{DFV}_{SL,i,t}\right)$	$p^{SURF}_{SL,i,t}$	$\eta^{BPF}_{SL,i,t}$	$MRS^{BPF\pi}_{e,i,t}$
Short-Term Loans (*j*=*SL*)	0.000757466 ((1.00000))	0.00317157 (0.577959) [0.563] ((4.18708))	-0.00124944 (-205.326) [0.000] ((-1.64950))	-0.068699 (-17.3040) [0.000] ((-90.6955))
Financial Good	$\varpi^{BPF}_{SL,i,t}$	$MRS^{BPF\pi}_{e,i,t}+\varpi^{BPF}_{SL,i,t}$		
Short-Term Loans (*j*=*SL*)	0.067534 (11.0818) [0.000] ((89.1579))	-0.00116466 (-0.212473) [0.832] ((-1.53758))		
Financial Good	$p^{GURF}_{LL,i,t}\left(=MC^{DFV}_{LL,i,t}\right)$	$p^{SURF}_{LL,i,t}$	$\eta^{BPF}_{LL,i,t}$	$MRS^{BPF\pi}_{e,i,t}$
Long-Term Loans (*j*=*LL*)	0.00264542 ((1.00000))	0.00702861 (1.27646) [0.202] ((2.65690))	-0.000901135 (-205.326) [0.000] ((-0.340640))	-0.068699 (-17.3040) [0.000] ((-25.9689))
Financial Good	$\varpi^{BPF}_{LL,i,t}$	$MRS^{BPF\pi}_{e,i,t}+\varpi^{BPF}_{LL,i,t}$		
Long-Term Loans (*j*=*LL*)	0.065217 (10.6739) [0.000] ((24.6527))	-0.00348205 (-0.632877) [0.527] ((-1.31626))		
Financial Good	$p^{GURF}_{DD,i,t}\left(=MC^{DFV}_{DD,i,t}\right)$	$p^{SURF}_{DD,i,t}$	$\eta^{BPF}_{DD,i,t}$	$MRS^{BPF\pi}_{e,i,t}$
Demand Deposits (*j*=*DD*)	-0.000439455 ((1.00000))	0.030881 (5.84798) [0.000] ((-70.2714))	-0.000138864 (-205.326) [0.000] ((0.315992))	0.068699 (17.3040) [0.000] ((-156.327))
Financial Good	$\varpi^{BPF}_{DD,i,t}$	$MRS^{BPF\pi}_{e,i,t}+\varpi^{BPF}_{DD,i,t}$		
Demand Deposits	-0.099880 (-16.8086)	-0.031182 (-5.90415)		

(*j*=*DD*)	[0.000] ((227.283))	[0.000] ((70.9554))		
Financial Good	$p_{TD,i,t}^{GURF}\left(=MC_{TD,i,t}^{DFV}\right)$	$p_{TD,i,t}^{SURF}$	$\eta_{TD,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$
Time Deposits (*j*=*TD*)	0.000311582 ((1.00000))	0.00604412 (1.11534) [0.265] ((19.3982))	-0.00111419 (-205.326) [0.000] ((-3.57591))	0.068699 (17.3040) [0.000] ((220.484))
Financial Good	$\varpi_{TD,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}+\varpi_{TD,i,t}^{BPF}$		
Time Deposits (*j*=*TD*)	-0.073317 (-12.1169) [0.000] ((-235.306))	-0.00461835 (-0.851389) [0.395] ((-14.8223))		
Financial Good	$p_{S,i,t}^{GURF}\left(=MC_{S,i,t}^{DFV}\right)$	$p_{S,i,t}^{SURF}$	$\eta_{S,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$
Securities (*j*=*S*)	0.016614 ((1.00000))	0.012766 (2.30675) [0.021] ((0.768415))	is assumed to be zero.	-0.068699 (-17.3040) [0.000] ((-4.13508))
Financial Good	$\varpi_{S,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}+\varpi_{S,i,t}^{BPF}$		
Securities (*j*=*S*)	0.072546 (11.8251) [0.000] ((4.36667))	0.00384747 (0.695208) [0.487] ((0.231585))		
Financial Good	$p_{A,i,t}^{GURF}\left(=MC_{A,i,t}^{DFV}\right)$	$p_{A,i,t}^{SURF}$	$\eta_{A,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$
Other Financial Assets (*j*=*A*)	-0.00863770 ((1.00000))	0.00925348 (1.67722) [0.094] ((-1.07129))	is assumed to be zero.	-0.068699 (-17.3040) [0.000] ((7.95337))
Financial Good	$\varpi_{A,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}+\varpi_{A,i,t}^{BPF}$		
Other	0.050808	-0.017891		

<table>
<tr><td>Financial
Assets
(j=A)</td><td>(8.29959)
[0.000]
((-5.88208))</td><td colspan="3">(-3.24282)
[0.001]
((2.07129))</td></tr>
<tr><td>Financial
Good</td><td>$p^{GURF}_{C,i,t} \left(= MC^{DFV}_{C,i,t}\right)$</td><td>$p^{SURF}_{C,i,t}$</td><td rowspan="2">$\eta^{BPF}_{C,i,t}$
is assumed to
be zero.</td><td>$MRS^{BPF\pi}_{e,i,t}$</td></tr>
<tr><td>Cash
(j=C)</td><td>-0.00881922
((1.00000))</td><td>-0.034746
(-6.55224)
[0.000]
((3.93977))</td><td>-0.068699
(-17.3040)
[0.000]
((7.78966))</td></tr>
<tr><td>Financial
Good</td><td rowspan="2">$\varpi^{BPF}_{C,i,t}$
is assumed to be
zero.</td><td colspan="3">Unexplained Residual
$\left(= p^{GURF}_{C,i,t} - \left(p^{SURF}_{C,i,t} + MRS^{BPF\pi}_{e,i,t}\right)\right)$</td></tr>
<tr><td>Cash
(j=C)</td><td colspan="3">0.094625
(15.8826)
[0.000]
((-10.7294))</td></tr>
<tr><td>Financial
Good</td><td>$p^{GURF}_{CL,i,t} \left(= MC^{DFV}_{CL,i,t}\right)$</td><td>$p^{SURF}_{CL,i,t}$</td><td rowspan="2">$\eta^{BPF}_{CL,i,t}$
is assumed to
be zero.</td><td>$MRS^{BPF\pi}_{e,i,t}$</td></tr>
<tr><td>Amount Due
from Banks
and Call
Loans
(j=CL)</td><td>-0.00383731
((1.00000))</td><td>-0.014974
(-2.77338)
[0.006]
((3.90219))</td><td>-0.068699
(-17.3040)
[0.000]
((17.9028))</td></tr>
<tr><td>Financial
Good</td><td rowspan="2">$\varpi^{BPF}_{CL,i,t}$
is assumed to be
zero.</td><td colspan="3">Unexplained Residual
$\left(= p^{GURF}_{CL,i,t} - \left(p^{SURF}_{CL,i,t} + MRS^{BPF\pi}_{e,i,t}\right)\right)$</td></tr>
<tr><td>Amount Due
from Banks
and Call
Loans
(j=CL)</td><td colspan="3">0.079835
(13.2374)
[0.000]
((-20.8050))</td></tr>
<tr><td>Financial
Good</td><td>$p^{GURF}_{CM,i,t} \left(= MC^{DFV}_{CM,i,t}\right)$</td><td>$p^{SURF}_{CM,i,t}$</td><td rowspan="2">$\eta^{BPF}_{CM,i,t}$
is assumed to
be zero.</td><td>$MRS^{BPF\pi}_{e,i,t}$</td></tr>
<tr><td>Call Money
and Borrowed</td><td>-0.037937
((1.00000))</td><td>-0.023592
(-4.22263)</td><td>0.068699
(17.3040)</td></tr>
</table>

Money (*j*=*CM*)		[0.000] ((0.621862))		[0.000] ((-1.81084))
Financial Good	$\varpi^{BPF}_{CM,i,t}$ is assumed to be zero.	Unexplained Residual $(= p^{GURF}_{CM,i,t} - \left(p^{SURF}_{CM,i,t} + MRS^{BPF\pi}_{e,i,t} \right))$		
Call Money and Borrowed Money (*j*=*CM*)		-0.083044 (-13.4468) [0.000] ((2.18898))		
Financial Good	$p^{GURF}_{CD,i,t} \left(= MC^{DFV}_{CD,i,t}\right)$	$p^{SURF}_{CD,i,t}$	$\eta^{BPF}_{CD,i,t}$ is assumed to be zero.	$MRS^{BPF\pi}_{e,i,t}$
Certificates of Deposit and Other Liabilities (*j*=*CD*)	-0.00221663 ((1.00000))	-0.015036 (-2.71148) [0.007] ((6.78329))		0.068699 (17.3040) [0.000] ((-30.9925))
Financial Good	$\varpi^{BPF}_{CD,i,t}$ is assumed to be zero.	Unexplained Residual $(= p^{GURF}_{CD,i,t} - \left(p^{SURF}_{CD,i,t} + MRS^{BPF\pi}_{e,i,t} \right))$		
Certificates of Deposit and Other Liabilities (*j*=*CD*)		-0.055879 (-9.09574) [0.000] ((25.2092))		

Note: 1. Tables 4.9.1 shows the estimates of the GURPs on the cost frontier over the entire period.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The numbers in double parentheses represent proportions with respect to $p^{GURF}_{j,i,t}$.

5. $\eta^{BPF}_{j,i,t}$ ($j = S, C, CL, A, CM, CD$) and $\varpi^{BPF}_{j,i,t}$ ($j = C, CL, CM, CD$) are assumed to be zero because it is unrealistic that these effects are not negligible.

6. There are unexplained residuals (i.e., $p^{GURF}_{j,i,t} - \left(p^{SURF}_{j,i,t} + MRS^{BPF\pi}_{e,i,t} \right) \neq 0$) for $j = C, CL, CM, CD$. How to decrease these residuals is a task for the future.

Table 4.9.2 GURPs on the Actual Cost Over the Entire Period

Financial Good	$p_{SL,i,t}^{GURA}$	$p_{SL,i,t}^{SURA}$	$\eta_{SL,i,t}^{BPA}$	$MRS_{e,i,t}^{BPA\pi}$ (A)
Short-Term Loans (j=SL)	0.199634 (8.35333) [0.000] ((1.00000))	0.014434 (103.531) [0.000] ((0.072302))	-0.00126193 (-8162.61) [0.000] ((-0.00632124))	0.471392 (24.9632) [0.000] ((2.36129))
Financial Good	$\varpi_{SL,i,t}^{BPA}$ (B)	(A)+(B)	$PIE_{i,SL,t}$	$MC_{SL,i,t}^{DAV}$
Short-Term Loans (j=SL)	-0.284930 (-26.0864) [0.000] ((-1.42727))	0.186462 (7.79985) [0.000] ((0.934019))	0.198740 (8.31596) [0.000]	0.00089317
Financial Good	$p_{LL,i,t}^{GURA}$	$p_{LL,i,t}^{SURA}$	$\eta_{LL,i,t}^{BPA}$	$MRS_{e,i,t}^{BPA\pi}$ (A)
Long-Term Loans (j=LL)	0.215443 (8.14598) [0.000] ((1.00000))	0.018329 (131.025) [0.000] ((0.085078))	-0.000910143 (-8162.61) [0.000] ((-0.00422451))	0.471392 (24.9632) [0.000] ((2.18801))
Financial Good	$\varpi_{LL,i,t}^{BPA}$ (B)	(A)+(B)	$PIE_{i,LL,t}$	$MC_{LL,i,t}^{DAV}$
Long-Term Loans (j=LL)	-0.273368 (-18.9388) [0.000] ((-1.26886))	0.198024 (7.47841) [0.000] ((0.919147))	0.209759 (7.93107) [0.000]	0.0056840
Financial Good	$p_{DD,i,t}^{GURA}$	$p_{DD,i,t}^{SURA}$	$\eta_{DD,i,t}^{BPA}$	$MRS_{e,i,t}^{BPA\pi}$ (A)
Demand Deposits (j=DD)	-0.132096 (-4.24789) [0.000] ((1.00000))	0.019959 (147.625) [0.000] ((-0.151096))	-0.000140252 (-8162.61) [0.000] ((0.00106175))	-0.471392 (-24.9632) [0.000] ((3.56855))
Financial Good	$\varpi_{DD,i,t}^{BPA}$ (B)	(A)+(B)	$PIE_{i,DD,t}$	$MC_{DD,i,t}^{DAV}$
Demand Deposits	0.319477 (17.3816)	-0.151915 (-4.88606)	-0.132019 (-4.24540)	-0.000077426

