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The pass-through from market interest rates to retail bank rates in Germany

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Abstract

In this paper, we address the pass-through from money and capital market interest rates to bank retail rates in Germany for the period January 2003 to December 2006 using a panel of almost 200 banks. In addition, banks' heterogeneous price setting behaviour is analysed by investigating the kind of attributes of a credit institution in terms of its balance sheet characteristics and its institutional arrangements that alter its adjustment process. The main conclusions are the incompleteness of pass-through in both the short and the long run and the existence of considerable heterogeneity across retail products and banks. Both maturity and loan size matter in determining the degree of pass-through as well as whether products are targeted at firms or households. Banks' balance sheet structure has a sizeable impact on the speed and magnitude of their adjustment. Large, illiquid, less diversified credit institutes and those heavily involved in interbank lending change their rates more rapidly and incorporate more of a change in market conditions in their rates in the long run. Even the different banking groups that are peculiar to Germany adjust their rates not in a uniform manner, but savings banks and credit cooperatives adjust their rates more slowly than the remaining banks.

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1 Introduction

In order to accomplish the mandate given to the European Central Bank (ECB) by the European Monetary Union Member States, it is vital that it fully understands the monetary policy transmission mechanism in the euro area. The area constitutes a newly formed entity and consequently the ECB did not know a priori how its policy would exactly affect each link in the chain of effects that make up the monetary transmission process. The first and second of these links revolve around the euro money market that as a result plays a central role in the transmission mechanism. The money market actually consists of two markets: The primary market is the place where central banks execute their policy by ensuring that the banking system is always short of liquidity. This gives the ECB a lever because it has the monopoly in providing banks in the euro area with liquidity. In the secondary market, banks have the possibility to acquire funds from each other when they are in need of funding. These two links in the transmission process concern firstly the impact of monetary policy modifications, i.e. a change in the key policy rate, on money market rates and secondly the effect movements in these rates have on retail bank rates. The latter are the interest rates set by commercial banks on loans, mortgages and deposits and therefore affect consumption and investment decisions by consumers and businesses. Without a complete pass-through of official policy changes to these retail rates, monetary policy will be inefficient in influencing spending and, eventually, inflation. However, not only a comprehensive knowledge about the magnitude of the pass-through but also information about the speed of adjustment of retail rates to market rate modifications is essential for an informed monetary policy decision.

Much of the previous literature regarding interest rate pass-through uses a panel error correction model (ECM), but studies differ in their theoretical foundations. De Bondt's ECM (2002), for example, is based on a marginal cost pricing framework including asymmetric information and switching costs following Rousseas (1985). His analysis of five deposit and four lending rates for the euro area as a whole comes to the conclusion that immediate pass-through is rather incomplete contrary to final pass-through. The 2002 cross-country study of euro area member states of De Bondt et al. relates the rates on loans and deposit – in separate estimation equations – to market rates of relevant maturity and is based on the profit-maximising framework of a Monti-Klein bank. Their results indicate that the returns on deposits are less responsive to market conditions than the prices put on loan products. Weth (2002), who investigates the pass-through of five lending rates, uses the same theoretical foundations but his is the only study in this brief review to exclusively analyse German rates, which he does for the period April 1993 to December 2000. In Germany, pass-through was highest for mortgage loans, which was nearly complete, and only around 50% for current account credit. The situation in the UK, however, seems completely different. Hofmann and Mizen (2004) use a Monti-Klein model to explain the differences in pass-through on thirteen deposit and mortgage rates of UK banks and building societies and find that whereas deposit rates adjust fully in the long run, mortgage rates do not.

Most papers written on this topic focus exclusively on the pricing side (except, for example, Weth, 2002) and thus presuppose that banks react uniformly to a policy change. In other words, these studies have not taken into account

that bank-specific characteristics might lead to a heterogeneous response. In particular, the structure of banks' balance sheets might have an effect on their adjustment process. This is related to the idea that credit institutes differ in their ability to access alternative means of funds following a monetary tightening that causes an increase in their refinancing costs. The credit channel of the monetary transmission mechanism offers one explanation for their differing ability, namely that capital markets are characterised by imperfections and banks suffer from informational asymmetries which lead to moral hazard and adverse selection problems. Because of these a credit institute has to pay an external finance premium which stands in relation to its financial structure. This is the concept inherent in a sub-channel of the credit channel: the bank-lending channel which emphasises the heterogeneous behaviour of Monetary Financial Institutes (MFIs) in relation to their loan supply following a monetary contraction. Common attributes used in this literature are banks' liquidity, their capital and size.

Therefore, this paper firstly analyses the pass-through of changes in market rates onto retail bank rates in Germany during the period January 2003 to December 2006 and secondly takes account of a credit institution's balance sheet characteristics. To this end, the new harmonised MFI interest rate (MIR) statistics is used which offers the opportunity for bank-level analysis and has several advantages concerning the investigation of interest rate pass-through. This study is the first to make use of these new statistics to examine long and short-run pass-through in Germany which is done within a panel ECM framework. In order to empirically investigate the impact of balance sheet factors an entirely new data set was constructed matching banks' individual retail rates on different loan and deposit products from the MIR statistics with their balance sheets and profit and loss accounts. Then balance sheet indicators are calculated for each bank. Based on the distribution of these indicators, three bank categories are set up with a similar number of banks in each category. Long-run pass-through rates and short-run elasticities are estimated for each category and the difference between the top and bottom one is calculated and its significance tested.

This study thus contributes to the literature by combining the approaches of the bank lending channel and pass-through literatures, by being the first to use the new MFI interest rate statistics for this purpose, by creating a new comprehensive dataset in the process and finally by providing a detailed analysis of the interest rate setting behaviour of German banks.

The main conclusions are the incompleteness of pass-through in both the short and the long run and the existence of considerable heterogeneity across retail products and banks. Both maturity and loan size matter in determining the degree of pass-through as well as whether products are targeted at firms or households. Balance sheet characteristics have a sizeable and significant impact on retail rate adjustment following changes in the market rate. Large, illiquid, less diversified credit institutes and those heavily involved in interbank lending alter their rates more rapidly and incorporate more of a change in market conditions in their rates in the long run.

The paper is structured as follows. The next section gives an overview of the theoretical background. Section 3 provides a brief description of the data and the construction of the data set, whereas section 4 illuminates the methodology. Section 5 presents the results and the final section concludes.

