Wesleyan Economic Working Papers

http://repec.wesleyan.edu/
Nº: 2018-002

Government Financial Institutions and Capital Allocation Efficiency in Japan

Masami Imai

June 2018

WESLEYAN UNIVERSITY

Department of Economics
Public Affairs Center
238 Church Street
Middletown, CT 06459-007

Tel: (860) 685-2340
Fax: (860) 685-2301
http://www.wesleyan.edu/econ

June 18, 2018

Government Financial Institutions and Capital Allocation Efficiency in Japan

Masami Imai (Wesleyan University)*

Abstract

This paper examines the impact of government loans on capital allocation efficiency with Japan's prefecture-level data from 1975-2005. We address the endogeneity of government loans by using the exogenous variation in the share of government loans that is correlated with the intensity of political support for the Liberal Democratic Party (LDP), the dominant political party. We find that the share of government loans is strongly and negatively correlated with the quality of capital allocation, as measured by the elasticity of industry investment to value-added, Wurgler's η, and that this negative correlation is more pronounced in declining industries than growing industries. Moreover, the results show that the share of government loans is negatively correlated with total factor productivity growth but positively correlated with investment-to-output ratio. Taken as a whole, Japan's government financial institutions might have propped up declining industries in the LDP strongholds with overall negative effects on capital allocation efficiency and technical progress.

Comments from Wako Watanabe and seminar participants at Wesleyan University and the Cabinet Office of Japan are gratefully acknowledged. All errors are mine.

* Professor of Economics, Wesleyan University, 238 Church Street, Middletown, CT 06459-0007. Email: mimai@wesleyan.edu, TEL: 860-685-2155.

Financial Market essentially involve the allocation of resources. They can be thought of the "brain" of the entire economic system, the central locus of decision-making: if they fail, not only will the sector's profit be lower than they otherwise have been, but the performance of the entire economic system may be impaired. Stiglitz (1993)

1. Introduction

The prevalence of government-owned banks and the pervasiveness of government's direct control over capital allocation are well-documented in many countries. In spite of privatization wave in the last two decades, the average share of total assets in state owned banks still stood at 15 percent in 2011 according to Barth, Caprio, and Levine (2013). In many countries, government ownership remains the overriding feature of their banking systems. Does the government ownership of financial institutions have positive or negative effects on real economic performance? This question has sparked the interest of economists and policy-makers alike since Gerschenkron (1962).

On the one hand, agency problems in financial markets might make government ownership of banks useful; i.e., government-own banks might be able to identify growing industries that are starving for external finance and make loans available to them. In this case, government loans should have positive impact on capital allocation efficiency and enhance economic growth. On the other hand, government banks might base their lending decisions, in part, on political cost-benefit calculations. If borrowers in declining industries are politically powerful and well-connected, they will be able to gain preferential access to capital from government financial institutions, which allow them to keep investing in negative net present

value projects. In this case, government owned banks distort capital allocation and impede economic growth.

Empirically, the performance of government owned banks is rather mixed. Earlier cross-country studies show that the pervasiveness of government-owned banks is negatively correlated with financial and economic development (e.g., La Porta, Lopez-de-Silanes, and Shleifer, 2002, Barth, Caprio, and Levine, 2001, 2004). Recently, however, Andrianova, Demetriades, and Shortland (2012) challenged the results of La Porta, Lopez-de-Silanes, and Shleifer (2002). They show that (1) the central results in La Porta, Lopez-de-Silanes, and Shleifer (2002) are not robust to the inclusion of institutional factors (e.g., property right protection and bureaucratic quality) and (2) the correlation between the prevalence of government ownership and economic growth turns out to be positive during more recent period. These papers underscore the limitation of cross-country studies in separating the economic impacts of government ownership of banks from other confounding institutional factors. The economic effects of government ownership of banks might be highly nonlinear as well.

