NBER WORKING PAPER SERIES

AGGLOMERATION AND THE PRICE OF LAND: EVIDENCE FROM THE PREFECTURES

Robert Dekle
Jonathan Eaton

Working Paper No. 4781

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 1994

We thank Aditya Bhattacharjea, Rabindra Bhandari, and Akiko Tamura for excellent research assistance and seminar participants at the Board of Governors of the Federal Reserve System, Tufts University, Tel Aviv University, New York University, Harvard University, Indiana University, and participants at the conference "Asset and Land Prices: Conceptual Issues and the Japanese Experience," Boston University, for comments. We gratefully acknowledge the support of the Japan-U.S. Friendship Commission and the National Science Foundation. This paper is part of NBER's research program in International Trade and Investment. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

NBER Working Paper #4781
June 1994

AGGLOMERATION AND THE PRICE OF LAND: EVIDENCE FROM THE PREFECTURES

ABSTRACT

We use Japanese prefectural wage and land price data to estimate the magnitude of agglomeration effects in manufacturing and finance. We also examine the range of agglomeration effects by estimating the extent to which they diminish with distance, using a specification that encompasses the polar cases of purely local agglomeration economies, on the one hand, and national increasing returns to scale, on the other. We find that agglomeration effects are slightly stronger in financial services than in manufacturing, and that they diminish substantially with distance in either sector. Our estimates indicate that agglomeration effects can explain about 5.6 per cent of the growth in Japanese output per worker in manufacturing and about 8.9 per cent of the growth in output per worker in financial services during 1976-1988. Our estimates imply that, while the average elasticity of productivity with respect to agglomeration is between 10 and 15 per cent, agglomeration economies in the largest prefectures are nearly exhausted.

Robert Dekle
Department of Economics
and International Relations
Boston University
270 Bay State Road
Boston, MA 02138

Jonathan Eaton
Department of Economics
Boston University
270 Bay State Road
Boston, MA 02138
and NBER

1. Introduction

A number of explanations of economic growth focus on increasing returns to scale external to the firm as a source of increased productivity.[1] External effects also play a central role in the literature on urban location, where they provide an explanation for the existence of cities.[2] Indeed, Lucas (1988) notes the similarity of his explanation of economic growth and explanations for cities:

> "It seems to me that the 'force' we need to postulate for the central role of cities in economic life is of exactly the same character as the 'external human capital' I have postulated as a force to account for certain features of aggregative development. If so, then land rents should provide an indirect measure of this force,...(p. 39)."

The two literatures differ in two basic respects, however. For one thing, the growth literature has assumed externalities at the aggregate level, while the urban literature treats externalities as local. Second, most models of growth have not incorporated a productive role for land; all factors of production except labor are reproducible. Hence there is no natural limit to the supply of complementary factors available to an individual worker. However, not surprisingly, land plays a central role in the urban literature. The competition among factors for scarce land in an

---

[1]See, for example, Arrow (1962), Romer (1986), and Lucas (1988).

[2]Examples of models that focus on externalities at the urban level are Mills (1967), Arnott (1979), Helpman and Pines (1980), and Henderson (1988). Henderson (1987) surveys this literature.

urban location provides a centrifugal force to offset centripetal agglomeration effects. Congestion effects explain the existence of multiple cities and economic activity in nonurban locations. If agglomeration effects are never offset by competition for scarce land then activity should converge to a single point that would become a "black hole" of economic activity. Presumably the limitations on economic activity implied by finite natural resources act as a constraint on economic growth as well.

Data on urban activity over time and across countries indicate a strong correlation between economic growth and urbanization. This relationship suggests that the benefits of proximity increasingly outweigh the costs of congestion as economies develop.[3]

The relationship between urbanization and growth has been attributed to various interrelated factors.[4] One is local scale economies, both internal and external to the firm, in industrial activity (as modeled, for instance, by Henderson (1988)). Another explanation is that the increased specialization of labor and differentiation of commodities associated with development make trade at a central location more desirable (as suggested, for example, by Diamond's (1982) models of search). The first argument explains urbanization and city size by the development of particular industries. Sassen (1991), for example, relates the most recent growth of New York, London, and Tokyo to the growth of international finance.[5] The second suggests that urbanization is

[3]Kuznets (1966, pp. 272-273) found that the per cent of the population living in urban locations grew substantially between the beginning and the middle of the twentieth century in all of a sample of twelve now industrialized countries. Chenery and Syrquin (1975), applying pooled time-series cross-sectional regression analysis to international data, found that the population of a typical country became more than 50 per cent urban once its per capita income exceeded $500 (in 1964 US $), and tapered off at 75 per cent once per capita GNP exceeded $2000.

[4]Jacobs (1969, 1984) is, of course, the basic reference.

[5]Boone (1989) finds that higher land prices in Japanese prefectures are

likely to be associated with agglomerations of more specialized, and more educated, individuals (as suggested by Glaeser et.al. (1991)).

The lack of comprehensive, uniform data on land rents or prices across time and space has impeded serious investigation of the extent and range of agglomeration effects on productivity. An exception to this absence of data is Japan, where the Economic Planning Agency of the Government of Japan has reported commercial and residential property values by prefecture since the early 1970s. Given the enormous range in the intensity of land use across the 46 prefectures of the Japanese archipelago, these data provide an excellent source of information on agglomeration effects. Our purpose here is to exploit these data to measure the intensity and scope of the effects of agglomeration on productivity.

We proceed as follows. In Section 2 we develop a model of industry production with positive production externalities among firms: More production by one firm raises productivity in firms nearby. The effect diminishes across space. The model encompasses the two polar cases that have received the most attention:

In one, agglomeration effects are completely local, with possible positive spillovers between firms within a region but not across regions. The urban economics literature has devoted the most attention to this case. Ciccone and Hall (1993) have recently estimated the extent of spillovers of this type with U.S. county and state data, finding an elasticity with respect to density of .04. A maintained assumption is that spillovers are purely local.

In the other polar case, spillover effects are nationwide, with distance imposing no impediment. The international trade and macroeconomics literature

---

associated with greater production of financial services.

has focused on externalities of this type.[6] Caballero and Lyons (1992) recently estimated the external economies in U.S. manufacturing as a whole at about 20 to 30 per cent.[7]

In Section 3 we describe how we use the model to infer the magnitude and geographical reach of external economies from Japanese prefectural data on land prices, wages, outputs, and regional characteristics. We use annual data for the period 1976 through 1988. Because of spectacular growth in the output of financial services in Japan during this period, and the attention given to it by Sassen (1991) and Boone (1989), we estimate tha extent and range of agglomeration effects in manufacturing and financial services separately.

Section 4 analyses our results. We find elasticities of productivity with respect to local activity between 10 and 15 per cent in manufacturing and between 12 and 20 per cent in finance. Our estimates of the elasticities with respect to nationwide activity are about 2 to 5 per cent higher in each case. For both sectors we find that the impact of agglomeration on productivity diminishes substantially with distance. Activity 10 kilometers away has half or less the impact of activity in the immediate vicinity. The estimated effect of agglomeration on productivity is within two per cent of the theoretical maximum implied by our specification for the largest prefectures, but only about three-fourths of the theoretical maximum in prefectures with the smallest agglomeration effects. Agglomeration influences the comparative advantage of prefectures as financial and manufacturing centers, and we discuss how this comparative advantage has shifted over time. Our estimates imply that increased agglomeration can explain about 5.6 per cent of the

---

[6]Helpman (1984) surveys models of international trade with positive production externalities.

[7]We focus on economies of agglomeration across space rather than over time. Henderson (1994) has recently estimated the extent of temporal rather than spatial decay of agglomeration effects.

growth of output per worker in manufacturing and about 8.9 per cent of the growth of output per worker in finance during the period that we examine.

Section 5 discusses some implications of our results.

2. A Model of Prefectural Production and Land Rents

We first discuss the theoretical framework that we use to estimate the extent and range of agglomeration effects in manufacturing and finance. As is standard in much of the literature on externalities, we treat technology at the plant level as linear homogeneous in the plant's inputs, but allow productivity at the plant level to depend on the general level of activity at nearby plants in that industry in the region. Specifically, we measure the agglomeration economies provided by prefecture p in industry i with the index:

$$A_{ip} = \sum_{j=1}^{46} \frac{Y_{ij}}{(1+\delta_i d_{pj})^2}, \qquad (1)$$

where Y_{ij} is a measure of the overall activity of industry i in prefecture j, and d_{pj} is the distance between prefecture p and prefecture j. At one extreme, if $\delta = \infty$ then agglomeration economies are purely local in nature: Increased activity in neighboring prefectures creates no externalities. At the other extreme, if $\delta = 0$ then increased activity in this industry anywhere in the country increases productivity in prefecture p to the same extent: External economies are then nationwide.[*]

We introduce agglomeration effects into the production function as

[*]"Gravity" models of international trade employ a similar specification to estimate trade intensity between countries: Intensity increases with the product of the trading partners' incomes but diminishes with the distance between them. Deardorff (1984) discusses the model and its origins.

follows: Output y_{fip} of plant f in industry i producing in prefecture p, as a function of its inputs k_{fip} of capital, l_{fip} of labor, and t_{fip} of land, and prefectural agglomeration in that industry, A_{ip}, is:

$$y_{fip} = e^{-\phi_i/A_{ip}} \varphi_i(k_{fip}, l_{fip}, t_{fip}) \psi_i(c_p, t) U_{ipt} \tag{2}$$

where:

$$\varphi_i(k,l,t) = k^{1-\beta_{Li}-\beta_{Ti}} l^{\beta_{Li}} t^{\beta_{Ti}}. \tag{3}$$

Here ϕ_i captures the extent of external economies in industry i and β_{Li}, β_{Ti}, and $1-\beta_{Li}-\beta_{Ti}$ are factor shares for that industry. The function ψ_i contains time and prefectural characteristics c_p that affect productivity as arguments. The term U_{ipt} is a lognormally distributed error.