($j=DD$)	[0.000] ((-2.41852))	[0.000] ((1.15003))	[0.000]	
Financial Good	$p^{GURA}_{TD,i,t}$	$p^{SURA}_{TD,i,t}$	$\eta^{BPA}_{TD,i,t}$	$MRS^{BPA\pi}_{e,i,t}$ (A)
Time Deposits ($j=TD$)	-0.192035 (-4.12866) [0.000] ((1.00000))	-0.00512606 (-37.0714) [0.000] ((0.026693))	-0.00112532 (-8162.61) [0.000] ((0.00586001))	-0.471392 (-24.9632) [0.000] ((2.45472))
Financial Good	$\varpi^{BPA}_{TD,i,t}$ (B)	(A)+(B)	$PIE_{i,TD,t}$	$MC^{DAV}_{TD,i,t}$
Time Deposits ($j=TD$)	0.285609 (7.06983) [0.000] ((-1.48728))	-0.185783 (-3.99169) [0.000] ((0.967447))	-0.195105 (-4.19466) [0.000]	0.0030703
Financial Good	$p^{GURA}_{S,i,t}$	$p^{SURA}_{S,i,t}$	$\eta^{BPA}_{S,i,t}$	$MRS^{BPA\pi}_{e,i,t}$ (A)
Securities ($j=S$)	0.262293 (1.81046) [0.070] ((1.00000))	0.024124 (171.578) [0.000] ((0.091975))	is assumed to be zero.	0.471392 (24.9632) [0.000] ((1.79719))
Financial Good	$\varpi^{BPA}_{S,i,t}$ (B)	(A)+(B)	$PIE_{i,S,t}$	$MC^{DAV}_{S,i,t}$
Securities ($j=S$)	-0.233223 (-12.3483) [0.000] ((-0.889169))	0.238169 (1693.91) [0.000] ((0.908025))	0.238155 (1.64385) [0.100]	0.024138
Financial Good	$p^{GURA}_{A,i,t}$	$p^{SURA}_{A,i,t}$	$\eta^{BPA}_{A,i,t}$	$MRS^{BPA\pi}_{e,i,t}$ (A)
Other Financial Assets ($j=A$)	0.200593 (154.415) [0.000] ((1.00000))	0.020577 (146.799) [0.000] ((0.102579))	is assumed to be zero.	0.471392 (24.9632) [0.000] ((2.34999))
Financial Good	$\varpi^{BPA}_{A,i,t}$ (B)	(A)+(B)	$PIE_{i,A,t}$	$MC^{DAV}_{A,i,t}$
Other	-0.291375	0.180016	0.207520	-0.0069267

Financial Assets (j=A)	(-15.4273) [0.000] ((-1.45257))	(1284.29) [0.000] ((0.897421))	(159.747) [0.000]	
Financial Good	$p^{GURA}_{C,i,t}$ (A)	$p^{SURA}_{C,i,t}$ (B)	$\eta^{BPA}_{C,i,t}$ is assumed to be zero.	$MRS^{BPA\pi}_{e,i,t}$ (C)
Cash (j=C)	0.170319 (295.783) [0.000] ((1.00000))	-0.023862 (-177.121) [0.000] ((-0.140104))		0.471392 (24.9632) [0.000] ((2.76769))
Financial Good	$\varpi^{BPA}_{C,i,t}$ is assumed to be zero.	Unexplained Residual ((A)-((B)+(C)))	$PIE_{i,C,t}$	$MC^{DAV}_{C,i,t}$
Cash (j=C)		-0.277210 (-14.6774) [0.000] ((-1.62759))	0.204106 (354.458) [0.000]	-0.033787
Financial Good	$p^{GURA}_{CL,i,t}$ (A)	$p^{SURA}_{CL,i,t}$ (B)	$\eta^{BPA}_{CL,i,t}$ is assumed to be zero.	$MRS^{BPA\pi}_{e,i,t}$ (C)
Amount Due from Banks and Call Loans (j=CL)	0.197323 (353.337) [0.000] ((1.00000))	-0.00389302 (-28.3809) [0.000] ((-0.019729))		0.471392 (24.9632) [0.000] ((2.38893))
Financial Good	$\varpi^{BPA}_{CL,i,t}$ is assumed to be zero.	Unexplained Residual ((A)-((B)+(C)))	$PIE_{i,CL,t}$	$MC^{DAV}_{CL,i,t}$
Amount Due from Banks and Call Loans (j=CL)		-0.270175 (-14.3049) [0.000] ((-1.36920))	0.204383 (365.979) [0.000]	-0.0070600
Financial Good	$p^{GURA}_{CM,i,t}$ (A)	$p^{SURA}_{CM,i,t}$ (B)	$\eta^{BPA}_{CM,i,t}$ is assumed to be zero.	$MRS^{BPA\pi}_{e,i,t}$ (C)
Call Money and	-0.239430 (-220.225)	-0.035058 (-246.989)		-0.471392 (-24.9632)

Borrowed Money (*j*=*CM*)	[0.000] ((1.00000))	[0.000] ((0.146423))		[0.000] ((1.96881))
Financial Good	$\varpi^{BPA}_{CM,i,t}$ is assumed to be zero.	Unexplained Residual ((A)-((B)+(C)))	$PIE_{i,CM,t}$	$MC^{DAV}_{CM,i,t}$
Call Money and Borrowed Money (*j*=*CM*)		0.267020 (14.1377) [0.000] ((-1.11523))	-0.203481 (-187.159) [0.000]	-0.035950
Financial Good	$p^{GURA}_{CD,i,t}$ (A)	$p^{SURA}_{CD,i,t}$ (B)	$\eta^{BPA}_{CD,i,t}$ is assumed to be zero.	$MRS^{BPA\pi}_{e,i,t}$ (C)
Certificates of Deposit and Other Liabilities (*j*=*CD*)	-0.209172 (-114.112) [0.000] ((1.00000))	-0.026417 (-187.509) [0.000] ((0.126293))		-0.471392 (-24.9632) [0.000] ((2.25360))
Financial Good	$\varpi^{BPA}_{CD,i,t}$ is assumed to be zero.	Unexplained Residual ((A)-((B)+(C)))	$PIE_{i,CD,t}$	$MC^{DAV}_{CD,i,t}$
Certificates of Deposit and Other Liabilities (*j*=*CD*)		0.288636 (15.2822) [0.000] ((-1.37990))	-0.216022 (-117.849) [0.000]	0.0068499

Note: 1. Tables 4.9.2 shows the estimates of the GURPs on the actual cost over the entire period.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The numbers in double parentheses represent proportions with respect to $p^{GURA}_{j,i,t}$.

5. $\eta^{BPA}_{j,i,t}$ ($j = S, C, CL, A, CM, CD$) and $\varpi^{BPA}_{j,i,t}$ ($j = C, CL, CM, CD$) are assumed to be zero because it is unrealistic that these effects are not negligible.

6. There are unexplained residuals (i.e., $p_{j,i,t}^{GURA} - \left(p_{j,i,t}^{SURA} + MRS_{e,i,t}^{BPA\pi} \right) \neq 0$) for $j = C, CL, CM, CD$. How to decrease these residuals is a task for the future.

<u>Table 4.9.3 GURPs on the Cost Frontier in Each Period</u>

$p_{SL,i,t}^{GURF}\left(=MC_{SL,i,t}^{DFV}\right)$	$p_{SL,i,t}^{SURF}$	$\eta_{SL,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$	$\varpi_{SL,i,t}^{BPF}$
1976-1986				
0.000185576 ((1.00000))	-0.00644568 (-0.561935) [0.574] ((-34.7334))	-0.00108699 (-95.3721) [0.000] ((-5.85736))	-0.050212 (-3.28357) [0.001] ((-270.575))	0.057930 (15.0131) [0.000] ((312.166))
1987-1989				
-0.000176340 ((1.00000))	-0.031446 (-4.29640) [0.000] ((178.324))	-0.00116505 (-135.016) [0.000] ((6.60683))	0.041486 (5.72508) [0.000] ((-235.263))	-0.00905193 (-4.27355) [0.000] ((51.3321))
1990-1995				
0.00126689 ((1.00000))	0.036846 (4.66222) [0.000] ((29.0834))	-0.00104885 (-133.999) [0.000] ((-0.827888))	-0.251306 (-14.5952) [0.000] ((-198.364))	0.216776 (22.1530) [0.000] ((171.108))
1996-2001				
0.00172154 ((1.00000))	0.027427 (41.1864) [0.000] ((15.9315))	-0.00144512 (-1722.00) [0.000] ((-0.839430))	0.00651281 (0.587444) [0.557] ((2.75506))	-0.030773 (-2.87241) [0.004] ((-17.8751))
2002-2007				
0.00292904 ((1.00000))	0.024736 (76.9547) [0.000] ((8.44509))	-0.00177075 (-4358.45) [0.000] ((-0.604551))	-0.064561 (-6.56131) [0.000] ((-22.0417))	0.044525 (4.67722) [0.000] ((15.2012))
2008-2010				
-0.00195323 ((1.00000))	0.000557131 (0.904038) [0.366]	-0.00141876 (-1995.25) [0.000]	-0.010189 (-1.31981) [0.187]	0.00909780 (1.10303) [0.270]

	((-0.285236))	((0.726366))	((5.21670))	((-4.65783))
2011-2016				
-0.0000329499 ((1.00000))	-0.027299 (-42.5606) [0.000] ((828.490))	-0.00127288 (-1589.54) [0.000] ((38.6307))	0.015608 (could not be estimated due to singularity) ((-473.685))	0.012931 (could not be estimated due to singularity) ((-392.436))
$p_{LL,i,t}^{GURF}\left(=MC_{LL,i,t}^{DFV}\right)$	$p_{LL,i,t}^{SURF}$	$\eta_{LL,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$	$\varpi_{LL,i,t}^{BPF}$
1976-1986				
0.00302421 ((1.00000))	-0.000529620 (-0.045924) [0.963] ((-0.175127))	-0.000845331 (-95.3721) [0.000] ((-0.279521))	-0.050212 (-3.28357) [0.001] ((-16.6034))	0.054611 (14.3915) [0.000] ((18.0580))
1987-1989				
0.00331840 ((1.00000))	-0.026353 (-3.58216) [0.000] ((-7.94155))	-0.000654305 (-135.016) [0.000] ((-0.197175))	0.041486 (5.72508) [0.000] ((12.5019))	-0.011160 (-5.25000) [0.000] ((-3.36317))
1990-1995				
0.00271174 ((1.00000))	0.038093 (4.81437) [0.000] ((14.0474))	-0.000962079 (-133.999) [0.000] ((-0.354783))	-0.251306 (-14.5952) [0.000] ((-92.6733))	0.216887 (22.1845) [0.000] ((79.9807))
1996-2001				
0.00287688 ((1.00000))	0.034204 (51.0623) [0.000] ((11.8893))	-0.000767582 (-1722.00) [0.000] ((-0.266811))	0.00651281 (0.587444) [0.557] ((2.26384))	-0.037073 (-3.46120) [0.001] ((-12.8864))
2002-2007				
0.00252766 ((1.00000))	0.027440 (85.2016)	-0.000749026 (-4358.45)	-0.064561 (-6.56131)	0.040398 (4.24409)

	[0.000] ((10.8558))	[0.000] ((-0.296332))	[0.000] ((-25.5418))	[0.000] ((15.9824))
2008-2010				
0.00251956 ((1.00000))	0.00474315 (7.67043) [0.000] ((1.88253))	-0.00110076 (-1995.25) [0.000] ((-0.436886))	-0.010189 (-1.31981) [0.187] ((-4.04412))	0.00906658 (1.09898) [0.272] ((3.59847))
2011-2016				
0.00136939 ((1.00000))	-0.027578 (-43.0076) [0.000] ((-20.1388))	-0.000929414 (-1589.54) [0.000] ((-0.678708))	0.015608 (could not be estimated due to singularity) ((11.3977))	0.014269 (could not be estimated due to singularity) ((10.4198))
$p_{DD,i,t}^{GURF}\left(=MC_{DD,i,t}^{DFV}\right)$	$p_{DD,i,t}^{SURF}$	$\eta_{DD,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$	$\varpi_{DD,i,t}^{BPF}$
1976-1986				
-0.000727244 ((1.00000))	0.059197 (5.47279) [0.000] ((-81.3997))	– (–) [–] ((–))	0.050212 (3.28357) [0.001] ((-69.0445))	-0.110137 (-24.5001) [0.000] ((151.444))
1987-1989				
0.00137590 ((1.00000))	0.072205 (10.3950) [0.000] ((52.4786))	– (–) [–] ((–))	-0.041486 (-5.72508) [0.000] ((-30.1521))	-0.029343 (-14.0418) [0.000] ((-21.3265))
1990-1995				
0.0000127868 ((1.00000))	0.00538181 (0.713461) [0.476] ((420.887))	-0.000174940 (-133.999) [0.000] ((-13.6813))	0.251306 (14.5952) [0.000] ((19653.5))	-0.256500 (-25.3932) [0.000] ((-20059.7))
1996-2001				
-0.00206932	-0.011166	-0.000154421	-0.00651281	0.015764