This paper attempts to investigate the local economic impact of government loans with prefecture-level data from Japan from 1975-2005. Our data offer three advantages and complement the aforementioned cross-country studies. First, the data offer common and high-quality data on capital allocation across industries and the extent to which government banks direct credit in local economies at prefecture-level. Second, and perhaps more importantly, our within-country approach allows us to keep constant difficult-to-measure factors (e.g., institutional quality and macroeconomic policies) that might have affected cross-country analyses. These settings allow us to examine more precisely the effects of government loans on

the efficiency of capital allocation across industries and on overall productivity gains within local economies. Third and last, we are able to exploit the fact that political considerations play an important role in the allocation of government loans in Japan (Cargill and Yoshino, 2003, Imai, 2009). By extracting a part of variation in the share of government loans that is correlated with the intensity of political support for the ruling Liberal Democratic Party (LDP), we isolate the causal impacts of government lending on local economic outcome.

To preview our main results, we first follow Wurgler (2000) to measure the extent to which capital is allocated to growing industries away from declining industries. Namely, we use industry-level data to estimate the elasticity of industry investment to value-added, that is, Wurgler's η, for each prefecture. We find that while Wurgler's *η's* are all positive and statistically significant with the exception of the island of Okinawa, it varies considerably across prefectures. For example, the elasticity of industry investment to value-added is several times as high in Hyogo, Kanagawa, and Hiroshima as in Yamaguchi, Nagasaki, and Hokkaido. These results are analogous to those found in Wurgler (2000), who uncover important heterogeneity in the elasticity of industry investment to value-added vary across countries. Our results, however, might be somewhat more surprising because there is no regulatory restriction on inter-regional flow of financial capital. A growing industry in, say, Yamaguchi, Nagasaki, and Hokkaido, should be able to finance its investment projects by borrowing from national financial market even if local credit supply is scarce.

Second, we find that local economies which rely heavily on government loans tend to exhibit lower value of Wurgler's η and that this negative correlation between government loans and capital allocation efficiency is stronger in declining industries. The results are robust even

when we control for proxy of the level of local economic and financial development; that is to say, the negative correlation of government loans and Wurgler's η is not driven by heterogeneity in the level of economic and financial development across prefectures. These results are consistent with the view that government financial institutions distort capital allocation and, in particular, lead to overinvestment in declining industries in Japan.

We also address the possibility that government loans might have been targeting those industries that generate positive externalities.[1] If government loans are used to correct market failure, then the extent to which government financial institutions control capital allocation should be positively correlated with overall efficiency gain. Nonetheless, we find the exactly opposite pattern of correlation: those local economies that rely on government loans more heavily tend to experience slower Total Factor Productivity (TFP) growth, even though their investment-to-output ratio tend to be higher. It is difficult to conclude from these results that government loans addressed financial market failures, successfully. Rather, taken as a whole, the results suggest that government financial institutions base their lending decision on political considerations, which, in turn, lead to efficiency losses from overinvestment in declining industries.

This paper is also related to three strands of literature. First, a large body of literature, dating back to Bagehot (1873), Schumpeter (1912), Gurley and Shaw (1955), and Goldsmith (1969), explores the role of financial development in economic growth. Although financial development seems to have causal impacts on economic growth (Levine, 2006), there remain

[1] Indeed, there is a large body of empirical research suggesting that investment generates positive externalities and that social return on investment is significantly higher than private return (e.g., De Long and Summers, 1991).

some questions as to whether the economic benefit of financial development is highly heterogeneous; in addition, we also know less about whether financial development facilitates investment boom or efficiency gain, or both (Demetriades and Hussein, 1996, Rioja and Valev, 2004a, 2004b, Jayaratne and Strahan, 1996, Beck, Levine, and Loayza, 2000, Wurgler, 2000, Rousseau and Wachtel, 2011). Our results corroborate the findings of those papers which show that financial reform can promote economic growth primarily via its impact on the quality of capital allocation and TFP growth, rather than the quantity of financial capital and capital deepening.