2 The adapted Monti-Klein imperfect competition model in the banking sector

Banks here are defined as financial intermediaries that buy funds, namely deposits, and sell them to borrowers[1]. This results in a supply of deposits D by the public and a demand for loans L by borrowers, whom the bank views as a homogenous group. Indeed, it is supposed that banks face an upward-sloping aggregate supply of deposits and a downward-sloping aggregate demand curve for loans, i.e. there is imperfect competition in the banking market. The resulting supply and demand functions $D(r_D)$ and $L(r_L)$, where r_D is the return on deposits and r_L is the price put on loan products, are more conveniently written in their inverse forms $r_L(L)$ and $r_D(D)$ for the following analysis. Furthermore, we assume that banking technology is given which implies that the cost of handling deposits and loans is characterised by function $C(D, L)$. There are N banks (indexed by $n = 1, \ldots, N$) all using this same technology. The balance sheet of bank n has D_n on the liability side and L_n and interbank balances M_n on the asset side. The balance sheet identity therefore reads as

$$D_n = L_n + M_n. \tag{1}$$

M_n are the net position of a bank on the interbank market, where the interest rate m is exogenous to the bank.

The profit of bank n, which takes other banks' volume of loans and deposits as given, is

$$\pi_n = r_L \left(L_n + \sum_{m \neq n} L_m^* \right) L_n + mM_n - r_D \left(D_n + \sum_{m \neq n} D_m^* \right) D_n - C_n(D_n, L_n) \tag{2}$$

which using Equation (1) can be rewritten as the sums of the intermediation margins on loans and deposits minus costs:

$$\pi_n = \left[r_L \left(L_n + \sum_{m \neq n} L_m^* \right) - m \right] L_n + \left[m - r_D \left(D_n + \sum_{m \neq n} D_m^* \right) \right] D_n - C_n(D_n, L_n). \tag{3}$$

The unique Cournot equilibrium has each bank setting $D_n^* = D^*/N$ and $L_n^* = L^*/N$ and is characterised by an N-tuple vector $(D_n^*, L_n^*)_{n=1,\ldots,N}$.

The first order conditions are

$$\frac{\partial \pi_n}{\partial L_n} = r_L'(L^*)\frac{L^*}{N} + r_L(L^*) - m - C_L'(D, L) = 0, \tag{4}$$

$$\frac{\partial \pi_n}{\partial D_n} = -r_D'(D^*)\frac{D^*}{N} + m - r_D(D^*) - C_D'(D, L) = 0. \tag{5}$$

[1] This section follows Freixas and Rochet (1997).

Solving for the optimal loan and deposit rate and assuming a linear cost function, $C_n(D_n, L_n) = \omega_D D + \omega_L L$, gives

$$r_L^* = -r_L'(L^*)\frac{L^*}{N} + m + \omega_L, \tag{6}$$

$$r_D^* = -r_D'(D^*)\frac{D^*}{N} + m - \omega_D. \tag{7}$$

From this, it can be seen that in perfect competition where $N \to \infty$ the loan and deposit intermediation margins equal their respective marginal costs. As the banking sector, however, becomes oligopolistic and N gets smaller, the deposit intermediation margin falls (since $r_D' > 0$) whereas the loan intermediation margin rises (since $r_L' < 0$) (Lim, 2001). The equations for the optimal retail rates also describe the two fundamental relationships between these rates given the exogenous market rate m. They are the long-run cointegrating relationships which will be mentioned again in the empirical analysis. Rewriting the optimal lending and deposit rates, we obtain

$$r_L^* = \omega_1 + \beta_1 m, \tag{8}$$

$$r_D^* = \omega_2 + \beta_2 m, \tag{9}$$

where

$$\omega_1 = \omega_L - r_L'(L^*)\frac{L^*}{N},$$

$$\omega_2 = -\omega_D - r_D'(D^*)\frac{D^*}{N}.$$

ω_1 and ω_2 can be seen as constant loan and deposit intermediation margins, whereas β_1 and β_2 measure the effect of a change in the market rate on the retail rate. This was assumed to be a one-for-one effect in the previous analysis, which is what most of the literature assumes. We are going to test this so-called completeness hypothesis in section 5.

From the equation for the optimal lending rate, we can also see that in the absence of costs, the marginal return on loans is equal to the exogenously given money market interest rate, which reflects the marginal yield of a risk free investment (Klein, 1971). Another result that follows from this model is that when costs are assumed to be additive, the pricing on loan products and the determination of the return on deposits are independent of each other. In other words, the optimal loan (deposit) rate is independent of the characteristics of the deposit (loan) market (Freixas and Rochet, 1997). This rather important assumption is employed in the literature to justify the use of separate equations for lending and deposit rate determination[2].

[2]Neumark and Sharpe (1992), De Bondt (2002) and Mojon (2000) are among those estimating lending and deposit rate pass-through separately.

3 Data

The data covers the sample period January 2003 to December 2006 and constitutes monthly data. There are 197 banks of different size and from different sectors and regions in the MFI interest rate (MIR) statistics – 8.5 per cent of the German banking population – which cover 65 per cent of the business (Deutsche Bundesbank, 2004). The MIR statistics, introduced in January 2003, are a harmonised euro-area wide representation of interest rates and new business volumes for loans and deposits. They constitute a major improvement for the analysis of interest rate pass-through since they contain interest rates that are the effective rates paid or received by bank customers instead of advertised ones. 28 of the 31 rates that make up the statistics are analysed in this paper: ten deposit rates and 18 lending rates.

In order to empirically investigate the impact of balance sheet factors on interest rate pass-through we constructed an entirely new data set matching banks' individual retail rates on different loan and deposit products from the MIR statistics with their balance sheets and profit and loss accounts. All three statistics were accessed during a research visit to the Deutsche Bundesbank.

In addition to these confidential data, publicly available money and capital market interest rates are employed. These market rates used to analyse the pass-through to bank rates were chosen consistent with comparable maturity which follows the cost of funds approach. This selects the exogenous market rate according to the maturity structure of the corresponding retail rate. This approach has banks setting their rates in relation to their marginal costs, i.e. market rates represent the cost of funds for deposit rates and the opportunity cost for lending rates (Kok Sørensen and Werner, 2006). EONIA and the three-month EurIBOR rates[3] were used as money market rates, whereas for retail rates of long maturity the long-term capital market interest rates chosen were German bearer debt securities. All market rates are average monthly rates.

4 Methodology

4.1 Estimation of the long-run pass-through level and the short-run elasticity

A common representation of the dynamic lending rate determination process in the literature is the Autoregressive Distributed Lag (ADL)[4] model, which relies on the assumption that there is a stationary long-run relationship between the two interest rates.

$$r_{i,t} = c_i + \sum_{k=1}^{4} \alpha_k r_{i,t-k} + \sum_{q=0}^{4} \beta_q m_{t-q} + \varepsilon_{i,t} \tag{10}$$

Here, the retail interest rate of bank i at time t, $r_{i,t}$, is related to four of its own lags, the contemporaneous market rate and four lags of the market rate which represent retail rate rigidities. c_i is a bank-specific effect and captures the individual mark-ups ω_1 and ω_2 of section 2 depending on whether $r_{i,t}$ relates

[3] From now on the three-month EurIBOR rate will be abbreviated to Euribor3.