((1.00000))	(-16.9969) [0.000] ((5.39619))	(-1722.00) [0.000] ((0.074624))	(-0.587444) [0.557] ((3.14732))	(1.47119) [0.141] ((-7.61814))
2002-2007				
-0.00108907 ((1.00000))	0.000668484 (2.13163) [0.033] ((-0.613814))	-0.000226009 (-4358.45) [0.000] ((0.207526))	0.064561 (6.56131) [0.000] ((-59.2811))	-0.066093 (-6.93748) [0.000] ((60.6874))
2008-2010				
0.000531621 ((1.00000))	0.013542 (22.3333) [0.000] ((25.4739))	-0.000246536 (-1995.25) [0.000] ((-0.463744))	0.010189 (1.31981) [0.187] ((19.1667))	-0.022954 (-2.78552) [0.005] ((-43.1769))
2011-2016				
0.000500101 ((1.00000))	0.042002 (66.4695) [0.000] ((83.9862))	-0.000209140 (-1589.54) [0.000] ((-0.418196))	-0.015608 (could not be estimated due to singularity) ((-31.2095))	-0.025684 (could not be estimated due to singularity) ((-51.3586))
$p_{TD,i,t}^{GURF}\left(=MC_{TD,i,t}^{DFV}\right)$	$p_{TD,i,t}^{SURF}$	$\eta_{TD,i,t}^{BPF}$	$MRS_{e,i,t}^{BPF\pi}$	$\varpi_{TD,i,t}^{BPF}$
1976-1986				
0.000446456 ((1.00000))	0.015235 (1.34453) [0.179] ((34.1232))	-0.000286861 (-95.3721) [0.000] ((-0.642528))	0.050212 (3.28357) [0.001] ((112.468))	-0.064713 (-16.2494) [0.000] ((-144.949))
1987-1989				
-0.000243978 ((1.00000))	0.035433 (4.88425) [0.000] ((-145.230))	-0.000677006 (-135.016) [0.000] ((2.77487))	-0.041486 (-5.72508) [0.000] ((170.041))	0.00648656E (3.07148) [0.002] ((-26.5867))
1990-1995				

-0.000484414 ((1.00000))	-0.030281 (-3.87344) [0.000] ((62.5114))	-0.00171621 (-133.999) [0.000] ((3.54286))	0.251306 (14.5952) [0.000] ((-518.783))	-0.219793 (-22.3280) [0.000] ((453.728))
1996-2001				
-0.000248554 ((1.00000))	-0.019790 (-29.8998) [0.000] ((79.6227))	-0.00175168 (-1722.00) [0.000] ((7.04749))	-0.00651281 (-0.587444) [0.557] ((26.2029))	0.027806 (2.59567) [0.009] ((-111.873))
2002-2007				
0.000580050 ((1.00000))	-0.00653794 (-20.6720) [0.000] ((-11.2714))	-0.000901970 (-4358.45) [0.000] ((-1.55499))	0.064561 (6.56131) [0.000] ((111.303))	-0.056541 (-5.93666) [0.000] ((-97.4762))
2008-2010				
0.00126427 ((1.00000))	0.00713846 (11.6858) [0.000] ((5.64631))	-0.00150373 (-1995.25) [0.000] ((-1.18941))	0.010189 (1.31981) [0.187] ((8.05951))	-0.014560 (-1.76596) [0.077] ((-11.5164))
2011-2016				
0.00114991 ((1.00000))	0.038613 (60.8895) [0.000] ((33.5791))	-0.00148962 (-1589.54) [0.000] ((-1.29543))	-0.015608 (could not be estimated due to singularity) ((-13.5732))	-0.020365 (could not be estimated due to singularity) ((-17.7105))
$p_{S,i,t}^{GURF}\left(=MC_{S,i,t}^{DFV}\right)$	$p_{S,i,t}^{SURF}$	$\eta_{S,i,t}^{BPF}$ is assumed to be zero.	$MRS_{e,i,t}^{BPF\pi}$	$\varpi_{S,i,t}^{BPF}$
1976-1986				
0.00103944 ((1.00000))	0.00826634 (0.711098) [0.477]	– (–) [–]	-0.050212 (-3.28357) [0.001]	0.042985 (11.6348) [0.000]

	((7.95266))	((–))	((-48.3068))	((41.3542))
1987-1989				
0.00127180 ((1.00000))	-0.016578 (-2.23148) [0.026] ((-13.0352))	– (–) [–] ((–))	0.041486 (5.72508) [0.000] ((32.6201))	-0.023636 (-11.0342) [0.000] ((-18.5850))
1990-1995				
0.00165545 ((1.00000))	0.047922 (6.00100) [0.000] ((28.9481))	– (–) [–] ((–))	-0.251306 (-14.5952) [0.000] ((-151.805))	0.205039 (21.1283) [0.000] ((123.857))
1996-2001				
0.00236394 ((1.00000))	0.045383 (67.1005) [0.000] ((19.1980))	– (–) [–] ((–))	0.00651281 (0.587444) [0.557] ((2.75506))	-0.049532 (-4.62605) [0.000] ((-20.9530))
2002-2007				
0.00148370 ((1.00000))	0.022553 (70.2727) [0.000] ((15.2005))	– (–) [–] ((–))	-0.064561 (-6.56131) [0.000] ((-43.5136))	0.043492 (4.56865) [0.000] ((29.3131))
2008-2010				
-0.071433 ((1.00000))	0.000931737 (1.51144) [0.131] ((-0.013043))	– (–) [–] ((–))	-0.010189 (-1.31981) [0.187] ((0.142642))	-0.062176 (-7.53752) [0.000] ((0.870401))
2011-2016				
0.146611 ((1.00000))	-0.028823 (-45.0050) [0.000] ((-0.196598))	– (–) [–] ((–))	0.015608 (could not be estimated due to singularity) ((0.106458))	0.159826 (could not be estimated due to singularity) ((1.09014))

$p^{GURF}_{A,i,t}\left(=MC^{DFV}_{A,i,t}\right)$	$p^{SURF}_{A,i,t}$	$\eta^{BPF}_{A,i,t}$ is assumed to be zero.	$MRS^{BPF\pi}_{e,i,t}$	$\varpi^{BPF}_{A,i,t}$
1976-1986				
-0.00257499 ((1.00000))	-0.050598 (-4.59671) [0.000] ((19.6499))	− (−) [−] ((−))	-0.050212 (-3.28357) [0.001] ((19.4999))	0.098236 (22.8105) [0.000] ((-38.1499))
1987-1989				
-0.000507920 ((1.00000))	-0.060278 (-8.48329) [0.000] ((118.677))	− (−) [−] ((−))	0.041486 (5.72508) [0.000] ((-81.6789))	0.018284 (8.73989) [0.000] ((-35.9979))
1990-1995				
-0.00174601 ((1.00000))	0.103213 (12.2897) [0.000] ((-59.1137))	− (−) [−] ((−))	-0.251306 (-14.5952) [0.000] ((143.932))	0.146347 (15.6730) [0.000] ((-83.8180))
1996-2001				
0.00274600 ((1.00000))	0.063144 (91.9578) [0.000] ((22.9947))	− (−) [−] ((−))	0.00651281 (0.587444) [0.557] ((2.37174))	-0.066910 (-6.25237) [0.000] ((-24.3664))
2002-2007				
-0.00365207 ((1.00000))	0.052016 (158.732) [0.000] ((-14.2427))	− (−) [−] ((−))	-0.064561 (-6.56131) [0.000] ((17.6779))	0.00889342 (0.934883) [0.350] ((-2.43517))
2008-2010				
-0.027561 ((1.00000))	0.016107 (25.8096)	− (−)	-0.010189 (-1.31981)	-0.033478 (-4.05530)

	[0.000] ((-0.584411))	[–] ((–))	[0.187] ((0.369707))	[0.000] ((1.21470))
2011-2016				
-0.040955 ((1.00000))	-0.019989 (-30.9432) [0.000] ((0.488087))	– (–) [–] ((–))	0.015608 (could not be estimated due to singularity) ((-0.381102))	-0.036573 (could not be estimated due to singularity) ((0.893014))

Note: 1. Tables 4.9.3 shows the estimates of the GURPs on the cost frontier, which have a risk-adjustment effect, in each period.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The numbers in double parentheses represent proportions with respect to $p_{j,i,t}^{GURF}$.

5. $\eta_{j,i,t}^{BPF}$ $(j = S, A)$ are assumed to be zero because it is unrealistic that these effects are not negligible.

6. Some *t*-values and p-values could not be estimated due to singularity.

Table 4.9.4 GURPs on the Actual Cost in Each Period

$p_{SL,i,t}^{GURA}$	$p_{SL,i,t}^{SURA}$	$\eta_{SL,i,t}^{BPA}$	$MRS_{e,i,t}^{BPA\pi}$	$\varpi_{SL,i,t}^{BPA}$
1976-1986				
0.013790 (3.88643) [0.000] ((1.00000))	0.00143898 (1.09261) [0.275] ((0.104352))	-0.00109482 (-836.628) [0.000] ((-0.079394))	0.025550 (3.98283) [0.000] ((1.85281))	-0.012104 (-2.83148) [0.005] ((-0.877764))
1987-1989				
1.39631 (14.5826) [0.000] ((1.00000))	0.011564 (38.3114) [0.000] ((0.00828200))	-0.00121576 (-3416.31) [0.000] ((-0.0008707))	1.24387 (109.399) [0.000] ((0.890828))	0.142089 (1.53771) [0.124] ((0.101760))
1990-1995				
1.00458 (37.0400) [0.000] ((1.00000))	0.014017 (167.589) [0.000] ((0.013953))	-0.00102624 (-12388.3) [0.000] ((-0.00102156))	0.800773 (297.096) [0.000] ((0.797123))	0.190815 (6.87662) [0.000] ((0.189945))
1996-2001				
0.087429 (1.54260) [0.123] ((1.00000))	0.016265 (12.0632) [0.000] ((0.186034))	-0.00143105 (-842.213) [0.000] ((-0.016368))	0.068116 (1.57894) [0.114] ((0.779103))	0.00447907 (0.277400) [0.781] ((0.051231))
2002-2007				
0.173771 (3.96765) [0.000] ((1.00000))	0.022832 (148.065) [0.000] ((0.131390))	-0.00176834 (-9072.94) [0.000] ((-0.010176))	0.131201 (3.77500) [0.000] ((0.755024))	0.021506 (1.49535) [0.135] ((0.123763))
2008-2010				
2.49247 (21.4436) [0.000]	0.015140 (126.787) [0.000]	-0.00143558 (-10419.3) [0.000]	1.71952 (143.926) [0.000]	0.759246 (7.04947) [0.000]

((1.00000))	((0.00607433))	((-0.00057597))	((0.689885))	((0.304616))
2011-2016				
1.42927 (22.7123) [0.000] ((1.00000))	0.013077 (132.860) [0.000] ((0.00914956))	-0.00132329 (-10768.5) [0.000] ((-0.00092585))	1.00577 (921.732) [0.000] ((0.703696))	0.411743 (6.60457) [0.000] ((0.288080))
Period	$PIE_{i,SL,t}$		$MC^{DAV}_{SL,i,t}$	
1976-1986	0.015006 (4.22925) [0.000]		-0.0012164	
1987-1989	1.39802 (14.6005) [0.000]		-0.0017157	
1990-1995	1.00140 (36.9227) [0.000]		0.0031811	
1996-2001	0.084242 (1.48638) [0.137]		0.0031864	
2002-2007	0.169971 (3.88089) [0.000]		0.0037999	
2008-2010	2.49838 (21.4945) [0.000]		-0.0059095	
2011-2016	1.42738 (22.6824) [0.000]		0.0018831	
$p^{GURA}_{LL,i,t}$	$p^{SURA}_{LL,i,t}$	$\eta^{BPA}_{LL,i,t}$	$MRS^{BPA\pi}_{e,i,t}$	$\varpi^{BPA}_{LL,i,t}$
1976-1986				
0.023466 (4.90559)	0.00739768 (5.58680)	-0.000851424 (-836.628)	0.025550 (3.98283)	-0.00863006 (-1.66284)