Second, recent papers on political economy of government control use detailed microeconomic data on the lending pattern of government banks to uncover political motivations in a variety of countries (Sapienza, 2004, Dinç 2005, Khwaja and Mian, 2005, Cole 2007, Carvalho, 2014, Micco, Panizza, and Yanez, M., 2007, Morck, Yavuz, and Yeung, 2011). Our paper moves this literature forward and examine the aggregate economic implication of politically motivated loans for capital allocation and productivity growth. Third and Lastly, the Japanese government's extensive involvement in credit allocation (and politics behind it) has been well-documented (Patterson 1994; Cargill and Yoshino 2003; Amyx, Takenaka, and Toyoda 2005; Beason and Patterson 2004; Imai 2009). However, there is no systematic empirical test for whether government banks improved productivity with the exception of Beason and Weinstein (1996). This paper fills this gap. Our central results show that government financial institutions have negative effects of capital allocation efficiency. Thus, the Japanese economy might be able to realize some productivity gain with the liberalization of a part of its financial system that remains under the government's tight control.

The rest of the paper is structured as follows. In Section 2, we briefly review the relevant literature on the performance of government financial institutions in Japan. Sections 3 introduce our data and explore the correlation between government loans and local economic outcomes, econometrically. Section 4 concludes.

2. Background on Government Financial Institutions in Japan

During the period we examine in this paper (1975-2005), there were 10 different government financial institutions which directed loans to a variety of borrowers: Government Housing Loan Corporation (Est. 1950), People's Finance Corporation (Est. 1949), Environmental Sanitation Business Finance Corporation (Est. 1967), Japan Finance Corporation for Small Business (Est. 1953), Agriculture, Forestry, and Fishery Finance Corporation (Est. 1953), Japan Finance Corporation for Municipal Enterprises (Est. 1957), Hokkaido-Tohoku Development Finance Public Corporation (Est. 1956), Japan Development Bank (Est. 1951), Okinawa Development Finance Corporation (Est. 1972), and Export-Import Bank (Est. 1950). These government financial institutions obtained funds from the Fiscal Investment and Loan Program (FILP) which was well-funded by the postal saving and insurance system. The postal saving system was the world's largest financial institution; e.g., in 1999, with over 24,000 post offices nationwide, the postal saving system drew 260 trillion yen. Doi (2005) shows that loans from government financial institutions reached nearly 160 trillion yen (20% of total loans) and that government provided them with the annual subsidy of 800 billion yen in 1999. Naturally, Doi (2005) raises a concern that the government's willingness to subsidize these financial institutions can create soft-budget constraints and lead to inefficient capital allocations.

A few relevant papers examine the performance of government financial institutions in Japan. Seko (1994) notes that government housing loans, which treat the financing of small and new houses preferentially, distort housing consumption decisions over floor space and quality and depress the market for used houses.[2] Horiuchi and Sui (1993) examines whether industrial development loans promoted investment by easing liquidity constraints for firms that faced severe agency problems, which they find to be the case. Beason and Weinstein (1996), however, find that industrial development loans, along with preferential trade barriers and subsidies, did not have any effects on output and technical growth.

More recently, several studies examine the performance of government financial institutions that target small and medium sized enterprises (SMEs). The results are rather mixed. Ogura (2017) shows that Japan Finance Corporation for Small Business increased loans to SMEs that have weak relationship with their main bank during the financial crisis of 2008. Ogura's results suggest that Japan Finance Corporation for Small Business specifically targeted SMEs which lacked access to relationship lending and thus faced severe agency problem.

Similarly, Sekino and Watanabe (2017) show that Japan Finance Corporation for Small Business increased loans to SMEs whose main banks cut back on lending due to binding capital requirements. Like Ogura (2017), their results indicate that government loans were made to address market failures. However, Sekino and Watanabe (2017) show that government loans were correlated, negatively, with firm performance (measured by profitability and investment rate). Hence, while government loans are likely to have mitigated credit crunch for SMEs, these

[2] Seko (1994) also emphasize that government housing loans also affect income distribution as the loan policy favors those households with already own land.

same loans might have also softened budget constraints for the borrowing firms with negative impacts on efficiency. Lastly, Doi and Hoshi (2002) carry out a close examination of the quality of FILP loans and estimate the amount of subsidy to government financial institutions. If government loans are used to fund viable investment projects, then one would expect to see adequate return on these loans. Doi and Hoshi (2002), however, show that 75 percent of all FILP loans are non-performing.