[4] See, for example, Kremers et al. (1992) and Pesaran and Shin (1999).

to a loan or deposit product. The ADL model can be rewritten in its error correction model (ECM) form:

$$\Delta r_{i,t} = \mu_i + \sum_{k=1}^{3} \gamma_k \Delta r_{i,t-k} + \sum_{q=0}^{3} \delta_q \Delta m_{t-q} + \lambda(r_{i,t-1} - \eta_i - \varphi m_{t-1}) + \varepsilon_{i,t} \quad (11)$$

or expressed differently as

$$\Delta r_{i,t} = \mu_i + \sum_{k=1}^{3} \gamma_k \Delta r_{i,t-k} + \sum_{q=0}^{3} \delta_q \Delta m_{t-q} + \lambda u_{i,t-1} + \varepsilon_{i,t}. \quad (12)$$

The ECM provides a convenient way to show both short-run dynamics and the long-run relationship. The stability of the former requires the sum of the δ coefficients to be positive and the sum of the γ coefficients to be smaller than one. These are stationarity conditions of the equilibrium mark-up. In Equation (11), the change in the retail rate depends on a bank specific effect, three lagged endogenous retail rate changes, one contemporary and three lagged exogenous market rate changes. The long-run relationship between retail rate and market rate is captured by φ, whereas λ represents the loading coefficient of the ECM which provides information on the speed of adjustment to a temporary deviation from the level relationship. This cointegrating relationship corresponds to theoretical Equations (8) and (9) of the optimal lending and deposit rates. $u_{i,t-1}$ in Equation (12) is the residual of this relation.

The short-run response of the retail rate to a change in the market rate is calculated from the coefficients of the ECM and is measured in terms of a one-month pass-through elasticity which indicates how many per cent of a simulated change in the market rate is in the retail rate after one month. In period $t = 1$, Equation (11) reads

$$\Delta r_{i,1} = \delta_0 \Delta m_1 + \lambda(r_{i,0} - \varphi m_0) \quad (13)$$

as the higher order lags disappear. Now assume that both the market and the retail rate are initially 0, i.e. $r_{i,0} = m_0 = 0$. Then a permanent change in the market rate from 0 to 1 ($\Delta m_1 = 0$) is simulated. If these values are put in Equation (13), you obtain $\Delta r_{i,1} = \delta_0$. In period $t = 2$, the ECM is

$$\Delta r_{i,2} = \gamma_1 \Delta r_{i,1} + \delta_0 \Delta m_2 + \delta_1 \Delta m_1 + \lambda(r_{i,1} - \varphi m_1). \quad (14)$$

Subsequently, let the market rate stay at $m_2 = 1$, so that there is no further change. Placing $\Delta m_2 = 0$ and $\Delta r_{i,1} = \delta_0$ into (14) results in

$$\Delta r_{i,2} = \gamma_1 \delta_0 + \delta_1 + \lambda(\delta_0 - \varphi). \quad (15)$$

The one-month pass-through is the cumulative change in the retail rate, meaning the current change ($\Delta r_{i,1}$) in addition to the change after one month ($\Delta r_{i,2}$):

$$\Delta r_{i,1} + \Delta r_{i,2} = \delta_0 + \gamma_1 \delta_0 + \delta_1 + \lambda(\delta_0 - \varphi). \quad (16)$$

4.2 Estimation of the impact of balance sheet indicators

For the purpose of investigating the impact of balance sheet factors on interest rate pass-through, variables from the Deutsche Bundesbank's balance sheet statistics and profit and loss accounts are used to calculate a number of characteristics for each bank. These are average indicators, i.e. they are averaged over the whole sample period and changes in an MFI's balance sheet structure during this time are not considered[5]. Each indicator is then taken separately and based on its distribution three bank categories are set up with a roughly similar number of banks in each category. This implies that for the characteristic size, for example, larger banks are in the top category whereas small MFIs are in the bottom one.

In order to estimate a heterogeneous pass-through response, dummy variables for the upper (U_i) and lower (L_i) categories are constructed:

$$U_i = \begin{cases} 1 & \text{if } i \text{ belongs to upper category} \\ 0 & \text{otherwise} \end{cases}, \tag{17}$$

$$L_i = \begin{cases} 1 & \text{if } i \text{ belongs to lower category} \\ 0 & \text{otherwise} \end{cases}. \tag{18}$$

After introducing these dummies the long-run relationship of a two-step model reads

$$r_{i,t} = \eta_i + \varphi m_t + \eta_i^U U_i + \varphi^U m_t U_i + \eta_i^L L_i + \varphi^L m_t L_i. \tag{19}$$

And the ECM is

$$\begin{aligned} \Delta r_{i,t} = \mu_i &+ \sum_{k=1}^{3} \gamma_k \Delta r_{i,t-k} + \sum_{k=1}^{3} \gamma_k^U \Delta r_{i,t-k} U_i + \sum_{k=1}^{3} \gamma_k^L \Delta r_{i,t-k} L_i \\ &+ \sum_{q=0}^{3} \delta_q \Delta m_{t-q} + \sum_{q=0}^{3} \delta_q^U \Delta m_{t-q} U_i + \sum_{q=0}^{3} \delta_q^L \Delta m_{t-q} L_i \\ &+ \lambda u_{i,t-1} + \lambda^U u_{i,t-1} U_i + \lambda^L u_{i,t-1} L_i + \varepsilon_{i,t}. \end{aligned} \tag{20}$$

Writing the long-run relationship and the ECM in such a way allows essentially three different long-run pass-through rates and short-run elasticities to be estimated: one each for category one, two and three. In our specification category two is the reference category, so its long-run pass-through rate is φ and its short-run elasticity is simulated in Equation (16). The pass-through levels of interest now are, however, those of the top and bottom category. Their respective long-run rates are defined as $\varphi + \varphi^U$ and $\varphi + \varphi^L$. The short-run elasticity of category 1 is given by

$$\begin{aligned} (\delta_0 + \delta_0^U) + (\gamma_1 + \gamma_1^U) \cdot (\delta_0 + \delta_0^U) + (\delta_1 + \delta_1^U) + (\lambda + \lambda^U) \cdot (\delta_0 + \delta_0^U) \\ - (\lambda + \lambda^U) \cdot (\varphi + \varphi^U) \end{aligned} \tag{21}$$

[5]Since the time period under consideration covers four years, the assumption that no fundamental changes in a bank's balance sheet structure took place seems not overly restrictive.

and of category 3 by

$$(\delta_0 + \delta_0^L) + (\gamma_1 + \gamma_1^L) \cdot (\delta_0 + \delta_0^L) + (\delta_1 + \delta_1^L) + (\lambda + \lambda^L) \cdot (\delta_0 + \delta_0^L) - (\lambda + \lambda^L) \cdot (\varphi + \varphi^L). \quad (22)$$

These regressions are run for each category and the short-run elasticities and the long-run response are calculated. Since we are interested in the difference between the upper (X_3) and lower (X_1) category values, they are tested under the null hypothesis:

$$H_0 : X_3 - X_1 = 0. \quad (23)$$

Valid inferences about the significance of the above hypothesis can be made because one of the properties of this specification is that parameters and the variance-covariance matrix are jointly estimated.