[0.000] ((1.00000))	[0.000] ((0.315253))	[0.000] ((-0.036284))	[0.000] ((1.08880))	[0.096] ((-0.367771))
1987-1989				
1.74780 (27.6499) [0.000] ((1.00000))	0.016878 (55.6299) [0.000] ((0.00965689))	-0.000682782 (-3416.31) [0.000] ((-0.0003907))	1.24387 (109.399) [0.000] ((0.711679))	0.487732 (8.54011) [0.000] ((0.279055))
1990-1995				
1.05637 (33.2186) [0.000] ((1.00000))	0.015238 (181.966) [0.000] ((0.014425))	-0.000941340 (-12388.3) [0.000] ((-0.00089111))	0.800773 (297.096) [0.000] ((0.758043))	0.241299 (7.28518) [0.000] ((0.228423))
1996-2001				
0.094124 (1.60229) [0.109] ((1.00000))	0.022976 (16.9409) [0.000] ((0.244107))	-0.000760111 (-842.213) [0.000] ((-0.00807565))	0.068116 (1.57894) [0.114] ((0.723686))	0.00379156 (0.207342) [0.836] ((0.040283))
2002-2007				
0.167888 (3.88370) [0.000] ((1.00000))	0.025532 (165.256) [0.000] ((0.152077))	-0.000748007 (-9072.94) [0.000] ((-0.00445541))	0.131201 (3.77500) [0.000] ((0.781482))	0.011903 (0.950435) [0.342] ((0.070896))
2008-2010				
2.37112 (21.6213) [0.000] ((1.00000))	0.019376 (161.707) [0.000] ((0.00817157))	-0.00111382 (-10419.3) [0.000] ((-0.00046974))	1.71952 (143.926) [0.000] ((0.725193))	0.633337 (6.07177) [0.000] ((0.267105))
2011-2016				
1.33537 (26.3200) [0.000] ((1.00000))	0.012787 (129.948) [0.000] ((0.00957559))	-0.000966220 (-10768.5) [0.000] ((-0.00072356))	1.00577 (921.732) [0.000] ((0.753175))	0.317783 (6.34010) [0.000] ((0.237973))

Period	$PIE_{i,LL,t}$	$MC^{DAV}_{LL,i,t}$
1976-1986	0.017691 (3.69829) [0.000]	0.0057751
1987-1989	1.73987 (27.5244) [0.000]	0.0079299
1990-1995	1.04990 (33.0151) [0.000]	0.0064700
1996-2001	0.087199 (1.48440) [0.138]	0.0069249
2002-2007	0.162718 (3.76410) [0.000]	0.0051700
2008-2010	2.36560 (21.5710) [0.000]	0.0055141
2011-2016	1.33282 (26.2697) [0.000]	0.0025515

$p^{GURA}_{DD,i,t}$	$p^{SURA}_{DD,i,t}$	$\eta^{BPA}_{DD,i,t}$	$MRS^{BPA\pi}_{e,i,t}$	$\varpi^{BPA}_{DD,i,t}$
1976-1986				
-0.00502082 (-0.994249) [0.320] ((1.00000))	0.051693 (41.2388) [0.000] ((-10.2957))	– (–) [–] ((–))	-0.025550 (-3.98283) [0.000] ((5.08874))	-0.031164 (-6.51510) [0.000] ((6.20699))
1987-1989				
-0.088903 (-0.171087) [0.864]	0.030969 (107.013) [0.000]	– (–) [–]	-1.24387 (-109.399) [0.000]	1.12400 (2.17485) [0.030]

((1.00000))	((-0.348350))	((–))	((13.9913))	((-12.6430))
1990-1995				
-0.816947 (-15.5630) [0.000] ((1.00000))	0.027300 (339.949) [0.000] ((-0.033417))	-0.000171169 (-12388.3) [0.000] ((0.000209523))	-0.800773 (-297.096) [0.000] ((0.980202))	-0.043302 (-0.810568) [0.418] ((0.053005))
1996-2001				
-0.079087 (-1.54746) [0.122] ((1.00000))	-0.000162735 (-0.122434) [0.903] ((0.00205768))	-0.000152918 (-842.213) [0.000] ((0.00193354))	-0.068116 (-1.57894) [0.114] ((0.861281))	-0.010655 (-0.973921) [0.330] ((0.134728))
2002-2007				
-0.152038 (-3.78226) [0.000] ((1.00000))	0.00253814 (16.7639) [0.000] ((-0.016694))	-0.000225702 (-9072.94) [0.000] ((0.00148450))	-0.131201 (-3.77500) [0.000] ((0.862947))	-0.023150 (-3.10099) [0.002] ((0.152262))
2008-2010				
-2.33836 (-67.7141) [0.000] ((1.00000))	-0.000873251 (-7.39768) [0.000] ((0.000373446))	-0.000249460 (-10419.3) [0.000] ((0.000106681))	-1.71952 (-143.926) [0.000] ((0.735352))	-0.617720 (could not be estimated due to singularity) ((0.264168))
2011-2016				
-1.33419 (could not be estimated due to singularity) ((1.00000))	0.00220802 (22.7611) [0.000] ((-0.00165495))	-0.000217423 (-10768.5) [0.000] ((0.000162962))	-1.00577 (-921.732) [0.000] ((0.753840))	-0.330415 (could not be estimated due to singularity) ((0.247652))
Period	$PIE_{i,DD,t}$		$MC^{DAV}_{DD,i,t}$	
1976-1986	-0.00346650 (-0.686455) [0.492]		-0.0015543	

1987-1989	-0.094654 (-0.182154) [0.855]		0.0057511	
1990-1995	-0.819557 (-15.6127) [0.000]		0.0026097	
1996-2001	-0.074774 (-1.46308) [0.143]		-0.0043124	
2002-2007	-0.149762 (-3.72562) [0.000]		-0.0022767	
2008-2010	-2.34014 (-67.7658) [0.000]		0.0017839	
2011-2016	-1.33645 (could not be estimated due to singularity)		0.0022582	
$p^{GURA}_{TD,i,t}$	$p^{SURA}_{TD,i,t}$	$\eta^{BPA}_{TD,i,t}$	$MRS^{BPA\pi}_{e,i,t}$	$\varpi^{BPA}_{TD,i,t}$
1976-1986				
-0.010273 (-2.00329) [0.045] ((1.00000))	0.00741323 (5.67441) [0.000] ((-0.721644))	-0.000288928 (-836.628) [0.000] ((0.028126))	-0.025550 (-3.98283) [0.000] ((2.48714))	0.00815264 (1.42800) [0.153] ((-0.793622))
1987-1989				
-1.64182 (-5.38949) [0.000] ((1.00000))	-0.00740360 (-24.6269) [0.000] ((0.00450939))	-0.000706471 (-3416.31) [0.000] ((0.000430298))	-1.24387 (-109.399) [0.000] ((0.757619))	-0.389836 (-1.28755) [0.198] ((0.237442))
1990-1995				
-0.997574 (-5.23734) [0.000]	-0.00759464 (-91.3670) [0.000]	-0.00167922 (-12388.3) [0.000]	-0.800773 (-297.096) [0.000]	-0.187527 (-0.983508) [0.325]

((1.00000))	((0.00761311))	((0.00168330))	((0.802720))	((0.187983))
1996-2001				
-0.080966 (-1.40138) [0.161] ((1.00000))	-0.00870282 (-6.49799) [0.000] ((0.107487))	-0.00173463 (-842.213) [0.000] ((0.021424))	-0.068116 (-1.57894) [0.114] ((0.841293))	-0.00241239 (-0.110473) [0.912] ((0.029795))
2002-2007				
-0.154299 (-2.95708) [0.003] ((1.00000))	-0.00465849 (-30.6081) [0.000] ((0.030191))	-0.000900744 (-9072.94) [0.000] ((0.00583766))	-0.131201 (-3.77500) [0.000] ((0.850305))	-0.017539 (-0.563850) [0.573] ((0.113666))
2008-2010				
-2.46233 (-5.21172) [0.000] ((1.00000))	-0.00735321 (-61.9657) [0.000] ((0.00298628))	-0.00152157 (-10419.3) [0.000] ((0.000617939))	-1.71952 (-143.926) [0.000] ((0.698330))	-0.733936 (-1.55918) [0.119] ((0.298066))
2011-2016				
-1.35063 (-4.93275) [0.000] ((1.00000))	-0.00131488 (-13.5087) [0.000] ((0.000973528))	-0.00154861 (-10768.5) [0.000] ((0.00114659))	-1.00577 (-921.732) [0.000] ((0.744666))	-0.341998 (-1.24937) [0.212] ((0.253214))

Period	$PIE_{i,TD,t}$	$MC^{DAV}_{TD,i,t}$
1976-1986	-0.014303 (-2.78924) [0.005]	0.0040303
1987-1989	-1.64249 (-5.39168) [0.000]	0.00066843
1990-1995	-0.997211 (-5.23543) [0.000]	-0.00036298
1996-2001	-0.081947	0.00098115

	(-1.41837) [0.156]	
2002-2007	-0.159302 (-3.05296) [0.002]	0.0050031
2008-2010	-2.46862 (-5.22504) [0.000]	0.0062928
2011-2016	-1.35590 (-4.95199) [0.000]	0.0052674

$p_{S,i,t}^{GURA}$	$p_{S,i,t}^{SURA}$	$\eta_{S,i,t}^{BPA}$ is assumed to be zero.	$MRS_{e,i,t}^{BPA\pi}$	$\varpi_{S,i,t}^{BPA}$
1976-1986				
0.024087 (1.27936) [0.201] ((1.00000))	0.016257 (12.1801) [0.000] ((0.674923))	– (–) [–] ((–))	0.025550 (3.98283) [0.000] ((1.06071))	-0.017719 (-2.86279) [0.004] ((-0.735635))
1987-1989				
2.07930 (1.15194) [0.249] ((1.00000))	0.027079 (88.3806) [0.000] ((0.013023))	– (–) [–] ((–))	1.24387 (109.399) [0.000] ((0.598215))	0.808354 (71.0809) [0.000] ((0.388762))
1990-1995				
1.25447 (1.10824) [0.268] ((1.00000))	0.024855 (294.088) [0.000] ((0.019813))	– (–) [–] ((–))	0.800773 (297.096) [0.000] ((0.638336))	0.428841 (160.536) [0.000] ((0.341851))
1996-2001				
0.099548 (1.08747)	0.034046 (24.8621)	– (–)	0.068116 (1.57894)	-0.00261374 (-0.062388)

[0.277] ((1.00000))	[0.000] ((0.342006))	[–] ((–))	[0.114] ((0.684250))	[0.950] ((-0.026256))
2002-2007				
0.159647 (11.8804) [0.000] ((1.00000))	0.020652 (134.136) [0.000] ((0.129359))	– (–) [–] ((–))	0.131201 (3.77500) [0.000] ((0.821821))	0.00779404 (0.224967) [0.822] ((0.048820))
2008-2010				
2.31679 (10.7785) [0.000] ((1.00000))	0.015519 (129.922) [0.000] ((0.00669854))	– (–) [–] ((–))	1.71952 (143.926) [0.000] ((0.742197))	0.581756 (48.3358) [0.000] ((0.251104))
2011-2016				
1.61996 (15.2360) [0.000] ((1.00000))	0.011492 (116.931) [0.000] ((0.00709405))	– (–) [–] ((–))	1.00577 (921.732) [0.000] ((0.620861))	0.602697 (576.590) [0.000] ((0.372045))

Period	$PIE_{i,S,t}$	$MC_{S,i,t}^{DAV}$
1976-1986	0.022346 (1.18686) [0.235]	0.0017414
1987-1989	2.07686 (1.15058) [0.250]	0.0024480
1990-1995	1.25141 (1.10553) [0.269]	0.0030635
1996-2001	0.094304 (1.03018) [0.303]	0.0052446
2002-2007	0.157177 (11.6966) [0.000]	0.0024703

2008-2010	2.41955 (11.2565) [0.000]		-0.10276	
2011-2016	1.41129 (13.2735) [0.000]		0.20867	
$p^{GURA}_{A,i,t}$	$p^{SURA}_{A,i,t}$	$\eta^{BPA}_{A,i,t}$ is assumed to be zero.	$MRS^{BPA\pi}_{e,i,t}$	$\varpi^{BPA}_{A,i,t}$
1976-1986				
0.011205 (66.9558) [0.000] ((1.00000))	-0.043032 (-34.0482) [0.000] ((-3.84046))	– (–) [–] ((–))	0.025550 (3.98283) [0.000] ((2.28022))	0.028687 (4.63108) [0.000] ((2.56024))
1987-1989				
1.63251 (169.593) [0.000] ((1.00000))	-0.018523 (-63.2105) [0.000] ((-0.011347))	– (–) [–] ((–))	1.24387 (109.399) [0.000] ((0.761939))	0.407159 (35.8035) [0.000] ((0.249407))
1990-1995				
1.05589 (171.250) [0.000] ((1.00000))	0.078954 (888.296) [0.000] ((0.074775))	– (–) [–] ((–))	0.800773 (297.096) [0.000] ((0.758390))	0.176158 (65.9736) [0.000] ((0.166834))
1996-2001				
0.090197 (183.829) [0.000] ((1.00000))	0.051634 (37.1391) [0.000] ((0.572454))	– (–) [–] ((–))	0.068116 (1.57894) [0.114] ((0.755189))	-0.029553 (-0.705714) [0.480] ((-0.327644))
2002-2007				
0.167448 (159.958)	0.050074 (318.531)	– (–)	0.131201 (3.77500)	-0.013827 (-0.399135)