3. Data and Econometric Analyses

3.1. Measuring Capital Allocation Efficiency with Wurgler's η

Our basic empirical approach is to use the prefecture-level data from Japan and link the quality of capital allocation to the scope of government financial institutions' involvement in credit allocation. In order to measure the efficiency of capital allocation, we follow the methodological approach of Wurgler (2000). Wurgler (2000) uses industry-level data for each of the 65 countries to estimate the elasticity of industry investment to value-added, η. Wurgler's η, thus, captures the extent to which capital is allocated to growing industries away from declining industries. He finds that the elasticity of industry investment to value added is strongly and positively correlated with financial development across countries; i.e., financially developed countries tend to increase investment more in their growing industries and decrease investment more in their declining industries, compared to financially under-developed countries. Hence, in a country without well-functioning financial system, a growing industry faces financing constraints and is unable to fully exploit its large investment opportunity, whereas a declining industry might be well-connected and enjoys preferential access to capital.

Following Wurgler (2000), we estimate the elasticity of industry investment to value-added for each prefecture using the industry-level data; i.e., a prefecture *p*'s *Wurgler's elasticity* is the coefficient η_p in the following regression equation:

$$\ln\left(\frac{I_{ipt}}{I_{ipt-1}}\right) = \alpha_p + \eta_p \ln\left(\frac{V_{ipt}}{V_{ipt-1}}\right) + \varepsilon_{pit}$$

where *i* represent industry, *t* year, *p* prefecture, *I* industry investment, and *V* industry value-added. Investment data and value-added data are available from 1975-2005 at industry-level for 47 prefectures taken from the Cabinet Office and the Regional-Level Japan Industrial Productivity Database, respectively. The data set covers 10 industries: 1. Agriculture, fishery, and forestry, 2. Mining, 3. Manufacturing, 4. Construction, 5. Utility, 6. Sales, 7. Finance, 8. Real estates, 9. Transportation and communication, and 10. Service.

The estimated elasticity of industry investment to value-added for each prefecture is reported in Table 1 and Figure 1. There are three notable results. First of all, Table 1 shows that they are all positive and statistically significant with the exception of Okinawa where the ratio of the elasticity estimate to standard error is only 1.5. That is, there is a strong overall tendency for industry investment to rise (fall) when industry value-added increases (falls) in each of Japan's prefectures. Nonetheless, as shown in both Table 1 and Figure 1, the estimates vary noticeably across prefectures as it ranges from .227 (Okinawa) to 1.035 (Hyogo), suggesting that the degree to which more capital is allocated into growing industries away from declining industries is highly heterogeneous within Japan. These results might be surprising for two reasons. First, Wurgler's η might vary across countries if value-added growth is measured with significant error in some countries, thereby producing attenuation bias in econometric estimations. Our prefecture-level data come from the common source that follow the same

accounting convention. There might be some measurement error and attenuation bias in the estimate of η, but one will be hard-pressed to argue that the size of attenuation bias varies significantly across prefecture.

Second, there is no regulatory or legal barrier to inter-prefectural flow of financial capital within Japan and that all 47 prefectures share the same legal (and similar cultural) institutions that could affect the performance of local capital markets. The exception might be the island of Okinawa is approximately 1000 kilometers away from the mainland Japan, roughly the same distance to Seoul from Tokyo (or to Shanghai from Tokyo). Hence, Okinawa is indeed geographically isolated and might not be as integrated as the rest of Japan, financially, which might explain its low η. Nonetheless, the heterogeneity in elasticity estimates is evident even if we disregard Okinawa; Wurgler's η is several times as high in Hyogo, Kanagawa, and Hiroshima as in Yamaguchi, Nagasaki, and Hokkaido.

3.2. Government Loans and Wurgler's η

The central question of this paper is whether the extent to which government financial institutions direct loans to the preferred borrowers or industries in a local economy affects Wurgler's η, the efficiency of capital allocation. On the one hand, if government loans are directed to growing industries that are starving for external finance, then government loans should have positive correlation with Wurgler's η. On the other hand, if government loans are directed to borrowers who do not have viable investment projects and yet who are politically influential and well-connected, then we expect government loans to have negative effects on Wurgler's η.