We adapt this functional form for the contribution of external economies from Henderson (1987). This specification implies that the elasticity of productivity with respect to total economic activity is large at low levels of activity and diminishes with increased economic activity as the contribution of agglomeration reaches its theoretical maximum of one.[9] The specification differs, for example, from what is implied by the Dixit-Stiglitz (1977) model of product differentiation, which has been applied to urban analysis by Fujita (1988). Two simple microeconomic models that yield this specification are the following:

[9]If production is Cobb-Douglas and all factors except land are mobile then the elasticity of production with respect to urban activity must diminish for cities of finite size to emerge. If external effects have a constant elasticity that is lower than the land share then activity will spread out evenly across space, while if the elasticity exceeds the land share it will collapse to a single point. See Henderson's (1987) discussion.

Product Differentiation:

One model captures the same Smithian notion that productivity increases with the division of labor among plants as the Dixit-Stiglitz (1977) framework. Specifically, say that the output y_f of plant f is a function of the number of plants N in its industry from which it buys inputs to produce its own output. In particular, let:

$$y_f = \sum e^{-\phi/N} \varphi_i(k_f, l_f, t_f).$$

If the minimum efficient plant size in the industry is X_i, then the number of plants in a prefecture will be proportional to industry output. Say that the output of a plant used as an input elsewhere is tradable at zero cost over a radius r. Also assume that it is so expensive to trade the output over a larger radius that it is not worth using elsewhere. If r has distribution $1-1/(1+\delta r)^2$, then the probability that that a plant will buy from another plant a distance r away is $1/(1+\delta r)^2$. Together these assumptions imply the specification that we use here.

Market Information

Another motivation for this specification is the superior knowledge about market conditions provided by greater levels of economic activity. Say, for example, that consumers desire a characteristic of a product θ_t^* at time t, and that θ_t^* evolves continuously according to the random walk process:

$$d\theta_t^* = \sigma dz$$

where z is a standard normal Wiener process. Consumers value a commodity embodying characteristic θ as equivalent to $e^{-(\theta-\theta*)^2}$ of a product embodying characteristic $\theta*$. Hence producers of a product with characteristic θ will have to price it at a discount of $e^{-(\theta-\theta*)^2}$. Plants can embody any value of θ in their products at equal cost.

Producers form their beliefs about θ by observing the price at which products of different qualities are sold. The most recent observation provides the best estimate of the current value of θ, and will predict the current value with variance $\sigma^2 t$, where t is the time that has lapsed since that transaction.

Suppose that the frequency of transactions in a prefecture is proportional to economic activity in the industry there, with a share $1/(1+\delta r)^2$ of transactions observed in a prefecture a distance r away. Under these assumptions, firms in prefecture p will have a forecast error that is proportional to $1/\sum Y_j/(1+\delta d_{pj})^2$. The average value of their products will fall as this forecast error rises according to the specification in equation (2).

3. Data and Estimation

Our task is to estimate the parameters ϕ and δ from Japanese prefectural data. We do so not by estimating the production function in equation (2), but by estimating the corresponding cost function. Cost minimization by firms implies that prefectural external economies and prefectural production amenities should exactly offset differences in factor costs across prefectures. Our procedure is to relate prefectural factor cost to external economies and prefectural amenities in order to estimate ϕ and δ.

We use data for the period 1976-1988.[10] Hence we have a panel with 598 observations (46 prefectures over 13 years). All data are in 1980 real yen[11].

Sectoral Decomposition

We estimate the parameters ϕ and δ for manufacturing and for financial services separately. Of the remaining sectors listed in Table 1, we remove agriculture and mining from the analysis. Both contribute negligibly to output and employment, and we regard the determination of their location as largely independent of the agglomeration and congestion effects that we address here.[12]

Of the remaining sectors, we treat (1) manufacturing and (2) finance and insurance as producing output that is primarily tradable among prefectures, and subject to the external economies modeled in Section 3. We treat the remaining 6 sectors as producing outputs that are nontradable, selling either to businesses or to households within the prefecture. We assume that these sectors produce at constant returns to scale at both the plant and industry levels, so are not themselves subject to external economies.

---

[10]Prior to 1975 the sectoral decomposition of prefectural value added was not consistent with the decomposition of the prefectural labor force.

[11]We obtained annual prefectural consumer price indices from various issues of the *Japan Statistical Yearbook*.

[12]In 1988 agricultural production was 2.7 per cent and mining was 0.3 per cent of Japanese GDP. Japanese tax policy treats agricultural land that was in agricultural use before 1950 very favorably relative to other land. Agricultural land is taxed at a lower rate than the standard tax and at 1.4 per cent of its assessed value. In most cases, agricultural land is exempt from inheritance taxes. We treat conversion of agricultural land to other uses as exogenous (determined, for example, by government policies) rather as the outcome of market forces. (Nevertheless, the anticipation that policies that protect agricultural land might be removed could have a significant effect on nonagricultural land prices, in particular, tending to depress them in prefectures where agricultural land is more plentiful.)

Local Factor Cost

We treat capital as completely mobile across prefectures, so that plants everywhere face the same cost of capital. Time effects thus pick up the effect of variations in the cost of capital over time. Hence only differences in wages and land rents create variation in local factor costs across prefectures. In order to obtain estimates of the cost of production by prefecture for manufacturing and financial services, then, we need to measure wage and land rents by prefecture, and their local (direct and indirect) shares in production.

Wages

Wages by industry and prefecture for the two traded and six nontraded sectors are calculated as the average labor cost per worker.[13]

Land Rents

The user cost of land is the rent, but we could only obtain comprehensive data on land prices.[14] Denoting the rent during period t as R_t, the price of land in period t as P_t, and the nominal opportunity cost of capital as r_t, the magnitudes are related by:

---

[13]We obtained the average labor cost per worker in each prefecture from the *Annual Report on Prefectural Accounts*. The number of workers in each sector by prefecture is taken from the *Japan Statistical Yearbook*.

[14]We obtain annual prefectural land prices by dividing private land values by the private usable land area of the prefecture. We take private prefectural land values from the Economic Planning Agency's *Annual Report on the National Accounts*. Prefectural usable land areas are from the *Japan Statistical Yearbook*.

$$R_t = r_t P_t - P^e_{t+1} - P_t,$$

where P^e_{t+1} is the price of land in that is expected in period t+1. We use the expected return on the stock market as our cost of capital variable.[15] We infer the expected land rent by estimating the equation:

$$\ln(r_t - \frac{P_{pt+1} - P_{pt}}{P_{pt}}) = \mu_t D_t + \mu_r D_{pr} + u_{pt} \qquad \text{(E1)}$$

on our prefectural panel. Here μ_{pr} is the coefficient of the dummy variable D_{pr} that indicates the prefecture's region, μ_t is the coefficient on the time dummy D_t, and u_{pt} is the error.[16] We use the forecast from this equation as our measure of local factor cost. We estimate this equation simultaneously with our estimation of the cost functions in manufacturing and in financial services.

Factor shares

We weight land and labor costs by their direct and indirect shares in production for each sector, using the 1980 national input-output matrix.[17] We partition this matrix between its two traded and six nontraded components as:

---

[15] We obtained this measure by estimating the total return on equity (dividends plus capital gain) as a first order autoregressive moving average process. We then used the one-period-ahead forecast as the expected return on capital. Data on the total return on equity are from Hamao and Ibbotson (1989).

[16] Regional dummies are based on our division of the Japanese archipelago into ten regions: Hokkaido, Tohoku, Hokuriku, Kanto (other than greater Tokyo), Greater Tokyo, Tokai, Kinki, Chugoku, Shikoku, and Kyushu. Table A1 shows how we assigned individual prefectures to these regions.

[17] The input-output matrix is from the *Annual Report on National Accounts*.

$$\begin{bmatrix} A_{TT} & A_{TN} \\ A_{NT} & A_{NN} \end{bmatrix}.$$

The *total* share of factor m in sector i, then, is $\bar{\beta}_{im}$ given by:

$$\bar{\beta}_{im} = \lambda_i \beta_{im} + \beta'_{Nm}(I-A_{NN})^{-1}A_{Nm},$$

where β_{im} is the *direct* share of factor m in value added in industry i, λ_i is the share of value added in the output of industry i, β'_{Nm} is a 6x1 column vector of the direct shares of factor m in the nontraded sectors, and A_{Nm} is the 6x1 vector of the corresponding shares of nontraded sectors in producing the output of sector i.

We calculate direct factor shares in value added for each of the eight sectors from national income accounts data from 1981 to 1985. The labor share in production for each sector is taken from national accounts data on wage payments by sector. Data on the reproducible capital stock by sector are multiplied by the long-term real interest rate to provide an estimate of the share of reproducible capital.[18] We treat the residual as the land share.

Industry Activity

We employ two different measures of industry activity. One is simply industry value added in the prefecture. The other is the density of industry value added, or value added per unit of usable land.[19] Which measure is more

[18]The Economic Planning Agency (1988) provides the national capital stock of the private sector by industry. Long-term real interest rates are from Hamao and Ibbotson (1989).

[19]Data on value added by industry are from various issues of the *Annual Report on the National Accounts* while usable land area by prefecture are from the *Japan Statistical Yearbook*.

appropriate depends upon the nature of agglomeration effects within and between prefectures. One possibility is that transportation and communications costs within a prefecture are very low relative to those between prefectures. This would be the case, for example, if individual prefectural boundaries tend to correspond to geographical barriers, such as mountain ranges and rivers, or if transportation and communications systems were much thicker within prefectures than between them. In this case total prefectural value added would provide the better measure of prefectural activity. Another possibility is that prefectural boundaries have little bearing on the range of agglomeration effects, in which case the density of activity in the prefecture captures economies of agglomeration better than the total level.

In fact, as we discuss below, the two measures yield similar estimates of the scale of external economies. The total value added measure provides somewhat better explanatory power and allows us to identify the role of distance much more precisely.

Prefectural Amenities

To capture other features that might affect productivity, we include the number of ports (PORTS) and Shinkansen (bullet train) stations in the prefecture.[20] Only the number of ports was significant, and results with the number of Shinkansen stations are not reported.