[0.000] ((1.00000))	[0.000] ((0.299043))	[–] ((–))	[0.000] ((0.783533))	[0.690] ((-0.082576))
2008-2010				
2.36645 (137.878) [0.000] ((1.00000))	0.030874 (255.320) [0.000] ((0.013047))	– (–) [–] ((–))	1.71952 (143.926) [0.000] ((0.726623))	0.616058 (51.1812) [0.000] ((0.260330))
2011-2016				
1.36634 (139.536) [0.000] ((1.00000))	0.020676 (208.565) [0.000] ((0.015132))	– (–) [–] ((–))	1.00577 (921.732) [0.000] ((0.736107))	0.339891 (325.282) [0.000] ((0.248761))

Period	$PIE_{i,A,t}$	$MC_{A,i,t}^{DAV}$
1976-1986	0.017757 (106.111) [0.000]	-0.0065525
1987-1989	1.63318 (169.662) [0.000]	-0.00067240
1990-1995	1.06364 (172.508) [0.000]	-0.0077589
1996-2001	0.081580 (166.265) [0.000]	0.0086176
2002-2007	0.156487 (149.488) [0.000]	0.010961
2008-2010	2.38301 (138.843) [0.000]	-0.016563
2011-2016	1.40660 (143.648)	-0.040260

	[0.000]	

Note: 1. Tables 4.9.4 shows the estimates of the GURPs on the actual cost, which have a risk-adjustment effect, in each period.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The numbers in double parentheses represent proportions with respect to $p_{j,i,t}^{GURA}$.

5. $\eta_{j,i,t}^{BPA}$ $(j = S, A)$ are assumed to be zero because it is unrealistic that these effects are not negligible.

6. Some *t*-values and p-values could not be estimated due to singularity.

Table 4.10.1 EGLIs on the Cost Frontier and the Actual Cost for the Entire Period

	Short-Term Loans (*j=SL*)	Long-Term Loans (*j=LL*)	Time Deposits (*j=TD*)
$EGLI^{F}_{j,i,t}$	0.761170 (1.84200) [0.065] ((1.00000))	0.623621 (2.11496) [0.034] ((1.00000))	0.948449 (20.5203) [0.000] ((1.00000))
$-\eta^{BPF}_{j,i,t} \big/ p^{SURF}_{j,i,t}$	0.393950 ((0.517558))	0.128210 ((0.205590))	0.184343 ((0.194363))
$-MRS^{BPF\pi}_{e,i,t} \big/ p^{SURF}_{j,i,t}$	21.6608 ((28.4572))	9.77417 ((15.6733))	-11.3662 ((-11.9840))
$-\varpi^{BPF}_{j,i,t} \big/ p^{SURF}_{j,i,t}$	-21.2936 ((-27.9748))	-9.27875 ((-14.8788))	12.1303 ((12.7896))
$EGLI^{A}_{j,i,t}$	0.938120 (1569.56) [0.000] ((1.00000))	0.689900 (291.499) [0.000] ((1.00000))	0.871335 (1199.49) [0.000] ((1.00000))
$PIE_{j,i,t} \big/ p^{SURA}_{j,i,t}$	13.7690 ((14.6772))	11.4438 ((16.5876))	–
$-\eta^{BPA}_{j,i,t} \big/ p^{SURA}_{j,i,t}$	0.087429 ((0.0931960))	0.049655 ((0.0719742))	–
$-MRS^{BPA\pi}_{e,i,t} \big/ p^{SURA}_{j,i,t}$	-32.6587 ((-34.8129))	-25.7177 ((-37.2774))	–
$-\varpi^{BPA}_{j,i,t} \big/ p^{SURA}_{j,i,t}$	19.7404 ((21.0425))	14.9141 ((21.6178))	–
$\dfrac{PIE_{j,i,t}}{p_{G,t} \cdot r^{FA}_{i,t} \big/ \left(1 + r^{FA}_{i,t}\right)}$	–	–	-8.17623 ((-9.38357))
$\dfrac{-\eta^{BPA}_{j,i,t}}{p_{G,t} \cdot r^{FA}_{i,t} \big/ \left(1 + r^{FA}_{i,t}\right)}$	–	–	0.047159 ((0.0541227))
$\dfrac{-MRS^{BPA\pi}_{e,i,t}}{p_{G,t} \cdot r^{FA}_{i,t} \big/ \left(1 + r^{FA}_{i,t}\right)}$	–	–	19.7545 ((22.6715))

$\dfrac{-\varpi_{j,i,t}^{BPA}}{p_{G,t} \cdot r_{i,t}^{FA} \big/ \left(1 + r_{i,t}^{FA}\right)}$	–	–	-11.9690 ((-13.7364))
$-h_{j,i,t}^{R} \big/ r_{i,t}^{FA}$	–	–	1.21482 ((1.39421))

Note: 1. Table 4.10.1 shows the estimates of the EGLIs on the cost frontier and the actual cost for the entire period.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The numbers in double parentheses represent proportions with respect to $EGLI_{j,i,t}^{F}$ or $EGLI_{j,i,t}^{A}$.

Table 4.10.2 EGLIs of the Long-Term Loans on the Actual Cost in Each Period

Period	$EGLI^{A}_{LL,i,t}$	$p^{SURA}_{LL,i,t}$	$MC^{DAV}_{LL,i,t}$
1976-2016	0.689900 (291.499) [0.000] ((1.00000))	0.018329 (131.025) [0.000]	0.0056840
1976-1986	0.219335 (1.56966) [0.116] ((1.00000))	0.00739768 (5.58680) [0.000]	0.0057751
1987-1989	0.530174 (62.7755) [0.000] ((1.00000))	0.016878 (55.6299) [0.000]	0.0079299
1990-1995	0.575398 (246.590) [0.000] ((1.00000))	0.015238 (181.966) [0.000]	0.0064700
1996-2001	0.69861 (39.2675) [0.000] ((1.00000))	0.022976 (16.9409) [0.000]	0.0069249
2002-2007	0.797507 (650.850) [0.000] ((1.00000))	0.025532 (165.256) [0.000]	0.0051700
2008-2010	0.715411 (406.507) [0.000] ((1.00000))	0.019376 (161.707) [0.000]	0.0055141
2011-2016	0.800463 (521.297) [0.000] ((1.00000))	0.012787 (129.948) [0.000]	0.0025515

Period	$PIE_{LL,i,t} / p_{LL,i,t}^{SURA}$	$-\eta_{LL,i,t}^{BPA} / p_{LL,i,t}^{SURA}$	$-MRS_{e,i,t}^{BPA\pi} / p_{LL,i,t}^{SURA}$	$-\varpi_{LL,i,t}^{BPA} / p_{LL,i,t}^{SURA}$
1976-2016	11.4438 ((16.5876))	0.049655 ((0.0719742))	-25.7177 ((-37.2774))	14.9141 ((21.6178))
1976-1986	2.39139 ((10.9029))	0.115093 ((0.524736))	-3.45374 ((-15.7464))	1.16659 ((5.31876))
1987-1989	103.083 ((194.432))	0.040453 ((0.0763014))	-73.6965 ((-139.004))	-28.8970 ((-54.5047))
1990-1995	68.9014 ((119.746))	0.061777 ((0.107364))	-52.5521 ((-91.3317))	-15.8357 ((-27.5213))
1996-2001	3.79518 ((5.43247))	0.033082 ((0.0473540))	-2.96463 ((-4.24361))	-0.165021 ((-0.236213))
2002-2007	6.3731 ((7.99128))	0.029297 ((0.0367357))	-5.13873 ((-6.44349))	-0.466188 ((-0.584557))
2008-2010	122.091 ((170.659))	0.057485 ((0.0803524))	-88.7459 ((-124.049))	-32.6871 ((-45.6900))
2011-2016	104.233 ((130.216))	0.075563 ((0.0943991))	-78.6557 ((-98.2628))	-24.8521 ((-31.0472))

Note: 1. Table 4.10.2 shows the estimates of the EGLIs of the long-term loans on the actual cost in each period.

2. The numbers in parentheses represent estimated *t*-values.

3. The numbers in brackets represent estimated p-values.

4. The numbers in double parentheses represent proportions with respect to $EGLI_{LL,i,t}^{A}$.

Table 4.11.1 Tests of the Efficient Structure Hypothesis

Financial Good	$\partial q_{j,i,t} / \partial EF_{i,t-1}^{D}$		
	Estimate	*t*-statistic	*p*-value
Short-Term Loans (j=SL)	-4.77017	-0.568399	0.570
Long-Term Loans (j=LL)	-0.320886	-1.82756	0.068
Securities (j=S)	1.22273	1.21341	0.225
Cash (j=C)	0.304329	0.822100	0.411
Amount Due from Banks and Call Loans (j=CL)	2.40958	0.493530	0.622
Other Financial Assets (j=A)	0.738585	2.94020	0.003
Total Financial Assets	-0.415839	-0.040699	0.968

Note: Table 4.11.1 shows the estimates of Eq. (4.11.1) over the entire period.

Table 4.11.2 Tests of the Quiet-Life Hypothesis

Period	$\partial EF_{i,t}^{D} / \partial HI_{L,t-1}$		
	Estimate	*t*-statistic	*p*-value
1976-2016	-0.078631	-2.25797	0.024
1976-1986	-0.178414	-1.72318	0.085
1987-1989	-0.064770	-2.26680	0.023
1990-1995	-0.059613	-2.33101	0.020
1996-2001	-0.054850	-2.37207	0.018
2002-2007	-0.091973	-2.03499	0.042
2008-2010	-0.073649	-2.44896	0.014
2011-2016	-0.135264	-1.77840	0.075

Note: Table 4.11.2 shows the estimates of Eq. (4.11.3) in each period.

<u>Table 4.12.1 Quiet-Life Hypothesis and the EGLI on the Cost Frontier</u>

Homma (2018, Propositions 13 and 14, pp. 81-82)	Estimate
$p_{LL,i,t}^{SURF}$	0.00702861
$MC_{LL,i,t}^{DFV}\left(=p_{LL,i,t}^{GURF}\right)$	0.00264542
$MC_{LL,i,t}^{DAV}$	0.0056840
$\frac{\partial p_{LL,i,t}^{GURF}}{\partial HI_{L,t-1}}$	0.00105096
$MH_{LL,i,t}$ (Eq. (4.12.1))	0.00137672
$\frac{MC_{LL,i,t}^{DFV}}{p_{LL,i,t}^{SURF}}\cdot\frac{\partial p_{LL,i,t}^{SURF}}{\partial HI_{L,t-1}}$	8.74960
(A3): $p_{LL,i,t}^{SURF}, MC_{LL,i,t}^{DFV}, MC_{LL,i,t}^{DAV} > 0$ (A4): $\frac{\partial p_{LL,i,t}^{GURF}}{\partial HI_{L,t-1}} < MH_{LL,i,t} < \frac{MC_{LL,i,t}^{DFV}}{p_{LL,i,t}^{SURF}}\cdot\frac{\partial p_{LL,i,t}^{SURF}}{\partial HI_{L,t-1}}$	

Note: Table 4.12.1 shows the relation between the quiet-life hypothesis and the EGLI on the cost frontier.