We put together the data on the share of government loans in total loans (private loans plus government loans) in each prefecture from 1975-2005 from the Bank of Japan. We calculate the average value for each prefecture during this time period.[3] Figure 2 shows the geographical distribution of the share of government loans. We drop Okinawa for our econometric analyses, given that Okinawa is unique in two dimensions. As described earlier, Okinawa might be financially isolated due to its geographical distance from the mainland. Moreover, Okinawa's economy relies heavily on a government financial institution, called Okinawa Development Finance Corporation, which does not operate in any other prefectures. Hence, we suspect a priori that even though Okinawa's η is low and its reliance on government loans is high, these two phenomena might not be causally related.[4] The scatter plot of the share of government loans against Wurgler's η is displayed in Figure 3. There are some outliers, but it shows a strong negative relationship between Wurgler's η and the share of government loans. The results are consistent with the notion that government financial institutions distort the allocation of capital.

We also consider other possible correlates of the elasticity of industry investment to value added. In particular, Wurgler (2000) find that the initial level of output per capita and various measures of financial development are positively correlated with the elasticity

[3] Even when we remove government housing loans from government loans and re-estimate all regressions, the results are qualitatively similar as the share of government loans without housing and that with housing is tightly correlated (the correlation coefficient is .91). We keep government housing loans in all regressions simply because there are not any comparable prefecture-level data on private housing loans, which should be subtracted from total loans when calculating the share of government loans if we are to remove government housing loans.
[4] Including Okinawa does not affect the qualitative results as we control for the level of economic and financial development in multiple regression framework.

estimate. We explore whether similar pattern of correlations can be observed in our prefecture-level data in Figures 4 and 5. It is unclear whether the number of banks per capita, a measure of local financial development, is correlated at all with Wurgler's η (Figure 5). Log of output per capita as of 1975 appear to be positively correlated with Wurgler's η (Figure 4). Hence, the low elasticity of industry investment to value-added might be a prominent feature of economically backward prefectures, which, in turn, might have motivated the government to direct more loans to these prefectures to facilitate economic development.

Table 2 explores these statistical correlations in a multiple regression framework where we regress the elasticity estimate on the share of government loans, log of initial output per capita in 1975, and the number of banks per capita. The results show that the observed negative correlation between Wurgler's η and the share of government loans is indeed statistically significant at 1% error level (column 1). Column 2 also confirms that Wurgler's η is positively correlated with initial output per capita but the level of statistical significance here does not reach 10%. Including both of these independent variables in a multiple regression framework (column 3), we find that the coefficient on the share of government loans remain quantitatively unchanged and statistically robust to the inclusion of initial output per capita. The coefficient on initial output per capita declines dramatically and further loses statistical significance once the share of government loans is included (column 3). The coefficient on the number of banks per capita is not statistically significant while that on the share of government loans remains robust to the inclusion of the number of bank per capita (columns 4 and 5).

3.3. Overinvestment vs. Underinvestment

The above results suggest that local economies whose credit demand is largely satisfied by government financial institutions is characterized by underinvestment in growing industries or overinvestment in declining industries or both, but it is not clear which one. We explore this question next. As done in Wurgler (2000), we first re-estimate the elasticity of industry investment to value-added for each prefecture, using just the observations in which industry value added was growing. We also re-estimate the elasticity of industry investment to value added for each prefecture, using just the observations in which industry value added was declining. In Figure 6, we plot these two elasticities against each other. Two patterns are notable. First, while η's that are estimated using just growing industries ($dV > 0$) are mostly positive (except for Yamaguchi), there are 7 prefectures whose η's are negative for declining industries ($dV < 0$). The elasticity of industry investment to value-added for declining industries is much more heterogeneous across prefectures than for growing industries. Second, these two estimates of Wurgler's η are not strongly correlated. The correlation coefficient between them is .15 and not significant. In sum, capital allocation amongst growing industries might be reasonably efficient in many prefectures, while at the same time these same prefectures might be continuing to increase investment in some of their declining industries.