Hence for the two sectors i=M,F we estimated the equation:

[20]Data on the number of ports and Shinkansen stations are from Asahi Newspapers (1991).

$$\bar{\beta}_{Ti}[\ln P_{pt} + \ln(\mu_r D_{pr} + \mu_t D_t)] + \bar{\beta}_{Li} \ln W_{pt} = \omega_0 + \phi \Big/ \sum_{j=1}^{46} \frac{Y_{ij}}{(1+\delta d_{pj})^2} + \kappa \, PORTS_p + \omega_t D_t + \omega_r D_{pr} + v_{pt} \qquad (E2)$$

jointly with equation (E1) to determine $\mu_t, \mu_d, \omega_0, \omega_t, \omega_d, \phi, \delta$, and κ. We also estimated the equations without the regional dummies in the cost equation.

A potential source of simultaneity bias is that unobserved prefecture characteristics that enhance productivity in the prefecture may simultaneously raise value added in that and in nearby prefectures and raise the cost of labor and land in that prefecture. To correct for possible simultaneity bias we also estimated equations (E1) and (E2) using instrumental variables for the term A_{ipt}. Instruments were the amount of land in the prefecture designated as "capable of development", average temperature, and the average number of days of sunshine per year.[21] Our instrumental variables appear to have better explanatory power for manufacturing than for finance, and for total value added than for density. Since manufacturing is the larger sector for all of the prefectures we consider, there is also more reason to think that simultaneity bias is greater in this sector. For these reasons we place more weight on the instrumented (IV) equations in the case of manufacturing and on the uninstrumented (non-IV) equations in the case of finance, although we report all sets of results.

We estimated all specifications with the Full-Information Maximum-Likelihood Technique in TSP. Because of the very nonlinear nature of the estimation, we estimated each system of equations for given values of δ between 0 and 1. We report the estimate that maximized the log likelihood function. The reported standard errors for other coefficients, calculated by

[21]Data on average temperature and on the average number of days of sunshine are from Asahi newspapers (1991).

the Berndt-Hall-Hall-Hausman method, are thus conditional on the indicated value of δ being the true value.

When density serves as the industry scale variable, the likelihood function as a function of δ is very flat. The value of δ that maximized the log likelihood was consequently very unstable, and sensitive to the use of instrumental variables. The implied national agglomeration effects at the national level are similar to those we obtain when we use the level of activity. For these reasons our discussion focuses mostly on the results in which total value added rather than its density serves as the measure of prefectural activity.

4. Results

Appendix A reports the basic estimation results. We discuss four aspects in turn: (1) the effect of distance, or the range of agglomeration effects, (2) the elasticity of productivity with respect to agglomeration at the local and national levels, (3) the magnitude of agglomeration effects across prefectures and industries, and (4) the contribution of increased agglomeration to productivity growth both to individual prefectures and nationally.

Distance

Table 3 reports, in its third column, the coefficient δ on distance in the agglomeration term for the various cases. A value of zero implies that agglomeration effects are nationwide, corresponding to aggregate external economies of scale, while an infinite value means that agglomeration effects are purely local. Except for the case of finance with IV correction, the estimated distance coefficient δ is 0.06 or 0.07 for both manufacturing and finance. The coefficient on distance in finance with IV correction is .03.

Table 4 reports the implications of these estimates for the gradient of the agglomeration effect. In fact, the range of estimates of δ imply a quite similar, and fairly steep, gradient. Moving activity a kilometer away from a location reduces its contribution to productivity at that location by between 87 and 94 per cent of its impact in the immediate vicinity, while moving it away 10 kilometers reduces its impact to between 39 and 57 per cent. Moving activity 100 kilometers away dilutes its impact to only 2 to 6 per cent of its local impact.[22]

We conclude, then, that agglomeration effects are substantially local in character. Nevertheless, this range of estimates leaves room for substantial productivity spillovers across prefectures, as we now discuss.

Prefectural and National Agglomeration Elasticities

Since the magnitude of the parameter ϕ depends on units in which value added is measured, we find it more instructive to report the elasticity of the effect of activity on productivity implied by our estimates of ϕ and δ. Our specification implies that this elasticity declines as the overall measure of nearby activity increases, however, so that the effect can vary substantially from prefecture to prefecture. Hence we calculate the elasticities implied by our estimates for each prefecture at the average value of the agglomeration

[22]When density rather than the level of value added served as the activity indicator, our estimate of δ was very sensitive to IV correction. Without correction the estimate was very high, implying virtually no spillovers beyond the immediate vicinity, while with the correction the implied spillovers were national.

variable during the period of estimation. Table 5 reports the calculated elasticities prefecture by prefecture. Note that they vary widely, and are substantially lower in large prefectures. Table 3 reports the simple average of the prefectural elasticities.

We report elasticities of two types. One we call the local elasticity, which is the percentage increase in productivity at a location resulting from a one per cent increase in activity at that location *holding activity elsewhere constant*. We also calculate the national elasticity for each prefecture, which is the percentage effect on productivity in that prefecture of a one per cent increase in activity *in all prefectures*.

The presence of regional dummies in the cost equations tends to reduce the size of the elasticities by between 3 to 8 per cent. This reduction is not surprising since the 10 regional dummies eliminate the contribution of cross-regional variability to the estimation.

Instrumental variables correction reduces the estimated elasticities for finance when total value added measures activity, and for both industries when density measures activity. This direction is expected since unobserved prefectural characteristics that raise productivity in a prefecture will also raise factor cost in the prefecture. Surprisingly, IV correction actually raises the estimated elasticities slightly in manufacturing when total value added measures activity.

Without IV correction, both the local and national elasticities in finance exceed those in manufacturing by 3 to 8 percentage points. Since instrumental variables correction reduces the estimated elasticities for finance considerably, and slightly raises those for manufacturing, instrumental variables correction reverses the ordering between the two industries. Since finance is a smaller share of prefectural GDP than is manufacturing for all prefectures, there is less scope for simultaneity bias in finance. Moreover, our instruments explain manufacturing GDP more successfully than they explain financial GDP. For this reason we concentrate more on the IV corrected equations in manufacturing and the uncorrected equations in finance.

The elasticities indicate that externalities for both industries are largely local. With total value added measuring activity, estimates of local elasticities range from 9 to 20 per cent, with the national elasticity a quarter to half as much higher.

It is useful to compare our results on the *regional* scope of externalities with Caballero and Lyons' (1992) finding about their *sectoral* scope. Their study finds that, within U.S. manufacturing, external effects are small within sectors but substantial across manufacturing as a whole. In contrast, we find strong externalities within regions but less between them. Together, our results suggest that location rather than specialization is a much greater source of external effects.

The Exhaustion of Agglomeration Externalities

Table 6 reports the contribution of total agglomeration economies in each industry in each prefecture, i.e. the value of term $\exp(-\phi/A_{ip})$ where A_{ip} is given in equation 1, at the beginning and at the end of the sample. We report these for the case in which regional dummies are included in (E2), using the IV-corrected measure of manufacturing activity and the non-IV corrected measure of financial activity.

The agglomeration measure $\exp(-\phi/A_{ip})$ has a theoretical maximum of 1. Note that the measure for some prefectures is within one or two percentage points of this maximum, indicating that the potential for agglomeration economies is nearly exhausted.

For manufacturing, Tokyo and Aichi (Nagoya) prefectures report the largest agglomeration externalities in 1990, both above .99. At the other extreme, Aomori prefecture in northern Honshu and Nagasaki prefecture in Kyushu have the lowest manufacturing externalities in 1990, at about 75 and 77 per cent of the theoretical maximum, respectively. These figures imply that the low level of manufacturing in and around this second pair of prefectures lowered productivity there to little over three-fourths of what it is in the first pair.

In finance, the largest agglomeration effects appear again for Tokyo now followed by Kanagawa (Yokohama). Miyazaki prefecture in Kyushu, and then Akita prefecture in Northern Honshu, report the lowest level of agglomeration externalities.

Relative agglomeration effects also contribute to the comparative advantage of prefectures between manufacturing and finance. In Chiba and Hokkaido, for example, the contribution of agglomeration to productivity is about the same in manufacturing and finance, but in prefectures like Aichi and Shiga, the contribution of agglomeration to productivity is about 3 per cent higher in manufacturing than it is in finance.

Moreover, the contribution of agglomeration economies to comparative advantage has shifted over time. Over the entire period externalities in finance have grown by about three per cent in Kanagawa and only by one per cent in manufacturing. In Aomori prefecture, however, manufacturing externalities grew by about 9 per cent in manufacturing, but only by about 5 per cent in finance.

Our functional form forces the contribution of agglomeration to productivity to diminish with the agglomeration parameter A_p. To test whether or not a diminishing agglomeration effect is implied by the data, we estimated the model using the following variant of the production function (2):

$$y_{fip} = (A_{ip})^{(\alpha_1 + \alpha_2 \ln A_{ip})} \varphi_i(k_{fip}, l_{fip}, t_{fip}) \psi_i(c_p, t) U_{ipt}. \qquad (2')$$

This specification allows the agglomeration elasticity either to increase ($\alpha_2 > 0$) or to decrease ($\alpha_2 < 0$), and encompasses the special case of a constant elasticity of productivity with respect to agglomeration ($\alpha_2 = 0$) assumed, for example, by Ciccone and Hall (1993). For most values of δ, we obtained significantly positive estimates of α_1 and significantly negative estimates of α_2. For all values of δ that we considered, the estimated coefficients imply an average agglomeration elasticity for Japan as a whole similar to what we report here, and negative agglomeration elasticities for the largest prefectures.

Agglomeration and Growth

Table 6 also reports the growth in the agglomeration measure during the sample period for each prefecture. The GDP-weighted national average growth in the manufacturing agglomeration measure is .17 per cent while the growth in the finance agglomeration measure is .26 per cent. These measures compare with an overall growth in output per worker of 3.0 per cent in manufacturing and 2.9 per cent in finance. Hence, agglomeration effects can account for a small but nontrivial part of overall growth in per capita output in these sectors.