The fixed-effects estimator was chosen as estimation method. This allows for the individual effect μ_i to capture the bank-specific loan and deposit intermediation margins, ω_1 and ω_2, and assumes that banks' interest rate setting differs only in this margin, so that the model coefficients are jointly estimated for all banks. The Nickell bias due to the dynamic nature of the model should not be of great concern here as Judson and Owen (1999) showed that when $T \geq 30$ the fixed effects or least squares dummy variable estimator "performs just as well or better than the viable alternatives" GMM one-step and two-step in an unbalanced panel. Here, T is 48.

Equations with several different lag structures were estimated for each retail rate. Reported in the next section are models with three lags for most retail rates which proved the most parsimonious.[6]

5 Estimation Results

5.1 Pass-through of all banks

Equation (12) was estimated for each retail rate and Table 1 presents the results for all banks. Standard errors were calculated using the Delta-Method[7]. The most striking feature is that pass-through is far from complete and highly heterogeneous across banking products. Therefore the completeness hypothesis can be rejected; in other words there is no one-for-one response of retail rates to changes in market rates. Long-run adjustment rates are almost always highly significant and range from 6% for deposits redeemable at a period of notice of up to three months[8] to 94% for the rate on loans over €1 million with a floating rate or an initial rate fixation of up to one year. The short-run transmission parameter is often higher than the long-term rate, especially for deposits.

[6] Exceptions are household and firm deposits with agreed maturity of over one and up to two years, housing and other loans with an initial rate fixation of over one and up to five years, as well as firm loans both up and over €1 million with an initial rate fixation of over one and up to five years whose estimation models all included two lags. Housing loans with an initial rate fixation of over five and up to ten years had four lags included.

[7] *** indicate significance at the 1% level, ** at 5% and * at 10%. Regarding the market rate, Bearer stands for German bearer debt securities.

[8] The lowest pass-through was recorded for this rate at 1% but was insignificant.

Results for these products are shown in the top half of Table 1. They exhibit a hump-shaped pattern with regard to maturity for both households and firms: Pass-through is low for overnight deposits, rises with increasing maturity and falls again for deposits with agreed maturity of over two years. So long-run adjustment for overnight deposits of households is only 27%, 75% and nearly 80% for deposits with agreed maturity up to one year and for over one and up to two years respectively, and just 44% for over two years. A possible reason for this pattern might be that with rising maturity of products monitoring costs for the banks amplify so that they feel safer pricing closer to market terms. The sluggish adjustment of deposits with fixed maturity over two years might be explained by the fact that this type of deposits is not very important to banks in terms of volumes. In the short run the same hump-shaped pattern emerges as in the long run. However, the short-run elasticities are often larger than the long-run pass-through parameters. This might be due to banks anticipating rate changes and pricing them in in advance. For deposits to firms, long-run and short-run pass-through rates follow the same pattern as for households, i.e. they are low for overnight deposits, rise with increasing maturity and are small again for two-year deposits; however, banks seem to adjust their rates for products targeted at firms faster and to a greater extent than products aimed at households. Redeemable deposits adjust extremely sluggishly, especially products redeemable at a period of notice up to three months (1%), but they have the only long-run coefficients (for deposits) not to be significant at any conventional level. In the short run, there is considerably higher pass-through for deposits redeemable at a period of notice up to three months than in the long-run.

The lower half of Table 1 shows the results for loans[9]. Monetary Financial Institutes impart only around 50% of a change in the market rate to the rate applied to overdrafts to households. Pass-through on overdrafts to firms are astoundingly low – considering it is such an important product – at 29% in the long-run and 20% after one month. Housing loans exhibit the highest adjustment rates ranging from 46% to 86% in the long run and again increasing with rising maturity. Even after only one month, banks have incorporated up to 86% of a market rate change in their retail rate. Rates on other credit respond more sluggishly with around 40% to 50% long-run adjustment. For products in this band with either a floating rate or fixed up to one year pass-through is substantially higher in the short run (up to 98%). Loans to corporations up to €1 million have long-run adjustment rates lying between 46% to 68%. Contrary to the pattern found for deposits, pass-through here falls with rising maturity in both the long and the short term. MFIs very quickly pass on changes in market terms to loans over €1 million as the comparatively high pass-through levels of 94% to 55% show. For loans over €1 million with an initial rate fixation of up to one year or with a floating rate, banks again 'overadjust' after one month. However, in this instance the reference market rate is Euribor3 and mostly when the short-run pass-through was found to be larger than the long-run one, Euribor3 was also used as reference.

[9]The results for consumer credit rates are not reported here due to the significant heterogeneity of products summarised in these bands.

5.2 Pass-through of separate banking groups

The German banking system is characterised by three different major banking groups, namely saving banks, credit cooperatives and commercial banks. The latter shall be loosely referred to as *other banks* in the following and they also include the so-called *Großbanken*, i.e. Germany's larger well-known banks. Most savings banks and especially cooperatives are rather small and have very strong inter-bank links with their head institutions. Since banks in these two groups are not strictly profit-maximising entities, it might be supposed that they price differently and have a distinct interest rate pass-through to *other banks*. In order to test whether the various groups do exhibit different pricing structures, the regressions were also run for banking groups separately.

The results indicate that there are indeed substantial differences across groups. *Other banks* price closest to market terms generally having higher short and long-term pass-throughs than all banks. Most notably, their prices adjust almost always faster for products targeted at firms. Savings banks adjust their rates mostly to a lesser extent and more slowly than *other banks*, but no clear pattern emerges when their price adjustment is compared to those of cooperatives. The latter have a lower average long-run pass-through rate than the rest of the banks.

5.3 Heterogeneous adjustment

As mentioned previously banks may react heterogeneously to alterations in the market rate and their responsiveness is related to their financial structure. A monetary contraction causes money and capital market interest rates to increase. Some MFIs are in a superior position to offset this rise in their cost of funds due to the characteristics of their balance sheets.