<u>Table 4.13.1 Intertemporal Regular Linkage of Single-Period Dynamic Cost Efficiencies</u>

T (t=1977)	$\partial EF^{D}_{i,t-1+2T} \big/ \partial EF^{D}_{i,t-1}$	(A0) $\partial EF^{D}_{i,t-2+2T} \big/ \partial EF^{D}_{i,t-3+2T}$
T=1	-4.29201 $\times 10^{-8}$	–
T=2	3.20682 $\times 10^{-15}$	1.64909 $\times 10^{-7}$
T=3	-2.20974 $\times 10^{-22}$	8.04109 $\times 10^{-8}$
T=4	1.50636 $\times 10^{-29}$	9.35874 $\times 10^{-8}$
T=5	-5.04673 $\times 10^{-37}$	3.90337 $\times 10^{-8}$
T=6	1.87914 $\times 10^{-44}$	1.07441 $\times 10^{-7}$
T=7	-1.06036 $\times 10^{-51}$	1.48935 $\times 10^{-7}$
T=8	5.91678 $\times 10^{-59}$	1.00870 $\times 10^{-7}$
T=9	-3.32560 $\times 10^{-66}$	1.20761 $\times 10^{-7}$
T=10	2.85999 $\times 10^{-73}$	1.54222 $\times 10^{-7}$
T=11	-1.19826 $\times 10^{-80}$	1.12841 $\times 10^{-7}$
T=12	1.20628 $\times 10^{-87}$	5.30645 $\times 10^{-7}$
T=13	-5.67902 $\times 10^{-95}$	2.33954 $\times 10^{-7}$
T=14	0.00000	5.68929 $\times 10^{-8}$
T=15	-0.00000	9.02005 $\times 10^{-8}$
T=16	0.00000	5.93909 $\times 10^{-8}$
T=17	-0.00000	2.35155 $\times 10^{-7}$
T=18	0.00000	3.39908 $\times 10^{-7}$
T=19	-0.00000	1.75244 $\times 10^{-7}$
T=20	0.00000	9.01049 $\times 10^{-8}$
k (t=1977)	(B1)	(B2)

	$q_{LL,i,t-2+2k}$	$q^{M}_{LL,i,t-2+2k}$	$\frac{\partial q_{LL,i,t-2+2k}}{\partial EF^{D}_{i,t-3+2k}}$	$\frac{\partial EF^{D}_{i,t-1+2k}}{\partial HI_{L,t-2+2k}}$
k =1	150449.16915	406921.49106	-0.753842	-0.173807
k =2	187555.71428	472013.34710	-0.891348	-0.299322
k =3	215737.27698	540769.81055	-0.970881	-0.274311
k =4	230276.71632	587019.92278	-1.09804	-0.240719
k =5	297254.73748	734452.83914	-1.68997	-0.087686
k =6	429847.01700	979630.40895	-3.19773	-0.064846
k =7	603707.43075	1260743.23938	-4.95467	-0.076624
k =8	720080.24562	1389264.31390	-5.01264	-0.065206
k =9	808181.73827	1497951.51814	-7.03849	-0.055520
k =10	867891.80650	1499750.77556	-11.3254	-0.053990
k =11	881363.02666	1478001.01176	-10.5415	-0.045175
k =12	937761.63571	1461628.89460	-18.5025	-0.056370
k =13	853747.96303	1287292.32902	-4.49850	-0.087903
k =14	800818.36460	1088023.19883	-5.24855	-0.092258
k =15	873859.01041	1152981.90620	-4.51795	-0.105097
k =16	1035012.48199	1339923.13449	-4.53428	-0.074841
k =17	1257422.89555	1544309.85778	-14.8893	-0.077919
k =18	1423713.17088	1692288.72432	-7.18147	-0.100336
k =19	1747227.73910	2049089.20519	-4.58729	-0.151774
k =20	1934024.56863	2240826.90196	-3.09432	-0.206258

Period	$EF^{D}_{i,t}$	Period	$EF^{D}_{i,t}$

1977	0.29388	1997	0.30486
1978	0.29389	1998	0.30589
1979	0.29348	1999	0.30982
1980	0.29474	2000	0.31393
1981	0.29612	2001	0.31529
1982	0.29696	2002	0.31566
1983	0.29910	2003	0.32008
1984	0.29973	2004	0.32236
1985	0.30232	2005	0.32463
1986	0.30389	2006	0.32369
1987	0.30395	2007	0.32253
1988	0.30446	2008	0.32480
1989	0.30511	2009	0.32456
1990	0.30565	2010	0.32784
1991	0.30476	2011	0.32779
1992	0.30587	2012	0.32917
1993	0.30721	2013	0.32846
1994	0.30612	2014	0.33030
1995	0.30538	2015	0.33503
1996	0.30355	2016	0.33663

Note: 1. Table 4.13.1 shows the intertemporal regular linkage of single-period dynamic cost efficiencies.

2. The details of $q^{M}_{LL,i,t-2+2k}$ are as follows:

$$q^{M}_{LL,i,t-2+2k} = \frac{\sum_i \left(q_{LL,i,t-2+2k}\right)^2}{\sum_k q_{LL,k,t-2+2k}} \cdot \left(1 + \sum_{k \neq i} \frac{dq_{LL,k,t-2+2k}}{dq_{LL,i,t-2+2k}}\right) - \sum_{h \neq i} \left(q_{LL,h,t-2+2k} \cdot \frac{dq_{LL,h,t-2+2k}}{dq_{LL,i,t-2+2k}} \right)$$

$$= \frac{\sum_i \left(q_{LL,i,t-2+2k}\right)^2}{\sum_k q_{LL,k,t-2+2k}} \cdot \left(1 + \sum_{s} \rho_{LL,s} \cdot D^{Y}_{s}\right) - \frac{\sum_s \rho_{LL,s} \cdot D^{Y}_{s}}{N-1} \cdot \sum_{h \neq i} q_{LL,h,t-2+2k} \, ,$$

where $\rho_{LL,s}$ is the conjectural derivative of long-term loans in period *s*, and N is the number of banks.

Table 4.13.2 Intertemporal Regular Linkage of Single-Period Optimal Financial Goods

T (t=1977)	$\frac{\partial q_{LL,i,t+2T}}{\partial q_{LL,i,t}}$	(E0) $\frac{\partial q_{LL,i,t-1+2T}}{\partial q_{LL,i,t-2+2T}}$
T=1	-5.07491×10^{-8}	1.34829×10^{-7}
T=2	4.13010×10^{-15}	9.77434×10^{-8}
T=3	-3.21869×10^{-22}	8.81016×10^{-8}
T=4	3.37696×10^{-29}	8.82824×10^{-8}
T=5	-2.14078×10^{-36}	1.36267×10^{-7}
T=6	1.23508×10^{-43}	1.72106×10^{-7}
T=7	-7.05083×10^{-51}	1.02443×10^{-7}
T=8	5.52439×10^{-58}	1.50230×10^{-7}
T=9	-4.99623×10^{-65}	1.76289×10^{-7}
T=10	3.99932×10^{-72}	1.86321×10^{-7}
T=11	-2.94104×10^{-79}	4.78877×10^{-7}
T=12	7.19837×10^{-87}	1.42015×10^{-7}
T=13	-3.95396×10^{-94}	7.21725×10^{-8}
T=14	0.00000	7.95955×10^{-8}
T=15	-0.00000	6.81849×10^{-8}
T=16	0.00000	1.42289×10^{-7}
T=17	-0.00000	3.00527×10^{-7}
T=18	0.00000	1.66600×10^{-7}
T=19	-0.00000	8.12967×10^{-8}
T=20	–	6.52357×10^{-8}
k (t=1977)	(B1)	(D2)

	$q_{LL,i,t-2+2k}$	$q^{M}_{LL,i,t-2+2k}$	$\frac{\partial q_{LL,i,t+2k}}{\partial EF^{D}_{i,t-1+2k}}$	$\frac{\partial EF^{D}_{i,t-1+2k}}{\partial HI_{L,t-2+2k}}$
k =1	150449.16915	406921.49106	-0.891348	-0.173807
k =2	187555.71428	472013.34710	-0.970881	-0.299322
k =3	215737.27698	540769.81055	-1.09804	-0.274311
k =4	230276.71632	587019.92278	-1.68997	-0.240719
k =5	297254.73748	734452.83914	-3.19773	-0.087686
k =6	429847.01700	979630.40895	-4.95467	-0.064846
k =7	603707.43075	1260743.23938	-5.01264	-0.076624
k =8	720080.24562	1389264.31390	-7.03849	-0.065206
k =9	808181.73827	1497951.51814	-11.3254	-0.055520
k =10	867891.80650	1499750.77556	-10.5415	-0.053990
k =11	881363.02666	1478001.01176	-18.5025	-0.045175
k =12	937761.63571	1461628.89460	-4.49850	-0.056370
k =13	853747.96303	1287292.32902	-5.24855	-0.087903
k =14	800818.36460	1088023.19883	-4.51795	-0.092258
k =15	873859.01041	1152981.90620	-4.53428	-0.105097
k =16	1035012.48199	1339923.13449	-14.8893	-0.074841
k =17	1257422.89555	1544309.85778	-7.18147	-0.077919
k =18	1423713.17088	1692288.72432	-4.58729	-0.100336
k =19	1747227.73910	2049089.20519	-3.09432	-0.151774
k =20	1934024.56863	2240826.90196	–	-0.206258

Period	$q_{LL,i,t}$	Period	$q_{LL,i,t}$

1977	150449.1692	1997	881363.0267
1978	183067.8722	1998	946679.9006
1979	187555.7143	1999	937761.6357
1980	184941.2798	2000	948275.6975
1981	215737.2770	2001	853747.9630
1982	211075.9673	2002	826697.3125
1983	230276.7163	2003	800818.3646
1984	274638.8021	2004	832042.5517
1985	297254.7375	2005	873859.0104
1986	359064.4422	2006	932373.2201
1987	429847.0170	2007	1035012.482
1988	510170.6712	2008	1121730.667
1989	603707.4308	2009	1257422.896
1990	661648.3906	2010	1302203.537
1991	720080.2456	2011	1423713.171
1992	771472.3449	2012	1567524.288
1993	808181.7383	2013	1747227.739
1994	821645.3461	2014	1829578.720
1995	867891.8065	2015	1934024.569
1996	852470.3526	2016	2039485.737

Note: 1. Table 4.13.2 shows the intertemporal regular linkage of single-period optimal financial goods.

2. For details of $q^{M}_{LL,i,t-2+2k}$, see the second note in Table 4.13.1.

Table 4.13.3 Intertemporal Regular Linkage of Single-Period Herfindahl Indices

T (t=1977)	$\frac{\partial HI_{L,t+2T}}{\partial HI_{L,t}}$	(H0) $\frac{\partial HI_{L,t-1+2T}}{\partial HI_{L,t-2+2T}}$
T=1	-4.33853×10^{-8}	1.16545×10^{-7}
T=2	3.26215×10^{-15}	9.83116×10^{-8}
T=3	-2.53410×10^{-22}	9.37908×10^{-8}
T=4	2.33070×10^{-29}	8.03138×10^{-8}
T=5	-1.17350×10^{-36}	1.29634×10^{-7}
T=6	5.60397×10^{-44}	1.58211×10^{-7}
T=7	-3.67455×10^{-51}	1.20488×10^{-7}
T=8	2.42564×10^{-58}	1.35054×10^{-7}
T=9	-2.14515×10^{-65}	1.67684×10^{-7}
T=10	1.07413×10^{-72}	1.18054×10^{-7}
T=11	-8.66573×10^{-80}	4.84653×10^{-7}
T=12	2.61623×10^{-87}	1.57834×10^{-7}
T=13	-1.44831×10^{-94}	6.18101×10^{-8}
T=14	0.00000	8.92725×10^{-8}
T=15	-0.00000	6.48324×10^{-8}
T=16	0.00000	2.54434×10^{-7}
T=17	-0.00000	3.12850×10^{-7}
T=18	0.00000	1.52739×10^{-7}
T=19	-0.00000	7.63002×10^{-8}
T=20	–	5.68909×10^{-8}
k (t=1977)	(F1)	(D2)

	$q_{LL,i,t+2k}$	$q^{M}_{LL,i,t+2k}$	$\frac{\partial q_{LL,i,t+2k}}{\partial EF^{D}_{i,t-1+2k}}$	$\frac{\partial EF^{D}_{i,t-1+2k}}{\partial HI_{L,t-2+2k}}$
k =1	187555.71428	472013.34710	-0.891348	-0.173807
k =2	215737.27698	540769.81055	-0.970881	-0.299322
k =3	230276.71632	587019.92278	-1.09804	-0.274311
k =4	297254.73748	734452.83914	-1.68997	-0.240719
k =5	429847.01700	979630.40895	-3.19773	-0.087686
k =6	603707.43075	1260743.23938	-4.95467	-0.064846
k =7	720080.24562	1389264.31390	-5.01264	-0.076624
k =8	808181.73827	1497951.51814	-7.03849	-0.065206
k =9	867891.80650	1499750.77556	-11.3254	-0.055520
k =10	881363.02666	1478001.01176	-10.5415	-0.053990
k =11	937761.63571	1461628.89460	-18.5025	-0.045175
k =12	853747.96303	1287292.32902	-4.49850	-0.056370
k =13	800818.36460	1088023.19883	-5.24855	-0.087903
k =14	873859.01041	1152981.90620	-4.51795	-0.092258
k =15	1035012.48199	1339923.13449	-4.53428	-0.105097
k =16	1257422.89555	1544309.85778	-14.8893	-0.074841
k =17	1423713.17088	1692288.72432	-7.18147	-0.077919
k =18	1747227.73910	2049089.20519	-4.58729	-0.100336
k =19	1934024.56863	2240826.90196	-3.09432	-0.151774
k =20	–	–	–	-0.206258

Period	$HI_{L,t}$	Period	$HI_{L,t}$

1977	0.51571	1997	0.53127
1978	0.51418	1998	0.53261
1979	0.51260	1999	0.54260
1980	0.51353	2000	0.54874
1981	0.51421	2001	0.55609
1982	0.51392	2002	0.55803
1983	0.51756	2003	0.57961
1984	0.52566	2004	0.59632
1985	0.52448	2005	0.57593
1986	0.5295	2006	0.58027
1987	0.52875	2007	0.57267
1988	0.53034	2008	0.58143
1989	0.53135	2009	0.58455
1990	0.52581	2010	0.59294
1991	0.52731	2011	0.58510
1992	0.53073	2012	0.58307
1993	0.52567	2013	0.58682
1994	0.51994	2014	0.58614
1995	0.52349	2015	0.59562
1996	0.52190	2016	0.57911

Note: 1. Table 4.13.3 shows the intertemporal regular linkage of single-period Herfindahl indices.