5. Conclusion

This paper has used data on land prices and wages in the Japanese prefectures to infer the extent and range of agglomeration economies in manufacturing and in financial services. The main implications are that: (1) while the extent of agglomeration economies in both sectors is significant (with agglomeration elasticities of around 10 per cent or more), they are fairly localized geographically. (2) Less conclusively we find agglomeration economies to be larger in finance than in manufacturing. (3) Agglomeration economies appear to be nearly exhausted in the prefectures where they are most pronounced. (4) The lowest observed measures of agglomeration economies imply productivity levels that are about three-quarters of the highest observed agglomeration economies. The exploitation of agglomeration economies can explain about 5.6 per cent of the labor productivity growth in manufacturing and 8.9 per cent of labor productivity growth in finance during the period of our sample.

These results suggest an explanation for the increased concentration of land prices in Japan based on the growth of the financial service sector. If financial services tend to occupy localities with larger land areas, either because of historical accident or because agglomeration effects are more pronounced in these sectors, then an increase in the relative price of these services in terms of manufactures will act to increase relative land prices in larger areas. Of the ten regions in Table A1, the Greater Tokyo region has the largest area of *land that could be used for building purposes*, followed by the Kinki area.[23] As a consequence of higher land prices in these areas, and

---

[23]Other regions such as Hokkaido and Hokuriku have higher total land areas, but most of this land is mountainous, forested, or agricultural and hence not available for private development. Within the Tokyo region, even the

of higher wages that workers must therefore be paid to compensate them for the higher cost of living in these areas, manufacturing activity will shift toward smaller areas. The net effect on total prefectural output may be relatively small.

---

individual prefectures of Chiba, Kanagawa, and Tokyo have more usable land area than any others except Hokkaido and Aichi.

REFERENCES

Arnott, Richard (1979), "Optimum City Size in a Spatial Economy," *Journal of Urban Economics*, 6: 65-89.

Arrow, Kenneth J. (1962), "The Economic Implications of Learning by Doing," *Review of Economic Studies*, 29: 155-173.

Asahi Newspapers (1991), *Minryoku* (Tokyo: Asahi Newspapers).

Boone, Peter (1989), "High Land Values in Japan: Is the Archipelago Worth Eleven Trillion Dollars?" Draft, Harvard University.

Caballero, Ricardo J. and Richard K. Lyons (1992), "External Effects in U.S. Procyclical Productivity," *Journal of Monetary Economics*, 29: 209-226.

Chenery, Hollis B. and Moises Syrquin (1975), *Patterns of Development: 1950-1970* (London: Oxford University Press).

Ciccone, Antonio and Robert E. Hall (1993), "Productivity and the Density of Economic Activity," *NBER Working Paper No, 4313*.

Deardorff, Alan V. (1984), "Testing Trade Theories and Predicting Trade Flows," *Handbook of International Economies, Volume I*, edited by Ronald W. Jones and Peter B. Kenen (Amsterdam: Elsevier Science Publishers).

Dixit, Avinash and Joseph E. Stiglitz (1977), "Monopolistic Competition and Optimum Product Diversity," *American Economic Review*, 72: 389.

Economic Planning Agency, Government of Japan (1988), *Gross Capital Stock of Private Enterprises* (Tokyo)

Economic Planning Agency, Government of Japan (Various years), *Annual Report on Prefectural Accounts* (Tokyo).

Economic Planning Agency, Government of Japan (Various years), *Annual Report on National Accounts* (Tokyo).

Fujita, Masahisa (1989), *Urban Economic Theory: Land Use and City Size* (Cambridge: Cambridge University Press).

Glaeser, Edward L., Hedi D. Kallal, Jose A. Scheinkman, and Andrei Shleifer (1992), "Growth in Cities," *Journal of Political Economy*, 100: 1126-1152.

Hamao, Yasushi and Roger Ibbotson (1989), *Stocks, Bonds, and Inflation: Japan* (Chicago: Ibbotson Associates).

Helpman, Elhanan (1984), "Increasing Returns, Imperfect Markets, and Trade Theory," *Handbook of International Economics, Volume I*, edited by Ronald W. Jones and Peter B. Kenen (Amsterdam: Elsevier Science Publishers).

Helpman, Elhanan and David Pines (1980), "Optimal Public Investment and Dispersion Policy in a System of Open Cities," *American Economic Review*, 70: 507-514.

Henderson, J. Vernon (1987), "General Equilibrium Modeling of a System of Cities," *Handbook of Regional and Urban Economies, Volume II*, edited by E.S. Mills (Amsterdam: Elsevier Science Publishers).

Henderson, J. Vernon (1988), *Urban Development: Theory, Fact, and Illusion* (New York: Oxford University Press).

Henderson, J. Vernon (1994), "Externalities and Industrial Development," *NBER Working Paper No.4730*

Jacobs, Jane (1969), *The Economy of Cities*. (New York: Random House).

Jacobs, Jane (1984), *Cities and the Wealth of Nations*. (New York: Random House).

Kuznets, Simon (1966), *Modern Economic Growth: Rate, Structure, and Spread* (New Haven: Yale University Press).

Lucas, Robert E. (1988), "On the Mechanics of Economic Development," *Journal of Monetary Economics*, 21: 3-42.

Mills, Edwin S. (1967), "An Aggregative Model of Resource Allocation in a Metropolitan Area," *American Economic Review*, 57: 197-210.

Rauch, James E. (1993), "Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities," *Journal of Urban Economics*, 34: 380-400.

Romer, Paul (1986), "Increasing Returns and Long-Run Growth," *Journal of Political Economy*, 94: 1002-1037.

Sassen, Saskia (1991), *The Global City.* (Princeton: Princeton University Press).

Table 1

Gross Prefectural Product: Private Sector Industries

"Traded" Goods and Services:

- Manufactures
- Finance and Insurance

"Nontraded" Goods and Services:

- Construction
- Electricity, Gas, and Water
- Wholesale and Retail
- Real Estate
- Transportation and Communication
- Other Services

Primary Goods and Services:

- Agriculture and Forestry
- Mining

Table 2

Parameter Estimates

β_{LM}	Direct and indirect labor share in manufacturing value added	.72
β_{FL}	Direct and indirect labor share in financial service value added	.70
β_{TM}	Direct and indirect land share in manufacturing value added	.12
β_{TF}	Direct and indirect land share in financial services value added	.28

Valuations are in billions of 1980 yen, distances are measured in kilometers and areas in square kilometers.

TABLE 3:
AVERAGE ELASTICITIES AND DISTANCE COEFFICIENTS

TOTAL VALUE ADDED	LOCAL ELASTICITY	NATIONAL ELASTICITY	DELTA
		MANUFACTURING	
SINGLE EQUATION			
WITHOUT REGIONAL DUMMIES	0.133	0.159	0.07
WITH REGIONAL DUMMIES	0.1	0.12	0.06
INSTRUMENTAL VARIABLES			
WITHOUT REGIONAL DUMMIES	0.152	0.177	0.07
WITH REGIONAL DUMMIES	0.101	0.12	0.07
		FINANCE	
SINGLE EQUATION			
WITHOUT REGIONAL DUMMIES	0.199	0.244	0.06
WITH REGIONAL DUMMIES	0.136	0.167	0.06
INSTRUMENTAL VARIABLES			
WITHOUT REGIONAL DUMMIES	0.12	0.2	0.03
WITH REGIONAL DUMMIES	0.091	0.149	0.03
DENSITY OF VALUE ADDED			
		MANUFACTURING	
WITH REGIONAL DUMMIES			
SINGLE EQUATION	0.15	0.15	0.5
INSTRUMENTAL VARIABLES	0.02	0.18	0.005
		FINANCE	
WITH REGIONAL DUMMIES			
SINGLE EQUATION	0.25	0.25	0.45
INSTRUMENTAL VARIABLES	0.01	0.14	0.001

TABLE 4:
AGGLOMERATION GRADIENTS

DELTA	DISTANCE	GRADIENT
0.03	1	0.94
0.03	10	0.59
0.03	100	0.06
0.06	1	0.89
0.06	10	0.39
0.06	100	0.02
0.07	1	0.87
0.07	10	0.35
0.07	100	0.02

TABLE 5: AGGLOMERATION ELASTICITIES

Prefecture	Number	Loc Man Elas	Nat Man Elas	Loc Fin Elas	Nat Fin Elas
Hokkaido	1	0.071	0.071	0.066	0.065
Aomori	2	0.329	0.36	0.233	0.241
Iwate	3	0.202	0.221	0.265	0.283
Miyagi	4	0.098	0.108	0.131	0.144
Akita	5	0.236	0.257	0.279	0.307
Yamagata	6	0.143	0.166	0.198	0.234
Fukushima	7	0.082	0.089	0.142	0.162
Niigata	8	0.07	0.072	0.123	0.131
Ibaragi	9	0.038	0.043	0.087	0.119
Tochigi	10	0.039	0.045	0.084	0.129
Gunma	11	0.045	0.053	0.077	0.109
Saitama	12	0.011	0.018	0.01	0.027
Chiba	13	0.018	0.027	0.021	0.041
Tokyo	14	0.007	0.008	0.008	0.007
Kanagawa	15	0.011	0.013	0.018	0.029
Yamanashi	16	0.081	0.127	0.109	0.2
Nagano	17	0.059	0.064	0.097	0.109
Shizuoka	18	0.029	0.03	0.066	0.072
Toyama	19	0.091	0.103	0.168	0.199
Ishikawa	20	0.114	0.142	0.169	0.198
Gifu	21	0.03	0.048	0.068	0.108
Aichi	22	0.013	0.013	0.034	0.035
Mie	23	0.045	0.059	0.103	0.141
Fukui	24	0.116	0.159	0.188	0.239
Shiga	25	0.025	0.044	0.032	0.102
Kyoto	26	0.023	0.036	0.042	0.062
Osaka	27	0.012	0.013	0.015	0.016
Hyogo	28	0.018	0.021	0.032	0.042
Nara	29	0.029	0.072	0.041	0.113
Wakayama	30	0.058	0.089	0.09	0.17
Tottori	31	0.176	0.273	0.257	0.374
Shimane	32	0.237	0.304	0.334	0.404
Okayama	33	0.051	0.057	0.107	0.129
Hiroshima	34	0.053	0.055	0.091	0.093
Yamaguchi	35	0.091	0.094	0.178	0.193
Tokushima	36	0.09	0.155	0.139	0.226
Kagawa	37	0.065	0.112	0.114	0.168
Ehime	38	0.108	0.118	0.184	0.199
Kochi	39	0.318	0.377	0.261	0.304
Fukuoka	40	0.046	0.047	0.069	0.069
Saga	41	0.156	0.215	0.224	0.301
Nagasaki	42	0.228	0.256	0.254	0.267
Kumamoto	43	0.158	0.164	0.207	0.224
Oita	44	0.169	0.166	0.259	0.277
Miyazaki	45	0.305	0.323	0.37	0.392
Kagoshima	46	0.236	0.244	0.212	0.212
Averages		0.101	0.12	0.136	0.167