Liquidity is of particular importance in this context since a liquid bank is able to draw on its liquid assets following a worsening of market conditions. It may thus feel less pressurised to adjust its rates swiftly. The bank lending channel literature confirms that liquidity influences banks' response to alterations in monetary conditions. Ehrmann et al. (2001) even find it to be the most significant characteristic to explain distributional effects across credit institutes in their lending response. Worms (2001) finds that the loan supply of German banks with a higher liquidity ratio falls less than that of illiquid MFIs, which is echoed by Kashyap and Stein (2000) for the US and Gambacorta (2005b) for Italy. The latter author furthermore shows that a significant reduction in liquid assets follows a monetary tightening proving that banks draw down these assets facing adverse market conditions. Gambacorta (2005a) arrives at the result that lending rates by liquid banks are stickier. Liquidity is defined as cash in hand plus balances with central banks plus Treasury bills, Treasury discount paper and similar debt instruments issued by public bodies and eligible for refinancing plus debt instruments plus shares and other variable yield securities.

A monetary tightening also leads to a fall in the deposit base of MFIs as their customers substitute away from deposits to securities which now yield a higher return. Banks then have to resort to more costly ways of refinancing as Kashyap and Stein (1995) argue that banking firms are just as prone to adverse selection problems as firms and thus face an external finance premium. The informational asymmetries in the market mean that some banks are better able

to raise alternative funds than others. Size is often cited in the bank lending channel literature as an important factor as a bank's size is an indicator of how much it suffers from informational asymmetry problems. A small credit institute is more prone to adverse selection and moral hazard problems than a large institute and has a relatively simple capital structure. It therefore faces a greater external finance premium. Additionally, a bank's size reflects its ability to access alternative sources of finance. A large MFI has many more instruments at its disposal and can access markets unavailable to small ones. It is thus better placed to raise alternative funds and can therefore afford to wait with the adjustment of its product prices. In other words, it has scope for interest rate smoothing. Alternatively, it may be that if a bank's customer structure is related to its size, i.e. big MFIs serve big firms which are themselves able to access the market for funds, then large banks compete directly with market terms and have to react swiftly. On the other hand, size might not be as important in Germany anyway since most small banks are savings and cooperative banks that are affiliated with a sector including great banks as their head institutions. In times of restrictive monetary policy funds flow from these head institutions to small banks which are now able to keep their loan portfolio relatively unaffected (Ehrmann and Worms, 2001). Thus, pass-through of large banks could be higher or lower than that of small ones. The literature comes to conflicting conclusions regarding the relevance of size which is measured by total assets in determining banks' heterogeneous loan supply reaction. Whereas Kashyap and Stein (1995, 1997) find that size matters in the loan supply reaction of US banks, there is no heterogeneous response according to size in the study of the four largest euro area countries by Ehrmann et al. (2001). Besides this, Gambacorta (2005b) and Worms (2001) derive the result that size is irrelevant for Italy and for Germany, respectively. Kishan and Opiela (2000) on the other hand do find that the smallest (and least capitalised) banks have a stronger loan supply reaction. Regarding the effect of size on interest rate pass-through Weth (2002) shows that it has a significant impact in Germany with large banks adjusting their lending rates faster than smaller ones.

Another bank category of interest in determining heterogeneous behaviour is the degree of diversification where it is defined as total income divided by interest income. If the part of total income that derives from the original business purpose of providing loans and accepting deposits is great, then a financial institution will have to pass on changes in its refinancing conditions more quickly.

In light of the recent turmoil on financial markets and the distress caused to banks by marked increases in money market rates, the relative volume of loans to banks becomes an important determinant for interest rate pass-through. MFIs with a large share of loans to banks in their portfolio are more concerned about conditions on the money markets where most of this lending business takes place. They feel more pressurised to pass on changes in these conditions to their own products. Thus, the hypothesis is investigated that these credit institutes adjust their rates more rapidly and to a larger extent. The exact definition of the indicator employed here is loans and advances to banks divided by total assets. To the author's knowledge no other study has tried to quantify the effect of the relative amount of bank loans on either pass-through or loan supply.

All in all, 24 different categories[10], related to banks' financial structure were examined but in the interest of brevity only results for the ones already mentioned will be presented: Liquidity, size, diversification and the relative volume of loans to other banks.

Tables 2 to 5 present the results. The columns entitled Cat 1 and Cat 3 give the long-run pass-through rate and the short-run elasticity of banks in category 1 and 3, respectively. The first and second columns from the right show the differences in long- and short-run pass-through between categories 1 and 3 and are calculated as the rate and elasticity of category 3 banks minus those of category 1 credit institutes. As expected, illiquid banks are quicker to pass on market conditions to their retail rates and have an overall higher degree of pass-through since they are not able to shield their customers from market conditions by drawing on their liquid assets. For instance, liquid banks in category 3 adjust their rate on other loans to households with an initial rate fixation of up to one year 31 percentage points less in the long-run and their one-month elasticity is 83 percentage points lower. Thus, results for liquidity are in line with the literature. Large banks exhibit a greater pass-through in both the short and long run. The reason for this is possibly that small banks' customers might rely more heavily on bank loans for financing and thus small banks compete less with market terms. Size therefore seems to matter in the interest rate setting behaviour of German banks and our results confirm those of Weth (2002), Kashyap and Stein (1995, 1997) and Kishan and Opiela (2000). It can also be seen by looking at Table 4 that financial institutions that are less diversified and are thus in category 3 pass on movements in market rates more swiftly and to a larger extent. This is in line with our expectations that these banks will have to pass on changes in its refinancing conditions more quickly. The difference, however, is only significant for a few rates. Less diversified credit institutes have incorporated, for example, 91 percent of a change in the market rate in their price on deposits redeemable at a notice of over three months in the long run compared to only 47 percent incorporated by diversified banks. There is overwhelming evidence illustrated in Table 5 that credit institutes with a relatively large volume of loans to other banks adjust their rates faster and to a larger extent. The long-run pass-through difference between category 3, which contains the MFIs with a large share of loans to banks, and category 1 institutes, which are those with relatively few bank loans, is positive for 18 of 25 retail rates, 14 of which are significant. In the short run the difference is positive for 21 rates although not as many are significant. It is interesting to note that those rates for which the difference happens to be negative are applied to deposit products. Banks that are heavily engaged in lending to other banks are more dependent on market conditions and therefore quickly adjust their product prices to reflect changes in market developments.

[10]These categories can be divided into three broadly-defined groups according to firstly the basic characteristics of a bank like its size and equity ratio, secondly its performance, e.g. its return on assets and efficiency, and lastly a bank's focus of business which includes its diversification or degree of relationship banking.

6 Conclusion

Recent events following the difficulties in the US sub-prime mortgage sector have starkly demonstrated the vital importance of the interbank money market and the financial health of banks for the functioning of each economy. The current credit crunch furthermore shows that there are dire consequences for the economy if credit institutes do not pass on decreases in central bank rates to their lending rates. The way retail bank rates behave in the largest euro area country after movements in money market rates and how balance sheet factors influence their adjustment is thus worth investigating.