2. $q^{M}_{LL,i,t+2k}$ is similar to $q^{M}_{LL,i,t-2+2k}$. For details of $q^{M}_{LL,i,t-2+2k}$, see the second note in Table 4.13.1.

Table 4.13.4 Intertemporal Regular Linkage of Single-Period EGLIs on the Cost Frontier

T	$\frac{\partial EGLI^F_{LL,i,t+2T}}{\partial EGLI^F_{LL,i,t}}$	$\frac{\partial EGLI^F_{LL,i,t-1+2T}}{\partial EGLI^F_{LL,i,t-2+2T}}$
T=1 (t=1977)	-2.81389×10^{-6}	–
T=2	2.82182×10^{-14}	1.75233×10^{-8}
T=1 (t=1989)	-3.67026×10^{-8}	3.65141×10^{-7}
T=2	6.33858×10^{-13}	2.22625×10^{-6}
T=3	-3.60594×10^{-22}	2.59835×10^{-9}
T=4	2.37083×10^{-29}	6.18718×10^{-8}
T=5	-5.68077×10^{-36}	5.60645×10^{-8}
T=6	4.15950×10^{-43}	6.64354×10^{-8}
T=1 (t=2005)	-6.86082×10^{-8}	1.17794×10^{-7}
T=2	1.42263×10^{-14}	6.69719×10^{-8}

T	(SA1)			
	$\frac{\partial EGLI^F_{LL,i,t}}{\partial EF^D_{i,t-1}}$	$\frac{\partial EGLI^F_{LL,i,t+2T}}{\partial EF^D_{i,t-1+2T}}$	$\frac{\partial EGLI^F_{LL,i,t-2+2T}}{\partial EF^D_{i,t-3+2T}}$	$\frac{\partial EGLI^F_{LL,i,t-1+2T}}{\partial EF^D_{i,t-2+2T}}$
t=1977	-0.430504	–	–	–
T=1	–	-28.2243	-0.430504	-0.827618
T=2	–	-3.78819	-28.2243	-2.99914
t=1989	-0.252031	–	–	–
T=1	–	-0.163929	-0.252031	-0.617899
T=2	–	-50.7365	-0.163929	-3.61799
T=3	–	-0.513526	-50.7365	-1.09167

T=4	–	-0.392600	-0.513526	-0.206019
T=5	–	-2.24528	-0.392600	-0.195061
T=6	–	-1.63308	-2.24528	-0.281103
t=2005	-0.113262	–	–	–
T=1	–	-0.134693	-0.113262	-0.147910
T=2	–	-0.771044	-0.134693	-0.151886

Period	$EGLI^{F}_{LL,i,t}$	Period	$EGLI^{F}_{LL,i,t}$
1977	0.811265	1997	0.916377
1978	0.832765	1998	0.943484
1979	-0.64221	1999	–
1980	0.338125	2000	0.930527
1981	0.394288	2001	0.765832
1982	–	2002	0.699734
1983	0.284905	2003	–
1984	–	2004	–
1985	–	2005	0.969358
1986	–	2006	0.972632
1987	–	2007	0.970397
1988	–	2008	–
1989	0.912851	2009	0.842594
1990	0.821292	2010	0.859408
1991	0.947061	2011	–
1992	0.783136	2012	–

1993	0.950286	2013	–
1994	0.958187	2014	–
1995	0.908508	2015	–
1996	0.957912	2016	0.942315

Note: 1. Table 4.13.4 shows the intertemporal regular linkage of single-period EGLIs on the cost frontier.

2. The EGLIs on the cost frontier in some periods are not shown because the SURPs on the cost frontier are negative.

Table 6.1 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.6a) for *j*=*SL*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\beta^R_{SL,1}$ (1976-1986)	-0.00223352	-4.41397	0.000
$\beta^R_{SL,2}$ (1987-1989)	-0.00246922	-5.00475	0.000
$\beta^R_{SL,3}$ (1990-1995)	-0.00187898	-3.84610	0.000
$\beta^R_{SL,4}$ (1996-2001)	-0.00235895	-4.68181	0.000
$\beta^R_{SL,5}$ (2002-2007)	-0.00232455	-4.39989	0.000
$\beta^R_{SL,6}$ (2008-2010)	-0.00196843	-3.65124	0.000
$\beta^R_{SL,7}$ (2011-2016)	-0.00203843	-3.75347	0.000
$\gamma^R_{SL,E}$	-0.00165671	-0.787563	0.431
$\gamma^R_{SL,H}$	-0.000379026	-0.315101	0.753
$\gamma^R_{SL,1}$	0.400055	90.9401	0.000
$\gamma^R_{SL,2}$	-0.108788	-38.3281	0.000
$\gamma^R_{SL,3}$	0.817965	47.9001	0.000
$\gamma^R_{SL,4}$	0.340257	7.09057	0.000
$\gamma^R_{SL,5}$	0.00221822	4.90803	0.000
$\gamma^R_{SL,6}$	-0.00623863	-3.40569	0.001
$\gamma^R_{SL,7}$	-0.013473	-2.30083	0.021

$\gamma^R_{SL,8}$	0.000307511	0.044394	0.965
$\gamma^R_{SL,9}$	0.000780025	0.696137	0.486
$\gamma^R_{SL,10}$	-0.00389243	-2.12092	0.034
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
R-squared	0.962141		
Number of Observations	4678		

Note: 1. Tables 6.1 to 6.3 show the results for the simultaneous estimation of the modified equations that add the Herfindahl index of each financial good in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6a) and (6.2.3.2.3); pp. 86-87). Table 6.1 shows the estimates of the parameters in the modified equation for Homma (2012, Eq. (6.2.3.1.6a) for *j=SL;* p.86).

2. This modified equation is as follows:

$$H^R_{SL,i,t} = \sum_i \alpha^R_{SL,i} \cdot D^B_i + \left(\sum_{s=1}^{7} \beta^R_{SL,s} \cdot D^Y_s\right) \cdot \ln Q_{SL,t-1} + \gamma^R_{SL,E} \cdot EF^S_{i,t-1} + \gamma^R_{SL,H} \cdot HI_{SL,t-1}$$

$$+\sum_{k=1}^{10} \gamma^R_{SL,k} \cdot z^{RQ}_{L,k,i,t-1} + \zeta^R_{SL,i,t},$$

where $H^R_{SL,i,t}$ is the actual collected interest rate for short-term loans in the current period, D^B_i is the individual bank dummy variable, D^Y_s is the period dummy variable for cases where the period covered by the analysis is split into several sub-periods (i.e., the dummy variable equals 1 in period *s* and 0 in the other periods), $\sum_{s=1}^{7} \beta^R_{SL,s} \cdot D^Y_s$ is β^R_{SL} in Eq. (3.1.3.2.12) (i.e., $\beta^R_{SL} = \sum_{s=1}^{7} \beta^R_{SL,s} \cdot D^Y_s$), $Q_{SL,t-1}$ is the total short-term loans in the short-term loans market in the previous period, $EF^S_{i,t-1}$ is the static cost unneutral efficiency in the previous period, $HI_{SL,t-1}$ is the Herfindahl index of short-term loans in the previous period, $z^{RQ}_{L,k,i,t-1}$ (k=1, … ,10) are the short-term prime rate in the previous period (k=1), the capital ratio of borrower firms in the previous period (k=2), the ratio of operating profit to total capital of borrower firms in the previous period (k=3), the loan loss provision rate in the previous period (k=4), the logarithm of the loan per case in the previous period (k=5), the proportion of loans for small and medium firms in the previous period (k=6), the Herfindahl index of loan proportions classified by industry in the previous period (k=7), the proportion of loans for real estate business in the previous period (k=8), the proportion of loans secured by real estate in the previous period (k=9), and the proportion of loans without collateral and without warranty in the previous period (k=10), and $\zeta^{R}_{SL,i,t}$ is the ordinary error term in the current period.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.2 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.6a) for j=LL; p.86)

Parameter	Estimate	t-statistic	p-value
$\beta^R_{LL,1}$ (1976-1986)	-0.00227444	-2.22793	0.026
$\beta^R_{LL,2}$ (1987-1989)	-0.00201266	-2.01302	0.044
$\beta^R_{LL,3}$ (1990-1995)	-0.00215324	-2.24012	0.025
$\beta^R_{LL,4}$ (1996-2001)	-0.00244962	-2.51306	0.012
$\beta^R_{LL,5}$ (2002-2007)	-0.00234401	-2.32893	0.020
$\beta^R_{LL,6}$ (2008-2010)	-0.00223024	-2.22365	0.026
$\beta^R_{LL,7}$ (2011-2016)	-0.00210508	-2.10886	0.035
$\gamma^R_{LL,E}$	-0.00341942	-0.984647	0.325
$\gamma^R_{LL,H}$	0.000253870	0.127739	0.898
$\gamma^R_{LL,1}$	0.466753	37.1860	0.000
$\gamma^R_{LL,2}$	-0.067137	-12.3797	0.000
$\gamma^R_{LL,3}$	0.304488	12.7018	0.000
$\gamma^R_{LL,4}$	0.092218	2.22822	0.026
$\gamma^R_{LL,5}$	0.00171424	2.13292	0.033
$\gamma^R_{LL,6}$	0.00433167	1.21338	0.225
$\gamma^R_{LL,7}$	-0.00621083	-0.738400	0.460

$\gamma^{R}_{LL,8}$	-0.014825	-1.25416	0.210
$\gamma^{R}_{LL,9}$	0.00552369	1.76969	0.077
$\gamma^{R}_{LL,10}$	-0.000732469	-0.239862	0.810
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
R-squared	0.954794		
Number of Observations	4678		

Note: 1. Tables 6.1 to 6.3 show the results for the simultaneous estimation of the modified equations that add the Herfindahl index of each financial good in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6a) and (6.2.3.2.3); pp. 86-87). Table 6.2 shows the estimates of the parameters in the modified equation for Homma (2012, Eq. (6.2.3.1.6a) for *j=LL*; p.86).

2. This modified equation is as follows:

$$H^{R}_{LL,i,t} = \sum_{i} \alpha^{R}_{LL,i} \cdot D^{B}_{i} + \left(\sum_{s=1}^{7} \beta^{R}_{LL,s} \cdot D^{Y}_{s}\right) \cdot \ln Q_{LL,t-1} + \gamma^{R}_{LL,E} \cdot EF^{S}_{i,t-1} + \gamma^{R}_{LL,H} \cdot HI_{LL,t-1}$$

$$+\sum_{k=1}^{10} \gamma^{R}_{LL,k} \cdot z^{RQ}_{L,k,i,t-1} + \zeta^{R}_{LL,i,t},$$

where $H^{R}_{LL,i,t}$ is the actual collected interest rate for long-term loans in the current period, $\sum_{s=1}^{7} \beta^{R}_{LL,s} \cdot D^{Y}_{s}$ is β^{R}_{LL} in Eq. (3.1.3.2.12) (i.e., $\beta^{R}_{LL} = \sum_{s=1}^{7} \beta^{R}_{LL,s} \cdot D^{Y}_{s}$), $Q_{LL,t-1}$ is the total long-term loans in the long-term loans market in the previous period, $HI_{LL,t-1}$ is the Herfindahl index of long-term loans in the previous period, $z^{RQ}_{L,1,i,t-1}$ is the long-term prime rate in the previous period, and all others are as per the second note in Table 6.1.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.3 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.2.3); p.87)

Parameter	Estimate	*t*-statistic	*p*-value
$\gamma_{L,E}^{D}$	0.00243181	1.09128	0.275
$\gamma_{L,H}^{D}$	-0.00295086	-1.83380	0.067
$\gamma_{L,1}^{D}$	-0.091858	-13.4851	0.000
$\gamma_{L,2}^{D}$	-0.033746	-8.58164	0.000
$\gamma_{L,3}^{D}$	-0.191883	-8.36138	0.000
$\gamma_{L,5}^{D}$	-0.000511418	-1.00127	0.317
$\gamma_{L,6}^{D}$	0.00977097	5.84702	0.000
$\gamma_{L,7}^{D}$	-0.00151872	-0.277649	0.781
$\gamma_{L,8}^{D}$	0.010304	2.33519	0.020
$\gamma_{L,9}^{D}$	-0.000862979	-0.473511	0.636
$\gamma_{L,10}^{D}$	0.00466001	1.71394	0.087
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
R-squared	0.280889		
Number of Observations	4678		

Note: 1. Tables 6.1 to 6.3 show the results for the simultaneous estimation of the modified equations that add the Herfindahl index of each financial good in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6a) and (6.2.3.2.3); pp. 86-

87). Table 6.3 shows the estimates of the parameters in the modified equation for Homma (2012, Eq. (6.2.3.2.3); p.87).