TABLE 6: AGGLOMERATION COEFFICIENTS AND GROWTH

Prefecture	Number	1990 Man Agglom	1977-1990 Growth	1990 Fin Agglom	1977-1990 Growth
Hokkaido	1	0.939	0.096	0.946	0.17
Aomori	2	0.759	1.23	0.81	0.688
Iwate	3	0.843	0.782	0.799	1.28
Miyagi	4	0.919	0.432	0.886	0.404
Akita	5	0.83	1.13	0.777	1.02
Yamagata	6	0.888	0.734	0.837	0.877
Fukushima	7	0.938	0.433	0.879	0.618
Niigata	8	0.939	0.18	0.901	0.439
Ibaragi	9	0.968	0.204	0.928	0.676
Tochigi	10	0.972	0.24	0.922	0.7
Gunma	11	0.962	0.304	0.929	0.494
Saitama	12	0.985	0.071	0.985	0.167
Chiba	13	0.979	0.085	0.978	0.255
Tokyo	14	0.993	0.022	0.997	0.043
Kanagawa	15	0.989	0.033	0.983	0.159
Yamanashi	18	0.912	0.731	0.877	1.02
Nagano	17	0.95	0.26	0.918	0.405
Shizuoka	18	0.977	0.141	0.948	0.276
Toyama	19	0.923	0.393	0.851	0.8
Ishikawa	20	0.889	0.404	0.852	0.639
Gifu	21	0.963	0.179	0.921	0.402
Aichi	22	0.99	0.054	0.975	0.131
Mie	23	0.953	0.203	0.902	0.644
Fukui	24	0.872	0.39	0.832	0.882
Shiga	25	0.967	0.214	0.925	0.364
Kyoto	26	0.97	0.128	0.952	0.204
Osaka	27	0.989	0.02	0.987	0.032
Hyogo	28	0.981	0.032	0.967	0.104
Nara	29	0.939	0.25	0.908	0.286
Wakayama	30	0.913	0.077	0.888	0.424
Tottori	31	0.811	1.06	0.725	0.948
Shimane	32	0.785	1.2	0.718	1.5
Okayama	33	0.957	0.224	0.909	0.467
Hiroshima	34	0.957	0.119	0.928	0.247
Yamaguchi	35	0.934	0.332	0.849	0.48
Tokushima	38	0.873	0.42	0.827	0.655
Kagawa	37	0.905	0.287	0.871	0.478
Ehime	38	0.899	0.077	0.846	0.546
Kochi	39	0.897	2.49	0.764	0.904
Fukuoka	40	0.962	0.13	0.948	0.244
Saga	41	0.834	0.692	0.788	1.17
Nagasaki	42	0.769	0.022	0.819	1.04
Kumamoto	43	0.888	0.954	0.839	0.91
Oita	44	0.889	1.32	0.792	0.813
Miyazaki	45	0.769	1.41	0.722	1.33
Kagoshima	48	0.82	0.919	0.848	0.924

TABLE A1: REGIONAL ASSIGNMENTS OF THE PREFECTURES

1 HOKKAIDO
Hokkaido
2 TOHOKU
Aomori
Iwate
Miyagi
Akita
Yamagata
Fukushima
3 HOKURIKU
Niigata
Toyama
Ishikawa
Fukui
4 KANTO
Ibaragi
Tochigi
Gunma
Yamanashi
Nagano
5 TOKYO
Chiba
Tokyo
Kanagawa
Saitama
6 TOKAI
Shizuoka
Gifu
Aichi
Mie
7 KINKI
Shiga
Kyoto
Osaka
Hyogo
Nara
Wakayama
8 CHUGOKU
Tottori
Shimane
Okayama
Hiroshima
Yamaguchi
9 SHIKOKU
Tukushima
Kagawa
Ehime
Kochi
10 KYUSHU
Fukuoka
Saga
Nagasaki
Kumamoto
Oita
Miyazaki
Kagashima

APPENDIX A

ESTIMATION RESULTS

Variable Definitions

Equation 1: Unit Cost of Production (E2)

Parameter	Coefficient
PHI	Inverse Agglomeration Measure
PORTS	Number of Ports
Z2-Z10	Dummies for Regions 2-10 (See Table A1)
X1-X13	Dummies for years 1976-1988

Equation 2: User Cost of Land (E1)

Parameter	Coefficient
BPL1-BPL13	Dummies for Years 1976-1988
BPL14-BPL22	Dummies for Regions 2-10 (See Table A1)

Equation 3: Instrumental Variable Equation

Parameter	Coefficient
BIN1	Amount of Land Capable of Development
BIN2	Number of Ports
BIN3	Average Annual Temperature
BIN4	Average number of days of sunshine per year
BIN5-BIN17	Dummies for years 1976-1988
BIN18-BIN26	Dummies for Regions 2-10 (See Table A1)

All specifications were estimated by the Full-Information Maximum-Likelihood routine in TSP. Reported equations are for the value of distance deflator delta that maximizes the log likelihood function. Standard errors are calculated by the Berndt-Hall-Hall-Hausman method, and are conditional on the reported estimate of delta being the true value.

MANUFACTURING 1

(value added, no IV's, no Regional Dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-124.197	6.47492	-19.1812
PORTS	.203389	.021130	9.62565
X1	-4.51051	.029520	-152.796
X2	-4.57924	.040385	-113.391
X3	-4.66484	.050076	-93.1550
X4	-4.59954	.054460	-84.4575
X5	-4.51357	.056534	-79.8378
X6	-4.44328	.053083	-83.7038
X7	-4.22626	.065272	-64.7486
X8	-4.09467	.053654	-76.3163
X9	-4.06904	.038302	-106.235
X10	-4.01311	.038260	-104.890
X11	-3.97258	.035457	-112.041
X12	-4.03143	.038590	-104.468
X13	-3.95837	.033546	-118.000
BPL1	.126496	.034018	3.71854
BPL2	.050971	.034003	1.49900
BPL3	.021273	.032248	.659686
BPL4	.020859	.032255	.646689
BPL5	.020500	.032261	.635464
BPL6	.020502	.032237	.635983
BPL7	.051284	.039544	1.29690
BPL8	.113081	.061138	1.84960
BPL9	.108012	.041405	2.60868
BPL10	.126672	.040799	3.10479
BPL11	.125637	.035046	3.58494
BPL12	.060582	.032628	1.85674
BPL13	.070645	.033718	2.09514
BPL14	.014801	.033129	.446756
BPL15	.024372	.034068	.715393
BPL16	-.983557E-02	.032344	-.304088
BPL17	-.017687	.032087	-.551211
BPL18	-.893958E-03	.032529	-.027482
BPL19	-.013207	.032017	-.412503
BPL20	-.746828E-02	.032462	-.230060
BPL21	-.443974E-02	.032241	-.137705
BPL22	-.908986E-02	.031986	-.284185

	1	2
@SSR	12.43811	3.90043

@LOGL = 967.256
DELTA = 0.070000

MANUFACTURING 2

(value added, no IV's, with Regional Dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-100.613	10.0620	-9.99933
PORTS	.272563	.023646	11.5268
Z2	-.102467	.247915	-.413315
Z3	-.115460	.246898	-.467643
Z4	.139461	.247525	.563422
Z5	.250999	.245839	1.02099
Z6	.040343	.247057	.163293
Z7	.126269	.246727	.511776
Z8	.640784E-02	.247716	.025868
Z9	.117302E-02	.248121	.472760E-02
Z10	.023091	.246686	.093603
X1	-4.64925	.248263	-18.7271
X2	-4.69623	.248520	-18.8968
X3	-4.97856	.459455	-10.8358
X4	-4.93616	.491446	-10.0442
X5	-4.90391	.483200	-10.1488
X6	-4.81818	.491975	-9.79356
X7	-4.33684	.257092	-16.8688
X8	-4.22331	.256266	-16.4802
X9	-4.19566	.250849	-16.7258
X10	-4.14043	.249750	-16.5783
X11	-4.09999	.248429	-16.5037
X12	-4.14281	.248490	-16.6719
X13	-4.06841	.247482	-16.4392
BPL1	.124812	.011899	10.4890
BPL2	.054724	.013014	4.20501
BPL3	.235463E-02	.895073E-02	.263065
BPL4	.168306E-02	.715157E-02	.235342
BPL5	.769055E-03	.397977E-02	.193241
BPL6	.101614E-02	.483033E-02	.210366
BPL7	.057230	.036633	1.56225
BPL8	.112076	.067051	1.67151
BPL9	.107277	.028262	3.79583
BPL10	.125291	.026851	4.66608
BPL11	.124212	.014049	8.84114
BPL12	.064509	.897403E-02	7.18842
BPL13	.074044	.010790	6.86222
BPL14	.324046E-03	.315601E-02	.102676
BPL15	.750149E-03	.388756E-02	.192962
BPL16	.861460E-03	.413594E-02	.208286
BPL17	.402926E-03	.321804E-02	.125208
BPL18	.756407E-03	.391346E-02	.193283
BPL19	.378464E-03	.321350E-02	.117773
BPL20	.296778E-03	.315885E-02	.093951
BPL21	.599839E-03	.360296E-02	.166485
BPL22	.399089E-03	.321795E-02	.124020