For Germany, the analysis with the new MFI interest rate statistics has shown that long-run pass-through is not complete. This means that banks do not fully pass on changes in policy. However, the short-run adjustment was found to be often larger than the long-term one, especially for deposits. The transmission parameters for these products exhibit a hump-shaped pattern with regard to maturity for both households and firms. The same pattern is distinguishable for loans to firms where a distinction can also be made according to loan size. Loans over €1 million are adjusted faster and to a greater extent than those up to €1 million. Regarding household loans, mortgages exhibit the highest pass-through and interestingly banks had incorporated more of a change in the market rate in these rates after one month than in the long run.

The results strongly indicate that MFIs differ substantially in the speed and magnitude of their adjustment rates according to their balance sheet characteristics. The size of a credit institutions is after all important. Large banks exhibit a greater pass-through in both the short and long run than small ones, which might be related to their differing customer structure and large institutions having therefore to compete directly with market terms. Liquidity seems another important factor in determining heterogeneous adjustment with illiquid banks being quicker to pass on market conditions to their retail rates and having an overall higher degree of pass-through. The degree of diversification, i.e. how much of a bank's total income derives from the original business purpose of providing loans and accepting deposits, also influences MFIs' response and banks that are less diversified pass on movements in market rates faster and to a larger extent. In addition, pass-through is higher for banks that grant many loans to other banks and therefore depend heavily on conditions on the market where such lending takes place.

Even different banking groups adjust their rates heterogeneously with savings banks and credit cooperatives changing their rates more slowly than the remaining banks, which might be explained by their different objectives as the latter two groups are not strictly profit-maximising.

Whereas this study analyses the interest rate pass-through mechanism in relatively stable times, it would be invaluable to examine the impact of the credit crunch. Future research should investigate and quantify its influence on the rate adjustment behaviour of banks.

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Table 1: Short and Long-run Pass-through of All Banks

	Retail Rate	Market Rate	All Banks		Other Banks		Savings Banks		Cooperatives	
			Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Deposits – *From households* – Overnight										
(1)		EONIA	0.274***	0.242***	0.282***	0.167**	0.258***	0.215***	0.274***	0.285***
– With agreed maturity ...										
(2)	≤ 1 y	EurIBOR	0.749***	0.844***	0.790***	0.830***	0.740***	0.770***	0.738***	0.994***
(3)	1 y – 2 y	Bearer	0.808***	0.827***	0.746***	0.604***	0.836***	0.928***	0.845***	0.875***
(4)	> 2 y	Bearer	0.464***	0.534***	0.463***	0.265**	0.629***	0.747***	0.499***	0.491***
– Redeemable at notice ...										
(5)	≤ 3 m	EurIBOR	0.010	0.223***	0.125***	0.308***	−0.021	0.164***	−0.017	0.281***
(6)	> 3 m	EurIBOR	0.092***	0.210***	−0.042	0.117**	0.117***	0.265***	0.134***	0.225**
– *From firms* – Overnight										
(7)		EONIA	0.386***	0.402***	0.457***	0.552***	0.400***	0.363***	0.285***	0.241***
– With agreed maturity ...										
(8)	≤ 1 y	EurIBOR	0.871***	1.047***	0.909***	1.056***	0.843***	1.024***	0.886***	1.181***
(9)	1 y – 2 y	Bearer	0.884***	0.898***	0.893***	0.984***	0.895***	0.900***	0.872***	0.478***
(10)	> 2 y	Bearer	0.328***	0.285**	0.399***	0.718**	0.668***	0.276*	0.454***	1.161***
Loans – *To households* – Overdrafts										
(12)		EONIA	0.513***	0.499***	0.512***	0.553***	0.490***	0.478***	0.570***	0.486***
– Consumer credit with an initial rate fixation ...										
(15)	> 5 y	Bearer	0.289***	0.128**	0.298***	0.081	0.322***	0.144**	0.210***	0.129
– Housing loans with an initial rate fixation ...										
(16)	≤ 1 y	EONIA	0.457***	0.398***	0.629***	0.737***	0.452***	0.246**	0.306***	0.344**
(17)	1 y – 5 y	Bearer	0.606***	0.399***	0.704***	0.420***	0.590***	0.394***	0.550***	0.395***
(18)	5 y – 10 y	Bearer	0.693***	0.405***	0.753***	0.479***	0.692***	0.391***	0.688***	0.394***
(19)	> 10 y	Bearer	0.857***	0.475***	0.907***	0.655***	0.922***	0.425***	0.847***	0.486***
– Other loans with an initial rate fixation ...										
(20)	≤ 1 y	EONIA	0.533***	0.609***	0.865***	0.931***	0.373***	0.495***	0.449***	0.361*
(21)	1 y – 5 y	Bearer	0.439***	0.315***	0.584***	0.550***	0.383***	0.214***	0.383***	0.298***
(22)	> 5 y	Bearer	0.500***	0.178***	0.649***	0.239***	0.470***	0.119**	0.376***	0.205***
– *To firms* – Overdrafts										
(23)		EONIA	0.293***	0.207**	0.231***	0.101	0.369***	0.277***	0.234***	0.276
– Loans up to €1 million with an initial rate fixation ...										
(24)	≤ 1 y	EONIA	0.678***	0.641***	0.893***	0.903***	0.627***	0.535***	0.423***	0.547***
(25)	1 y – 5 y	Bearer	0.567***	0.453***	0.604***	0.549***	0.559***	0.433***	0.592***	0.454***
(26)	> 5 y	Bearer	0.465***	0.098**	0.521***	0.221**	0.440***	−0.005	0.509***	0.160
– Loans over €1 million with an initial rate fixation ...										
(27)	≤ 1 y	EONIA	0.935***	0.786***	0.937***	0.855***	0.948***	0.610***	0.889***	1.152***
(28)	1 y – 5 y	Bearer	0.598***	0.476***	0.707***	0.591***	0.498***	0.048	0.382***	0.492
(29)	> 5 y	Bearer	0.555***	0.487***	0.664***	0.562***	0.492***	0.452***	0.403***	0.161