2. This modified equation is as follows:

$$H^{D}_{L,i,t} = \sum_{i} \alpha^{D}_{L,i} \cdot D^{B}_{i} + \gamma^{D}_{L,E} \cdot EF^{S}_{i,t-1} + \gamma^{D}_{L,H} \cdot HI_{SL,t-1} + \sum_{k\in\{1-3,5-10\}} \gamma^{D}_{L,k} \cdot z^{RQ}_{L,k,i,t-1} + \zeta^{D}_{L,i,t},$$

where $H^{D}_{L,i,t}$ is the actual default loss rate for loans in the current period (i.e., $H^{D}_{L,i,t} = H^{D}_{SL,i,t} = H^{D}_{LL,i,t}$), and all others are as per the second note in Table 6.1.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.4 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.6b) for *j*=*SL*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\gamma^{Q}_{SL,E}$	0.00144106	1.94453	0.052
$\gamma^{Q}_{SL,H}$	-0.000237239	-1.29589	0.195
$\gamma^{Q}_{SL,1}$	0.041905	8.96873	0.000
$\gamma^{Q}_{SL,2}$	-0.00247387	-6.34230	0.000
$\gamma^{Q}_{SL,3}$	0.00330686	2.62315	0.009
$\gamma^{Q}_{SL,4}$	0.011572	2.68060	0.007
$\gamma^{Q}_{SL,7}$	-0.00122233	-1.77071	0.077
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
Adjusted R-squared	0.618835		
Number of Observations	1692		

Note: 1. Tables 6.4 shows the results for the estimation of the modified equation that adds the Herfindahl index of short-term loans in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6b) for *j*=*SL*; pp. 86-87).

2. This modified equation is as follows:

$$H^{Q}_{SL,i,t} = \sum_{i} \alpha^{Q}_{SL,i} \cdot D^{B}_{i} + \gamma^{Q}_{SL,E} \cdot EF^{S}_{i,t-1} + \gamma^{Q}_{SL,H} \cdot HI_{SL,t-1} + \sum_{k\in\{1,2,3,4,7\}} \gamma^{Q}_{SL,k} \cdot z^{RQ}_{L,k,i,t-1} + \zeta^{Q}_{SL,i,t},$$

where $H^{Q}_{SL,i,t}$ is the actual uncollected interest rate for short-term loans in the current period, and all others are as per the second note in Table 6.1.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.5 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.6b) for *j=LL*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\gamma^{Q}_{LL,E}$	0.00147511	1.95585	0.050
$\gamma^{Q}_{LL,H}$	-0.000204113	-1.03426	0.301
$\gamma^{Q}_{LL,1}$	0.020893	10.6872	0.000
$\gamma^{Q}_{LL,2}$	-0.00144029	-4.01989	0.000
$\gamma^{Q}_{LL,3}$	0.00349106	2.83672	0.005
$\gamma^{Q}_{LL,4}$	0.00989985	2.30656	0.021
$\gamma^{Q}_{LL,7}$	-0.00114155	-1.59851	0.110
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
Adjusted R-squared	0.625455		
Number of Observations	1692		

Note: 1. Tables 6.5 shows the results for the estimation of the modified equation that adds the Herfindahl index of long-term loans in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.6b) for *j=LL*; pp. 86-87).

2. This modified equation is as follows:

$$H^{Q}_{LL,i,t} = \sum_{i} \alpha^{Q}_{LL,i} \cdot D^{B}_{i} + \gamma^{Q}_{LL,E} \cdot EF^{S}_{i,t-1} + \gamma^{Q}_{LL,H} \cdot HI_{LL,t-1} + \sum_{k\in\{1,2,3,4,7\}} \gamma^{Q}_{LL,k} \cdot z^{RQ}_{L,k,i,t-1} + \zeta^{Q}_{LL,i,t},$$

where $H^{Q}_{LL,i,t}$ is the actual uncollected interest rate for long-term loans in the current period, and all others are as per the second note in Table 6.2.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.6 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.7a) for *j=DD*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\beta^{R}_{DD,3}$ (1990-1995)	0.000680991	6.49630	0.000
$\beta^{R}_{DD,4}$ (1996-2001)	0.000655912	6.22836	0.000
$\beta^{R}_{DD,5}$ (2002-2007)	0.000646485	6.12901	0.000
$\beta^{R}_{DD,6}$ (2008-2010)	0.000636965	6.09294	0.000
$\beta^{R}_{DD,7}$ (2011-2016)	0.000633794	6.17143	0.000
$\gamma^{R}_{DD,E}$	-0.00184176	-2.75728	0.006
$\gamma^{R}_{DD,H}$	0.000434124	1.31671	0.188
$\gamma^{R}_{DD,1}$	-0.00439639	-11.1153	0.000
$\gamma^{R}_{DD,2}$	0.099776	46.9430	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
Adjusted R-squared	0.804260		
Number of Observations	2785		

Note: 1. Tables 6.6 shows the results for the estimation of the modified equation that adds the Herfindahl index of demand deposits in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.7a) for *j=DD*; p. 86).

2. This modified equation is as follows:

$$H^{R}_{DD,i,t} = \sum_{i} \alpha^{R}_{DD,i} \cdot D^{B}_{i} + \left(\sum_{s=3}^{7} \beta^{R}_{DD,s} \cdot D^{Y}_{s}\right) \cdot \ln Q_{DD,t-1} + \gamma^{R}_{DD,E} \cdot EF^{S}_{i,t-1} + \gamma^{R}_{DD,H} \cdot HI_{DD,t-1}$$

$$+\sum_{k=1}^{2}\gamma_{DD,k}^{R}\cdot z_{D,k,i,t-1}^{RQ}+\zeta_{DD,i,t}^{R},$$

where $H_{DD,i,t}^{R}$ is the actual collected interest rate for demand deposits in the current period, $\sum_{s=3}^{7}\beta_{DD,s}^{R}\cdot D_{s}^{Y}$ is β_{DD}^{R} in Eq. (3.1.3.2.12) (i.e., $\beta_{DD}^{R}=\sum_{s=3}^{7}\beta_{DD,s}^{R}\cdot D_{s}^{Y}$), $Q_{DD,t-1}$ is the total demand deposits in the demand deposits market in the previous period, $HI_{DD,t-1}$ is the Herfindahl index of demand deposits in the previous period, $z_{D,k,i,t-1}^{RQ}$ (k=1,2) are the logarithms of the disposable income for workers' households (except farmers) (k=1) and the yield on government bonds (k=2), and all others are as per the second note in Table 6.1.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.7 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.7b) for *j*=*DD*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\gamma_{DD,2}^{Q}$	0.049383	8.92692	0.000
$\gamma_{DD,3}^{Q}$	0.655223	24.2240	0.000
$\gamma_{DD,4}^{Q}$	-0.368224×10^{-6}	-4.45802	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
Adjusted R-squared	0.800649		
Number of Observations	1693		

Note: 1. Tables 6.7 shows the results for the estimation of the modified equation for Homma (2012, Eqs. (6.2.3.1.7b) for *j*=*DD*; p. 86).

2. This modified equation is as follows:

$$H_{DD,i,t}^{Q}=\sum_{i}\alpha_{DD,i}^{Q}\cdot D_{i}^{B}+\sum_{k\in\{2,3,4\}}\gamma_{DD,k}^{Q}\cdot z_{D,k,i,t-1}^{RQ}+\zeta_{DD,i,t}^{Q},$$

where $H_{DD,i,t}^{Q}$ is the actual uncollected interest rate for demand deposits in the current period, $z_{D,k,i,t-1}^{RQ}$ ($k\in\{2,3,4\}$) are the yield on government bonds (*k*=2), the interest rate of ordinary savings (*k*=3), and the TOPIX (*k*=4), and all others are as per the second note in Table 6.1.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.8 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.7a) for *j=TD*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\beta^{R}_{TD,1}$ (1980-1986)	0.00274183	2.48785	0.013
$\beta^{R}_{TD,2}$ (1987-1989)	0.00369885	3.36775	0.001
$\beta^{R}_{TD,3}$ (1990-1995)	0.00506134	4.61318	0.000
$\beta^{R}_{TD,4}$ (1996-2001)	0.00475978	4.29178	0.000
$\beta^{R}_{TD,5}$ (2002-2007)	0.00419667	3.73105	0.000
$\beta^{R}_{TD,6}$ (2008-2010)	0.00396048	3.57069	0.000
$\beta^{R}_{TD,7}$ (2011-2016)	0.00397213	3.64740	0.000
$\gamma^{R}_{TD,E}$	0.00715878	3.08222	0.002
$\gamma^{R}_{TD,H}$	0.00687255	3.10191	0.002
$\gamma^{R}_{TD,1}$	-0.146166	-37.0608	0.000
$\gamma^{R}_{TD,2}$	0.795027	99.0544	0.000
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
Adjusted R-squared	0.948033		
Number of Observations	3610		

Note: 1. Tables 6.8 shows the results for the estimation of the modified equation that adds the Herfindahl index of time deposits in the previous period and the static cost unneutral efficiency in the previous period to the independent variables in Homma (2012, Eqs. (6.2.3.1.7a) for *j=TD*; p. 86).

2. This modified equation is as follows:

$$H^R_{TD,i,t} = \sum_i \alpha^R_{TD,i} \cdot D^B_i + \left(\sum_{s=1}^{7} \beta^R_{TD,s} \cdot D^Y_s\right) \cdot \ln Q_{TD,t-1} + \gamma^R_{TD,E} \cdot EF^S_{i,t-1} + \gamma^R_{TD,H} \cdot HI_{TD,t-1}$$

$$+\sum_{k=1}^{2} \gamma^R_{TD,k} \cdot z^{RQ}_{D,k,i,t-1} + \zeta^R_{TD,i,t},$$

where $H^R_{TD,i,t}$ is the actual collected interest rate for time deposits in the current period, $\sum_{s=1}^{7} \beta^R_{TD,s} \cdot D^Y_s$ is β^R_{TD} in Eq. (3.1.3.2.12) (i.e., $\beta^R_{TD} = \sum_{s=1}^{7} \beta^R_{TD,s} \cdot D^Y_s$), $Q_{TD,t-1}$ is the total time deposits in the time deposits market in the previous period, $HI_{TD,t-1}$ is the Herfindahl index of time deposits in the previous period, and all others are as per the second note in Table 6.6.

3. The conditional heteroskedasticity of the error term is explicitly controlled.

Table 6.9 Estimation Results for the Modified Equation for Homma (2012, Eq. (6.2.3.1.7b) for *j*=*TD*; p.86)

Parameter	Estimate	*t*-statistic	*p*-value
$\gamma^{Q}_{TD,2}$	-0.047259	-3.84573	0.000
$\gamma^{Q}_{TD,3}$	0.329793	17.2120	0.000
$\gamma^{Q}_{TD,4}$	0.242506×10^{-6}	2.52058	0.012
The coefficients of the individual bank dummy variables are omitted due to space restrictions.			
Adjusted R-squared	0.767796		
Number of Observations	1693		

Note: 1. Tables 6.9 shows the results for the estimation of the modified equation for Homma (2012, Eqs. (6.2.3.1.7b) for *j*=*TD*; p. 86).

2. This modified equation is as follows:

$$H^{Q}_{TD,i,t} = \sum_i \alpha^{Q}_{TD,i} \cdot D^{B}_{i} + \sum_{k \in \{2,3,4\}} \gamma^{Q}_{TD,k} \cdot z^{RQ}_{D,k,i,t-1} + \zeta^{Q}_{TD,i,t},$$

where $H^{Q}_{TD,i,t}$ is the actual uncollected interest rate for time deposits in the current period, $z^{RQ}_{D,3,i,t-1}$ is the interest rate of postal savings certificates in the previous period, and all others are as per the second note in Table 6.7.

3. The conditional heteroskedasticity of the error term is explicitly controlled.