	1	2
@SSR	10.06253	3.79330

@LOGL = 1037.94119
DELTA = 0.060000

MANUFACTURING 3

(value added, with IV's, no Regional Dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-139.890	40.1049	-3.48810
PORTS	.213857	.037567	5.69273
X1	-4.49424	.051698	-86.9331
X2	-4.56385	.053290	-85.6411
X3	-4.66045	.062713	-74.3144
X4	-4.59592	.065430	-70.2422
X5	-4.51003	.068001	-66.3231
X6	-4.43867	.065471	-67.7964
X7	-4.21173	.076465	-55.0806
X8	-4.08318	.062647	-65.1779
X9	-4.05833	.047823	-84.8608
X10	-4.00280	.047387	-84.4705
X11	-3.96221	.044916	-88.2146
X12	-4.01980	.045648	-88.0616
X13	-3.94964	.038274	-103.194
BPL1	.129060	.037018	3.48637
BPL2	.053846	.036454	1.47709
BPL3	.022447	.034727	.646390
BPL4	.022073	.034729	.635574
BPL5	.021689	.034725	.624607
BPL6	.021701	.034700	.625398
BPL7	.054318	.043144	1.25900
BPL8	.115753	.064261	1.80131
BPL9	.110739	.044223	2.50408
BPL10	.129342	.044144	2.92998
BPL11	.128314	.038257	3.35401
BPL12	.064221	.035503	1.80888
BPL13	.074272	.036182	2.05275
BPL14	.954924E-02	.037117	.257274
BPL15	.021377	.036727	.582043
BPL16	-.011714	.034793	-.336671
BPL17	-.018988	.034511	-.550188
BPL18	-.246110E-02	.034646	-.071036
BPL19	-.014720	.034424	-.427619
BPL20	-.987922E-02	.034719	-.284550
BPL21	-.761267E-02	.034436	-.221065
BPL22	-.010970	.034109	-.321619

Instrumental Variable Equation

BIN1	-.107082E-06	.414517E-07	-2.58329
BIN2	.996451E-03	.411794E-03	2.41978
BIN3	-.149639E-03	.452713E-04	-3.30537
BIN4	.237044E-06	.461968E-06	.513117
BIN5	.270284E-02	.642480E-03	4.20689
BIN6	.255305E-02	.638663E-03	3.99749
BIN7	.246789E-02	.644902E-03	3.82677
BIN8	.240897E-02	.653398E-03	3.68684
BIN9	.245121E-02	.654170E-03	3.74705
BIN10	.250518E-02	.649871E-03	3.85489
BIN11	.247243E-02	.645981E-03	3.82740
BIN12	.238829E-02	.651813E-03	3.66407
BIN13	.233437E-02	.660507E-03	3.53421
BIN14	.231689E-02	.661964E-03	3.50003
BIN15	.232041E-02	.663377E-03	3.49788
BIN16	.223909E-02	.674112E-03	3.32154
BIN17	.208692E-02	.667406E-03	3.12692

	1	2	3
@SSR	12.62479	3.88510	0.00058590

@LOGL = 4256.51651
DELTA = 0.070000

MANUFACTURING 4

(value added, with IV's, with regional dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-96.2981	14.8514	-6.48412
PORTS	.270093	.028620	9.43713
Z2	-.098902	.270244	-.365974
Z3	-.108989	.271872	-.400882
Z4	.143995	.273818	.525879
Z5	.257305	.269786	.953735
Z6	.045314	.271444	.166935
Z7	.133869	.270228	.495392
Z8	.015537	.271099	.057312
Z9	.011721	.271654	.043148
Z10	.027080	.271879	.099605
X1	-4.65137	.272539	-17.0668
X2	-4.69858	.272246	-17.2586
X3	-5.24009	10.8905	-.481164
X4	-5.25787	10.7589	-.488699
X5	-5.20529	10.7571	-.483894
X6	-5.11699	10.7575	-.475668
X7	-4.33918	.281017	-15.4410
X8	-4.22578	.282184	-14.9752
X9	-4.19819	.274323	-15.3038
X10	-4.14296	.274166	-15.1112
X11	-4.10254	.272362	-15.0628
X12	-4.14530	.272482	-15.2131
X13	-4.07152	.272007	-14.9685
BPL1	.125305	.012504	10.0212
BPL2	.055202	.015262	3.61693
BPL3	.125067E-03	.011340	.011029
BPL4	.279231E-04	.250222E-02	.011159
BPL5	.206157E-04	.184852E-02	.011153
BPL6	.263598E-04	.236224E-02	.011159
BPL7	.057720	.037064	1.55730
BPL8	.112566	.067695	1.66284
BPL9	.107764	.028401	3.79435
BPL10	.125785	.027614	4.55508
BPL11	.124708	.013382	9.31927
BPL12	.065089	.921915E-02	7.06019
BPL13	.074659	.010560	7.06979
BPL14	.598769E-05	.532990E-03	.011234
BPL15	.155009E-04	.138294E-02	.011209
BPL16	.182672E-04	.163039E-02	.011204
BPL17	.131623E-04	.117384E-02	.011213
BPL18	.166329E-04	.148423E-02	.011206
BPL19	.853700E-05	.760323E-03	.011228
BPL20	.470610E-05	.418575E-03	.011243
BPL21	.856244E-05	.763009E-03	.011222
BPL22	.106495E-04	.948986E-03	.011222

Instrumental Variable Equation

BIN1	.116084E-04	.109399E-05	10.6111
BIN2	-.014987	.322964E-02	-4.64046
BIN3	.011256	.117057E-02	9.61558
BIN4	-.774294E-04	.738653E-05	-10.4825
BIN5	-.183145	.029263	-6.25860
BIN6	-.183107	.029249	-6.26036
BIN7	-.179399	.029101	-6.16467
BIN8	-.179062	.029012	-6.17211
BIN9	-.174639	.028829	-6.05775
BIN10	-.176477	.028904	-6.10554
BIN11	-.183282	.029353	-6.24403
BIN12	-.183474	.029345	-6.25221
BIN13	-.183528	.029371	-6.24859
BIN14	-.183552	.029356	-6.25253
BIN15	-.183537	.029361	-6.25109
BIN16	-.183683	.029365	-6.25521
BIN17	-.184088	.029341	-6.27417
BIN18	.159675	.021755	7.33966
BIN19	.141469	.022313	6.34029
BIN20	.165408	.022065	7.49642
BIN21	.160859	.022136	7.26674
BIN22	.153100	.022680	6.75038
BIN23	.153702	.023092	6.65602
BIN24	.152045	.023091	6.58457
BIN25	.162392	.023970	6.77493
BIN26	.144142	.022650	6.36402

	1	2	3
@SSR	14.75826	3.78608	0.086170

@LOGL = 2754.78006
DELTA = 0.070000

MANUFACTURING 5

(densities, no IV's, with regional dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-.046404	.381427E-02	-12.1660
PORTS	.273610	.022758	12.0226
Z2	-.637416	.116874	-5.45390
Z3	-.775445	.124612	-6.22287
Z4	-.500388	.126975	-3.94086
Z5	-.393336	.125317	-3.13874
Z6	-.606263	.127472	-4.75603
Z7	-.537543	.126706	-4.24245
Z8	-.689191	.124148	-5.55137
Z9	-.699545	.124452	-5.62100
X1	-3.98788	.132287	-30.1457
X2	-4.03592	.132767	-30.3986
X3	-4.38427	.813469	-5.38960
X4	-4.36798	.768018	-5.68734
X5	-4.35622	.769250	-5.66294
X6	-4.20014	.776257	-5.41076
X7	-3.67949	.149538	-24.6058
X8	-3.56816	.149034	-23.9420
X9	-3.54116	.133974	-26.4318
Z10	-.620508	.119533	-5.19109
X10	-3.48577	.134158	-25.9825
X11	-3.44629	.131132	-26.2811
X12	-3.49110	.131446	-26.5591
X13	-3.41789	.128328	-26.6341
BPL1	.125576	.011898	10.5542
BPL2	.055520	.013369	4.15288
BPL3	.172693E-02	.011470	.150557
BPL4	.112654E-02	.731849E-02	.153930
BPL5	.652289E-03	.454506E-02	.143516
BPL6	.115401E-02	.750189E-02	.153829
BPL7	.058000	.036902	1.57175
BPL8	.112825	.066847	1.68781
BPL9	.108024	.028198	3.83087
BPL10	.126057	.026763	4.71020
BPL11	.124968	.013199	9.46812
BPL12	.065249	.892956E-02	7.30709
BPL13	.074948	.010706	7.00048
BPL14	-.349116E-03	.303069E-02	-.115194
BPL15	-.162270E-03	.239413E-02	-.067778
BPL16	-.127827E-03	.232183E-02	-.055054
BPL17	-.248853E-03	.263566E-02	-.094418
BPL18	-.157113E-03	.238558E-02	-.065859
BPL19	-.426359E-03	.337755E-02	-.126233
BPL20	-.326370E-03	.293596E-02	-.111163
BPL21	-.205046E-03	.251108E-02	-.081656
BPL22	-.254856E-03	.266156E-02	-.095754

	1	2
@SSR	10.13026	3.78874

@LOGL = 1036.05867
DELTA = 0.50000

MANUFACTURING 6

(densities, with IV's, with regional dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-.726994	1.75116	-.415151
PORTS	.289515	.028304	10.2288
Z2	-.683598	1.15603	-.591331
Z3	-.756849	1.48987	-.507996
Z4	-.482273	1.58796	-.303705
Z5	-.367197	1.65784	-.221491
Z6	-.571878	1.60895	-.355436
Z7	-.505618	1.63760	-.308757
Z8	-.644747	1.42548	-.452301
Z9	-.701534	1.47069	-.477011
Z10	-.476003	.956378	-.497715
X1	-3.99796	1.88841	-2.11710
X2	-4.04888	1.84550	-2.19393
X3	-4.42834	1.99900	-2.21527
X4	-4.41127	2.00451	-2.20068
X5	-4.36031	2.01988	-2.15870
X6	-4.28055	2.03998	-2.09832
X7	-3.69502	1.81565	-2.03509
X8	-3.58360	1.79112	-2.00076
X9	-3.55618	1.77896	-1.99902
X10	-3.50340	1.76988	-1.97946
X11	-3.46098	1.77558	-1.94921
X12	-3.50646	1.75253	-2.00080
X13	-3.43187	1.71870	-1.99678
BPL1	.125100	.012140	10.3045
BPL2	.054867	.013251	4.14071
BPL3	.967579E-03	.819219E-02	.118110
BPL4	.480453E-03	.411166E-02	.116851
BPL5	.257365E-03	.233010E-02	.110452
BPL6	.301210E-03	.276041E-02	.109118
BPL7	.057393	.037803	1.51821
BPL8	.112356	.067509	1.66431
BPL9	.107542	.028745	3.74123
BPL10	.125560	.027356	4.58990
BPL11	.124483	.013654	9.11705
BPL12	.064835	.870407E-02	7.44879
BPL13	.074711	.011128	6.71362
BPL14	.186629E-03	.187510E-02	.099530
BPL15	.287749E-03	.253408E-02	.113552
BPL16	.350200E-03	.297153E-02	.117852
BPL17	.189576E-03	.188225E-02	.100718
BPL18	.297442E-03	.260130E-02	.114343
BPL19	.155047E-03	.168574E-02	.091976
BPL20	.162322E-03	.172364E-02	.094174
BPL21	.275595E-03	.251169E-02	.109725
BPL22	.181084E-03	.183395E-02	.098740