Table 2: Pass-through of Liquid and Illiquid Banks

	Retail Rate	Market Rate	Long Run Cat 1	Long Run Cat 3	Short Run Cat 1	Short Run Cat 3	Difference (3 − 1) Long Run	Difference (3 − 1) Short Run
Deposits – *From households* – Overnight								
(1)		EONIA	0.303***	0.303***	0.250***	0.235***	−0.001	−0.015
– With agreed maturity ...								
(2)	≤ 1 y	EurIBOR	0.784***	0.707***	0.839***	0.900***	−0.077***	0.062
(3)	1 y – 2 y	Bearer	0.799***	0.860***	0.700***	0.925***	0.061*	0.225**
(4)	> 2 y	Bearer	0.490***	0.573***	0.413***	0.618***	0.083*	0.205*
– Redeemable at notice ...								
(5)	≤ 3 m	EurIBOR	0.064***	−0.007	0.226***	0.257***	−0.071**	0.032
(6)	> 3 m	EurIBOR	0.022	0.178***	0.076	0.312***	0.155***	0.236**
– *From firms* – Overnight								
(7)		EONIA	0.341***	0.430***	0.397***	0.421***	0.090***	0.024
– With agreed maturity ...								
(8)	≤ 1 y	EurIBOR	0.879***	0.864***	1.132***	0.909***	−0.015	−0.223*
(9)	1 y – 2 y	Bearer	0.882***	0.926***	1.041***	0.807***	0.044	−0.234
Loans – *To households* – Overdrafts								
(12)		EONIA	0.485***	0.584***	0.503***	0.516***	0.099	0.013
– Consumer credit with an initial rate fixation ...								
(15)	> 5 y	Bearer	0.169**	0.225***	−0.035	0.027	0.056	0.062
– Housing loans with an initial rate fixation ...								
(16)	≤ 1 y	EONIA	0.439***	0.405***	0.367**	0.188*	−0.035	−0.179
(17)	1 y – 5 y	Bearer	0.609***	0.588***	0.395***	0.381***	−0.020	−0.013
(18)	5 y – 10 y	Bearer	0.742***	0.682***	0.460***	0.377***	−0.060*	−0.083
(19)	> 10 y	Bearer	0.976***	0.839***	0.659***	0.383***	−0.137***	−0.276***
– Other loans with an initial rate fixation ...								
(20)	≤ 1 y	EONIA	0.636***	0.330***	0.915***	0.090	−0.307***	−0.825***
(21)	1 y – 5 y	Bearer	0.390***	0.348***	0.322***	0.217**	−0.042	−0.105
(22)	> 5 y	Bearer	0.565***	0.394***	0.232***	0.181**	−0.171***	−0.051
– *To firms* – Overdrafts								
(23)		EONIA	0.094	0.526***	−0.136	0.499***	0.432***	0.634**
– Loans up to €1 million with an initial rate fixation ...								
(24)	≤ 1 y	EONIA	0.740***	0.635***	0.629***	0.505**	−0.105	−0.124
(25)	1 y – 5 y	Bearer	0.505***	0.555***	0.390***	0.391***	0.050	0.001
(26)	> 5 y	Bearer	0.547***	0.385***	0.208*	0.024	−0.162**	−0.184
– Loans over €1 million with an initial rate fixation ...								
(27)	≤ 1 y	EONIA	0.895***	0.962***	0.839***	0.610**	0.067	−0.230
(28)	1 y – 5 y	Bearer	0.642***	0.410***	0.252	0.466	−0.232*	0.214
(29)	> 5 y	Bearer	0.545***	0.525***	0.682***	0.561***	−0.020	−0.121

Table 3: Pass-through of Large and Small Banks

	Retail Rate	Market Rate	Long Run Cat 1	Long Run Cat 3	Short Run Cat 1	Short Run Cat 3	Difference (3 − 1) Long Run	Difference (3 − 1) Short Run
Deposits – *From households* – Overnight								
(1)		EONIA	0.277***	0.258***	0.275***	0.121*	−0.018	−0.154*
– With agreed maturity ...								
(2)	≤ 1 y	EurIBOR	0.710***	0.802***	0.851***	0.763***	0.092***	−0.088
(3)	1 y – 2 y	Bearer	0.833***	0.766***	0.919***	0.520***	−0.067**	−0.399***
(4)	> 2 y	Bearer	0.544***	0.492***	0.587***	0.370***	−0.052	−0.217
– Redeemable at notice ...								
(5)	≤ 3 m	EurIBOR	0.002	0.097***	0.200***	0.261***	0.095***	0.061
(6)	> 3 m	EurIBOR	0.089***	−0.066	0.255***	0.097*	−0.155***	−0.158
– *From firms* – Overnight								
(7)		EONIA	0.302***	0.467***	0.273***	0.566***	0.165***	0.293***
– With agreed maturity ...								
(8)	≤ 1 y	EurIBOR	0.828***	0.908***	1.027***	1.124***	0.080***	0.097
(9)	1 y – 2 y	Bearer	0.871***	0.945***	0.759***	0.955***	0.074	0.195
Loans – *To households* – Overdrafts								
(12)		EONIA	0.523***	0.501***	0.421***	0.543***	−0.022	0.123
– Consumer credit with an initial rate fixation ...								
(15)	> 5 y	Bearer	0.345***	0.254**	0.177*	−0.031	−0.091	−0.207
– Housing loans with an initial rate fixation ...								
(16)	≤ 1 y	EONIA	0.267***	0.661***	0.008	0.679***	0.394***	0.670***
(17)	1 y – 5 y	Bearer	0.549***	0.692***	0.392***	0.417***	0.142***	0.026
(18)	5 y – 10 y	Bearer	0.671***	0.741***	0.368***	0.465***	0.070**	0.098
(19)	> 10 y	Bearer	0.861***	0.924***	0.376***	0.664***	0.063	0.288***
– Other loans with an initial rate fixation ...								
(20)	≤ 1 y	EONIA	0.369***	0.841***	0.262	0.737***	0.472***	0.475
(21)	1 y – 5 y	Bearer	0.413***	0.565***	0.320***	0.646***	0.152**	0.326
(22)	> 5 y	Bearer	0.399***	0.652***	0.131***	0.334***	0.253***	0.203
– *To firms* – Overdrafts								
(23)		EONIA	0.306***	0.179**	0.492**	−0.042	−0.127	−0.534**
– Loans up to €1 million with an initial rate fixation ...								
(24)	≤ 1 y	EONIA	0.487***	0.878***	0.539***	0.988***	0.392***	0.449**
(25)	1 y – 5 y	Bearer	0.540***	0.610***	0.358***	0.547***	0.069	0.189
(26)	> 5 y	Bearer	0.422***	0.539***	0.037	0.205***	0.117*	0.168
– Loans over €1 million with an initial rate fixation ...								
(27)	≤ 1 y	EONIA	0.996***	0.929***	1.061***	0.808***	−0.067	−0.254
(28)	1 y – 5 y	Bearer	0.287***	0.698***	−0.316	0.517***	0.411***	0.833*
(29)	> 5 y	Bearer	0.308***	0.680***	−0.395	0.627***	0.372***	1.022**