Instrumental Variable Equation

BIN1	.523507E-05	.117057E-04	.447225
BIN2	.743785E-03	.051920	.014325
BIN3	-.671814E-03	.648847E-02	-.103540
BIN4	-.257871E-04	.614906E-04	-.419367
BIN5	1.00613	.273087	3.68429
BIN6	.982102	.273534	3.59042
BIN7	.962883	.273132	3.52534
BIN8	.954838	.273201	3.49500
BIN9	.962702	.273132	3.52467
BIN10	.971731	.273016	3.55925
BIN11	.963852	.273157	3.52856
BIN12	.949057	.273034	3.47596
BIN13	.941717	.273196	3.44704
BIN14	.935968	.273170	3.42632
BIN15	.939189	.273309	3.43636
BIN16	.925078	.273329	3.38449
BIN17	.905282	.273408	3.31110
BIN18	-.542689	.237773	-2.28238
BIN19	-.728995	.249342	-2.92367
BIN20	-.784601	.263617	-2.97629
BIN21	-.822427	.267471	-3.07483
BIN22	-.792753	.265320	-2.98791
BIN23	-.808511	.274524	-2.94513
BIN24	-.684071	.267566	-2.55664
BIN25	-.703303	.272968	-2.57650
BIN26	-.399443	.265256	-1.50588

	1	2	3
@SSR	12.23521	3.78827	3.78523

@LOGL = 1647.97457
DELTA = 0.0050000

FINANCE 1

(value added, no IV's, no Regional Dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-40.1214	3.65660	-10.9723
PORTS	.279225	.029767	9.38042
X1	-4.87729	.049483	-98.5647
X2	-5.06639	.086344	-58.6770
X3	-5.28433	.124461	-42.4578
X4	-5.19470	.140378	-37.0051
X5	-5.10734	.161935	-31.5395
X6	-5.00218	.149709	-33.4127
X7	-4.63234	.174987	-26.4724
X8	-4.36703	.137500	-31.7601
X9	-4.33638	.084796	-51.1392
X10	-4.25813	.080467	-52.9177
X11	-4.20577	.060455	-69.5690
X12	-4.35660	.062503	-69.7021
X13	-4.33800	.064839	-66.9047
BPL1	.160986	.035808	4.49576
BPL2	.087798	.036652	2.39546
BPL3	.057343	.035228	1.62775
BPL4	.056823	.035158	1.61623
BPL5	.055861	.035129	1.59017
BPL6	.055988	.035065	1.59670
BPL7	.087270	.047508	1.83696
BPL8	.147452	.066147	2.22916
BPL9	.142634	.045253	3.15193
BPL10	.161389	.043944	3.67263
BPL11	.160089	.037859	4.22852
BPL12	.095830	.035277	2.71651
BPL13	.104688	.035976	2.90992
BPL14	-.033200	.034608	-.959331
BPL15	-.023571	.035008	-.673289
BPL16	-.044150	.034338	-1.28576
BPL17	-.045766	.034301	-1.33426
BPL18	-.042957	.034231	-1.25492
BPL19	-.046447	.034329	-1.35300
BPL20	-.033568	.034779	-.965185
BPL21	-.043140	.034512	-1.25000
BPL22	-.032171	.034680	-.927657

	1	2
@SSR	25.09544	3.91988

@LOGL = 754.65579
DELTA = 0.060000

FINANCE 2

(value added, no IV's, with Regional Dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-26.8632	5.73063	-4.68766
PORTS	.369011	.028765	12.8286
Z2	.120955	.290286	.416674
Z3	.033419	.292451	.114271
Z4	.367025	.286958	1.27902
Z5	.429971	.285705	1.50494
Z6	.306420	.286551	1.06934
Z7	.413994	.287459	1.44018
Z8	.106248	.293422	.362102
Z9	.248903	.291184	.854797
Z10	.084588	.290185	.291498
X1	-5.27125	.290651	-18.1360
X2	-5.43008	.294422	-18.4432
X3	-6.12737	.867284	-7.06500
X4	-6.08661	1.08879	-5.59024
X5	-6.21901	1.09185	-5.69584
X6	-6.04690	1.12739	-5.36364
X7	-4.96524	.339737	-14.6149
X8	-4.73289	.329855	-14.3484
X9	-4.70322	.299308	-15.7137
X10	-4.62284	.295777	-15.6295
X11	-4.56852	.290318	-15.7363
X12	-4.69478	.290054	-16.1859
X13	-4.66884	.290905	-16.0493
BPL1	.125770	.012611	9.97280
BPL2	.055831	.013245	4.21534
BPL3	.336696E-02	.010247	.328569
BPL4	.281342E-02	.010731	.262186
BPL5	.129060E-02	.603767E-02	.213759
BPL6	.163238E-02	.727669E-02	.224329
BPL7	.057835	.036017	1.60578
BPL8	.112903	.066859	1.68867
BPL9	.108149	.028832	3.75103
BPL10	.126111	.026504	4.75820
BPL11	.125017	.014803	8.44551
BPL12	.065057	.933021E-02	6.97273
BPL13	.075081	.011122	6.75060
BPL14	-.198474E-03	.388171E-02	-.051131
BPL15	-.532965E-03	.426347E-02	-.125007
BPL16	-.383092E-03	.402991E-02	-.095062
BPL17	-.279287E-03	.391699E-02	-.071302
BPL18	-.448620E-03	.411525E-02	-.109014
BPL19	-.291551E-03	.393442E-02	-.074103
BPL20	-.300455E-03	.397767E-02	-.075535
BPL21	-.282059E-03	.394300E-02	-.071534
BPL22	-.501758E-03	.418580E-02	-.119871

	1	2
@SSR	22.36461	3.79250

@LOGL = 798.70799
DELTA = 0.060000

FINANCE 3

(value added, with IV's, no Regional Dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-33.4004	13.4185	-2.48912
PORTS	.389704	.052811	7.37919
Z2	.085628	.302521	.283049
Z3	-.011614	.308851	-.037605
Z4	.327414	.297843	1.09928
Z5	.416246	.298255	1.39560
Z6	.284783	.297529	.957159
Z7	.383161	.300965	1.27311
Z8	.043497	.309571	.140508
Z9	.192609	.311282	.618761
Z10	.055399	.301373	.183821
X1	-4.28150	.318891	-13.4262
X2	-4.44021	.320766	-13.8425
X3	-5.80600	27.3718	-.212116
X4	-5.78637	27.6187	-.209509
X5	-5.88747	27.6107	-.213231
X6	-5.72464	27.5949	-.207453
X7	-3.96774	.369222	-10.7462
X8	-3.73448	.363276	-10.2800
X9	-3.70590	.321785	-11.5167
X10	-3.62370	.320610	-11.3025
X11	-3.56983	.315311	-11.3216
X12	-3.69708	.316237	-11.6909
X13	-3.66994	.317067	-11.5747
BPL1	.125375	.013246	9.46497
BPL2	.055038	.013638	4.03559
BPL3	.128170E-03	.012532	.010227
BPL4	.813418E-04	.802298E-02	.010139
BPL5	.246099E-04	.242981E-02	.010128
BPL6	.374476E-04	.369324E-02	.010139
BPL7	.057384	.037147	1.54477
BPL8	.112575	.066720	1.68729
BPL9	.107802	.028499	3.78261
BPL10	.125780	.027092	4.64263
BPL11	.124700	.014673	8.49865
BPL12	.064868	.947309E-02	6.84759
BPL13	.074938	.011566	6.47935
BPL14	-.498116E-05	.498953E-03	-.998323E-02
BPL15	-.837274E-05	.831752E-03	-.010066
BPL16	-.604460E-05	.603047E-03	-.010023
BPL17	-.313493E-05	.320362E-03	-.978558E-02
BPL18	-.774113E-05	.769366E-03	-.010062
BPL19	-.431722E-05	.434741E-03	-.993056E-02
BPL20	-.663467E-05	.660865E-03	-.010039
BPL21	-.138670E-04	.137185E-02	-.010108
BPL22	-.583887E-05	.583543E-03	-.010006

Instrumental Variable Equation

BIN1	.124735E-05	.234657E-06	5.31562
BIN2	-.684529E-02	.116072E-02	-5.89743
BIN3	.324694E-02	.354263E-03	9.16534
BIN4	-.105424E-04	.354461E-05	-2.97420
BIN5	-.018886	.538620E-02	-3.50631
BIN6	-.019041	.533295E-02	-3.57039
BIN7	-.014269	.556383E-02	-2.56463
BIN8	-.013648	.562440E-02	-2.42660
BIN9	-.721250E-02	.554565E-02	-1.30057
BIN10	-.010492	.555196E-02	-1.88971
BIN11	-.020235	.544842E-02	-3.71384
BIN12	-.020259	.540215E-02	-3.75019
BIN13	-.020165	.535782E-02	-3.76365
BIN14	-.020468	.534268E-02	-3.83100
BIN15	-.020553	.538678E-02	-3.81552
BIN16	-.020768	.542715E-02	-3.82675
BIN17	-.021132	.549047E-02	-3.84888