Table 4: Pass-through of Diversified and Less Diversified Banks

	Retail Rate	Market Rate	Long Run Cat 1	Long Run Cat 3	Short Run Cat 1	Short Run Cat 3	Difference (3 − 1) Long Run	Difference (3 − 1) Short Run
Deposits – *From households* – Overnight								
(1)		EONIA	0.306***	0.550***	0.240***	0.286***	0.244***	0.046
– With agreed maturity ...								
(2)	≤ 1 y	EurIBOR	0.717***	0.921***	0.826***	1.020***	0.204**	0.194
(3)	1 y – 2 y	Bearer	0.591***	0.704***	0.659***	0.789***	0.113	0.130
(4)	> 2 y	Bearer	0.662***	0.796***	0.461***	0.666***	0.135	0.205
– Redeemable at notice ...								
(5)	≤ 3 m	EurIBOR	0.408***	0.469***	0.186***	0.348***	0.062	0.162*
(6)	> 3 m	EurIBOR	0.467***	0.906***	0.158***	0.283***	0.439***	0.125
– *From firms* – Overnight								
(7)		EONIA	0.310***	0.450***	0.381***	0.395***	0.140*	0.014
– With agreed maturity ...								
(8)	≤ 1 y	EurIBOR	0.980***	1.041***	0.984***	1.163***	0.062	0.179
(9)	1 y – 2 y	Bearer	0.528***	0.720***	0.743***	1.184***	0.192	0.441
Loans – *To households* – Overdrafts								
(12)		EONIA	0.950***	0.327*	0.842***	0.531**	−0.623*	−0.311
– Consumer credit with an initial rate fixation ...								
(15)	> 5 y	Bearer	0.449***	0.413***	0.095	0.178*	−0.036	0.083
– Housing loans with an initial rate fixation ...								
(16)	≤ 1 y	EONIA	0.809***	0.687***	0.923***	0.784***	−0.123	−0.138
(17)	1 y – 5 y	Bearer	0.572***	0.646***	0.377***	0.432***	0.074	0.055
(18)	5 y – 10 y	Bearer	0.784***	0.833***	0.477***	0.526***	0.049	0.049
(19)	> 10 y	Bearer	0.812***	0.873***	0.586***	0.729***	0.061	0.143
– Other loans with an initial rate fixation ...								
(20)	≤ 1 y	EONIA	1.165***	0.723***	1.947***	1.097***	−0.442**	−0.850*
(21)	1 y – 5 y	Bearer	0.287***	0.491***	0.172***	0.432***	0.204**	0.260
(22)	> 5 y	Bearer	0.501***	0.835***	0.048***	0.406***	0.334***	0.357
– *To firms* – Overdrafts								
(23)		EONIA	1.164***	0.543***	0.345**	0.465**	−0.622**	0.119
– Loans up to €1 million with an initial rate fixation ...								
(24)	≤ 1 y	EONIA	0.604***	0.660***	0.602***	0.619***	0.056	0.017
(25)	1 y – 5 y	Bearer	0.616***	0.508***	0.425***	0.411***	−0.108	−0.015
(26)	> 5 y	Bearer	0.560***	0.605***	0.223***	0.178**	0.045	−0.044
– Loans over €1 million with an initial rate fixation ...								
(27)	≤ 1 y	EONIA	0.880***	0.726***	0.681***	0.944***	−0.155	0.263
(28)	1 y – 5 y	Bearer	0.386***	0.394***	0.241	0.511***	0.008	0.271
(29)	> 5 y	Bearer	0.755***	0.729***	0.632***	0.509***	−0.026	−0.123

Table 5: Pass-through of Active and Less Active Banks in the Interbank Market

	Retail Rate	Market Rate	Long Run Cat 1	Long Run Cat 3	Short Run Cat 1	Short Run Cat 3	Difference (3 − 1) Long Run	Difference (3 − 1) Short Run
Deposits – *From households* – Overnight								
(1)		EONIA	0.280***	0.261***	0.260***	0.147**	−0.018	−0.113
– With agreed maturity ...								
(2)	≤ 1 y	EurIBOR	0.710***	0.802***	0.708***	1.007***	0.092***	0.299
(3)	1 y – 2 y	Bearer	0.823***	0.790***	0.890***	0.697***	−0.033	−0.192*
(4)	> 2 y	Bearer	0.563***	0.525***	0.604***	0.395***	−0.039	−0.210*
– Redeemable at notice ...								
(5)	≤ 3 m	EurIBOR	−0.047**	0.166***	0.200***	0.358***	0.213***	0.158*
(6)	> 3 m	EurIBOR	0.173***	−0.081***	0.216***	0.129	−0.254***	−0.087
– *From firms* – Overnight								
(7)		EONIA	0.296***	0.506***	0.297***	0.553***	0.210***	0.256***
– With agreed maturity ...								
(8)	≤ 1 y	EurIBOR	0.845***	0.923***	0.896***	1.282***	0.077***	0.386***
(9)	1 y – 2 y	Bearer	0.922***	0.907***	0.178	0.981***	−0.016	0.803***
Loans – *To households* – Overdrafts								
(12)		EONIA	0.447***	0.383***	0.432***	0.549***	−0.064	0.117
– Consumer credit with an initial rate fixation ...								
(15)	> 5 y	Bearer	0.217***	0.403***	0.036	0.202*	0.186	0.166
– Housing loans with an initial rate fixation ...								
(16)	≤ 1 y	EONIA	0.387***	0.535***	0.300***	0.707***	0.147**	0.406*
(17)	1 y – 5 y	Bearer	0.562***	0.674***	0.391***	0.416***	0.112***	0.025
(18)	5 y – 10 y	Bearer	0.671***	0.735***	0.334***	0.440***	0.064*	0.106
(19)	> 10 y	Bearer	0.859***	0.874***	0.373***	0.611***	0.015	0.238***
– Other loans with an initial rate fixation ...								
(20)	≤ 1 y	EONIA	0.441***	0.762***	0.543***	0.688***	0.321***	0.145
(21)	1 y – 5 y	Bearer	0.361***	0.572***	0.125***	0.591***	0.211***	0.466**
(22)	> 5 y	Bearer	0.463***	0.587***	0.129***	0.222***	0.124*	0.092
– *To firms* – Overdrafts								
(23)		EONIA	0.182**	0.281***	0.037	0.263*	0.099	0.226
– Loans up to €1 million with an initial rate fixation ...								
(24)	≤ 1 y	EONIA	0.667***	0.825***	0.409***	0.992***	0.158**	0.583***
(25)	1 y – 5 y	Bearer	0.481***	0.593***	0.382***	0.457***	0.113*	0.076
(26)	> 5 y	Bearer	0.437***	0.551***	0.183***	0.222**	0.114*	0.039
– Loans over €1 million with an initial rate fixation ...								
(27)	≤ 1 y	EONIA	0.938***	0.932***	0.385**	0.984***	−0.006	0.599**
(28)	1 y – 5 y	Bearer	0.527***	0.685***	0.160	0.618***	0.158	0.459
(29)	> 5 y	Bearer	0.416***	0.646***	0.234**	0.516***	0.230***	0.281

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