	1	2	3
@SSR	51.95114	3.78606	0.033678

@LOGL = 2717.38030
DELTA = 0.030000

FINANCE 4

(value added, with IV's, with regional dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-30.7597	11.1182	-2.76661
PORTS	.383088	.044957	8.52113
Z2	.088440	.335452	.263644
Z3	-.012383	.343512	-.036048
Z4	.328298	.334559	.981285
Z5	.446467	.347626	1.28433
Z6	.285490	.334885	.852501
Z7	.390760	.336113	1.16259
Z8	.046030	.342440	.134419
Z9	.192109	.339392	.566039
Z10	.056346	.340294	.165581
X1	-4.29362	.340187	-12.6214
X2	-4.44935	.345129	-12.8919
X3	-5.86326	23.3949	-.250621
X4	-5.96285	23.4660	-.254105
X5	-6.04382	23.4489	-.257744
X6	-5.87962	23.4338	-.250903
X7	-3.97408	.401569	-9.89637
X8	-3.74302	.382662	-9.78154
X9	-3.71456	.347730	-10.6823
X10	-3.63191	.347059	-10.4648
X11	-3.57792	.342344	-10.4513
X12	-3.70427	.344461	-10.7538
X13	-3.67614	.343720	-10.6951
BPL1	.125384	.013698	9.15332
BPL2	.055082	.014412	3.82189
BPL3	.149746E-03	.012504	.011976
BPL4	.556646E-04	.466253E-02	.011939
BPL5	.254578E-04	.213232E-02	.011939
BPL6	.330701E-04	.276774E-02	.011948
BPL7	.057545	.040303	1.42780
BPL8	.112589	.067771	1.66131
BPL9	.107802	.029124	3.70154
BPL10	.125792	.027611	4.55592
BPL11	.124679	.017570	7.09608
BPL12	.064824	.011776	5.50468
BPL13	.074926	.010856	6.90168
BPL14	-.426332E-05	.361114E-03	-.011806
BPL15	-.892753E-05	.750275E-03	-.011899
BPL16	-.559083E-05	.471813E-03	-.011850
BPL17	-.196379E-05	.171785E-03	-.011432
BPL18	-.748722E-05	.629893E-03	-.011887
BPL19	-.358302E-05	.305062E-03	-.011745
BPL20	-.592044E-05	.499157E-03	-.011861
BPL21	-.398945E-05	.338235E-03	-.011795
BPL22	-.636464E-05	.536823E-03	-.011856

Instrumental Variable Equation

BIN1	.591437E-04	.979830E-05	6.03612
BIN2	-.073443	.026564	-2.76470
BIN3	.046126	.014340	3.21668
BIN4	.553052E-04	.884803E-04	.625056
BIN5	-1.72526	.251799	-6.85173
BIN6	-1.72463	.250897	-6.87385
BIN7	-1.64180	.250886	-6.54399
BIN8	-1.61989	.250482	-6.46707
BIN9	-1.52079	.249317	-6.09980
BIN10	-1.56958	.249444	-6.29232
BIN11	-1.72684	.254267	-6.79145
BIN12	-1.72748	.253614	-6.81145
BIN13	-1.72722	.251906	-6.85661
BIN14	-1.72783	.251964	-6.85744
BIN15	-1.72863	.252733	-6.83975
BIN16	-1.73376	.254408	-6.81488
BIN17	-1.73174	.252042	-6.87084
BIN18	.972389	.198238	4.90515
BIN19	.923518	.210551	4.38619
BIN20	.899862	.213192	4.22090
BIN21	1.15131	.221671	5.19376
BIN22	.832651	.223450	3.72635
BIN23	.979981	.227237	4.31259
BIN24	.864774	.224078	3.85926
BIN25	.793807	.235664	3.36839
BIN26	.810222	.230375	3.51696

	1	2	3
@SSR	37.55479	3.78603	11.64644

@LOGL = 1040.13569
DELTA = 0.030000

FINANCE 5

(densities, no IV's, with regional dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-.015284	.175482E-02	-8.70991
PORTS	.366980	.031057	11.8162
Z2	-.354812	.133622	-2.65534
Z3	-.619017	.148725	-4.16217
Z4	-.210880	.148052	-1.42436
Z5	-.221311	.155590	-1.42240
Z6	-.339298	.154584	-2.19491
Z7	-.253552	.156654	-1.61855
Z8	-.609460	.161163	-3.78163
Z9	-.481826	.154617	-3.11626
Z10	-.550922	.143749	-3.83253
X1	-4.54926	.167798	-27.1116
X2	-4.71502	.176511	-26.7124
X3	-5.39218	.758519	-7.10882
X4	-5.35480	.942585	-5.68097
X5	-5.51346	.989367	-5.57271
X6	-5.32826	1.01695	-5.23944
X7	-4.26935	.242377	-17.6145
X8	-4.03993	.238101	-16.9673
X9	-4.00833	.180440	-22.2142
X10	-3.93386	.176566	-22.2798
X11	-3.87939	.167578	-23.1497
X12	-4.00295	.165891	-24.1300
X13	-3.98271	.167970	-23.7109
BPL1	.125513	.012187	10.2986
BPL2	.055588	.012987	4.28021
BPL3	.351068E-02	.945335E-02	.371369
BPL4	.288730E-02	.966478E-02	.298745
BPL5	.105397E-02	.404565E-02	.260518
BPL6	.145757E-02	.546609E-02	.266658
BPL7	.057545	.035866	1.60441
BPL8	.112627	.066847	1.68484
BPL9	.107887	.028365	3.80352
BPL10	.125823	.026253	4.79263
BPL11	.124744	.014423	8.64874
BPL12	.064773	.873039E-02	7.41922
BPL13	.074774	.010727	6.97090
BPL14	.353902E-04	.173389E-02	.020411
BPL15	-.262938E-03	.194797E-02	-.134981
BPL16	-.124951E-03	.177190E-02	-.070518
BPL17	.464199E-05	.171236E-02	.271087E-02
BPL18	-.166426E-03	.180722E-02	-.092090
BPL19	-.329287E-05	.172964E-02	-.190378E-02
BPL20	.452554E-05	.188107E-02	.240583E-02
BPL21	-.544736E-05	.178618E-02	-.304973E-02
BPL22	-.210135E-03	.186414E-02	-.112725

	1	2
@SSR	21.18558	3.79347

@LOGL = 814.83726
DELTA = 0.45000

FINANCE 6

(densities, with IV's, with regional dummies)
NUMBER OF OBSERVATIONS = 598

Parameter	Estimate	Standard Error	t-statistic
PHI	-.490420	.913730	-.536723
PORTS	.391767	.054759	7.15434
Z2	-.146759	.360662	-.406914
Z3	-.239045	.412487	-.579521
Z4	.155062	.397757	.389842
Z5	.316741	.348565	.908698
Z6	.122644	.398698	.307612
Z7	.243257	.363360	.669465
Z8	-.189862	.380395	-.499119
Z9	-.040995	.418138	-.098042
Z10	-.149534	.304110	-.491710
X1	-4.09645	.590895	-6.93262
X2	-4.25048	.586675	-7.24504
X3	-5.74843	37.7723	-.152186
X4	-5.97758	38.3872	-.155718
X5	-6.00979	38.3774	-.156597
X6	-5.84026	38.3611	-.152244
X7	-3.77559	.580456	-6.50452
X8	-3.54650	.560365	-6.32892
X9	-3.52132	.534815	-6.58419
X10	-3.43930	.518859	-6.62859
X11	-3.39124	.500242	-6.77921
X12	-3.52557	.484904	-7.27066
X13	-3.50076	.465924	-7.51358
BPL1	.125371	.013803	9.08267
BPL2	.055063	.014048	3.91967
BPL3	.910529E-04	.012273	.741897E-02
BPL4	.164411E-04	.225264E-02	.729860E-02
BPL5	.686989E-05	.941170E-03	.729931E-02
BPL6	.102946E-04	.140965E-02	.730296E-02
BPL7	.057574	.039609	1.45357
BPL8	.112592	.067353	1.67168
BPL9	.107800	.028750	3.74957
BPL10	.125795	.028376	4.43315
BPL11	.124676	.019937	6.25352
BPL12	.064834	.011569	5.60406
BPL13	.074927	.011192	6.69495
BPL14	-.152322E-06	.229387E-04	-.664038E-02
BPL15	-.821201E-06	.113439E-03	-.723912E-02
BPL16	.124508E-06	.188370E-04	.660975E-02
BPL17	.144456E-05	.197479E-03	.731499E-02
BPL18	-.655681E-06	.906192E-04	-.723556E-02
BPL19	.274883E-06	.381284E-04	.720941E-02
BPL20	-.419860E-06	.587153E-04	-.715078E-02
BPL21	-.103778E-05	.142697E-03	-.727261E-02
BPL22	-.582611E-07	.124886E-04	-.466515E-02

Instrumental Variable Equation

BIN1	-.973509E-06	.952486E-05	-.102207
BIN2	.497923E-03	.022415	.022213
BIN3	.253571E-02	.013043	.194409
BIN4	.151730E-03	.756790E-04	2.00491
BIN5	.278944	.232973	1.19732
BIN6	.270104	.232156	1.16346
BIN7	.325409	.231192	1.40752
BIN8	.335575	.231108	1.45203
BIN9	.414452	.231608	1.78945
BIN10	.380006	.231246	1.64329
BIN11	.209303	.235021	.890572
BIN12	.194414	.234418	.829348
BIN13	.191698	.233768	.820036
BIN14	.174109	.233198	.746616
BIN15	.154902	.234232	.661319
BIN16	.135084	.235929	.572561
BIN17	.104913	.236747	.443146
BIN18	-.193829	.178693	-1.08470
BIN19	-.275376	.194692	-1.41442
BIN20	-.323006	.193601	-1.66841
BIN21	-.091618	.194252	-.471645
BIN22	-.344637	.196669	-1.75237
BIN23	-.240600	.201282	-1.19534
BIN24	-.281678	.199289	-1.41341
BIN25	-.377194	.208073	-1.81279
BIN26	-.099505	.200446	-.496418

	1	2	3
@SSR	52.07647	3.78594	8.98681

@LOGL = 1033.47250
DELTA = 0.00100000