These phenomena might be surprising from the perspective of value-maximizing creditors who should have strong incentives to fund positive net present value projects and not fund negative net present value projects. However, it might be the case that private loans fund growing sectors based mostly on economic considerations, while government loans might continue to fund declining sectors based on non-economic considerations. If that is the case, the negative effects of government loans on Wurgler's η should be larger among declining

industries than growing industries, which we explore in Table 3 (columns 1-4 for growing industries and columns 5-8 for declining industries). The results show that the coefficient on the share of government loans is negative but small and statistically insignificant for growing industries (columns 1-4). Local economies' reliance on government financial institutions does not seem to reduce their proclivity to increase investment in growing industries. However, columns 5-8 shows that the share of government loans has a large negative and significant coefficient. That is, government financial institutions seem to reduce the extent to which declining industries restrain from investment. These results suggest that government banks' inefficiency stem over investment in declining industries.

3.4. Instrumental Variable Approach

The above results are consistent with the hypothesis that government financial institutions distort capital allocation in Japan. The results are robust even when we control for proxy of the level of economic development as well as local financial development. Hence, the negative correlation of government loans and Wurgler's η is not driven by heterogeneity in the level of economic and financial development across prefectures. A concern about endogeneity problem still remains, however. For example, government financial institutions might be more active in prefectures where local financial system is functioning poorly to begin with. Since we do not get to observe the counterfactual of what capital allocation would look like in the absence of government loans, it is difficult to rule out this alternative interpretation. In order to deal with this endogeneity problem, we exploit the fact that government loans are allocated based, in part, on political considerations.

In Japan, the Liberal Democratic Party (LDP) is the dominant political party which consistently held majority in the Diet. The LDP is widely known to have used its position to implement regulations and subsidies favorable to their supporters (Ramseyer and Rosenbluth 1993; Kawaura 2003; Meyer and Naka 1998). Imai (2009) shows that prefectures that support the LDP tend to receive more government loans. In this section, we exploit this strong positive correlation between the intensity of political support for the LDP and the share of government loans to examine whether the basic results from the Ordinary Least Squares still hold in instrumental variable regressions.

We measure the intensity of political support for the LDP by calculating the average vote share of the LDP in the Lower House elections from 1975-2005 for each prefecture. We plot the share of government loans against the LDP vote share in Figure 7, which shows positive correlation between them. Table 4 (Panel B) shows the results of first stage regressions where the share of government loans is regressed on the vote share of the LDP in the Lower House elections. The coefficient on LDP vote share is positive and statistically significant in all specifications; prefectures that support the LDP tend to receive more government loans. Table 4 (Panel A) replicates Table 2 using instrumental variable regressions. The coefficient on the share of government loans remains negative and statistically significant in this table as in Table 2, although its standard error increased by three-fold, which is a typical consequence in instrumental variable regressions. Similarly, we explore the difference between growing and declining industries using instrumental variable regressions in Table 5. It shows that the coefficient on government loans is much larger in absolute value when Wurgler's η is calculated based on declining industries. Again, the results suggest that a large presence of government

financial institutions in local financial markets distorts capital allocation favoring industries in decline.

3.5. Total Factor Productivity Growth and Investment-Output Ratio

Thus far, the results show that local economies in which government financial institutions play a larger role in directing credit to favored borrowers tend to have low Wurgler's η. A natural interpretation is that government loans favor declining industries, which, in turn, continue investing in negative net present value projects which private lenders would not be willing to finance. In this case, we should observe that those local economies with a larger presence of government financial institutions is characterized by more investment but less efficiency gain. That is, while the share of government loans should be positively correlated with investment-to-output ratio, it should be negatively correlated with overall efficiency gain.

Alternatively, government loans might have been targeting those industries whose investment generate positive externalities. If government financial institutions successfully use their credit policies to correct financial market failure and externalities are locally confined to some extent, then those prefectures that rely heavily on government loans should exhibit more efficiency gains as well as more investment in the long run. In order to assess these two competing interpretations, we examine the impact of government loans on Total Factor Productivity (TFP) growth and investment-to-output ratio. The data on TFP growth are obtained from the Regional-Level Japan Industrial Productivity Database.

The results are displayed in Tables 6 and 7. Here, we find that the coefficient on the share of government loans is positive for investment-to-output ratio, while it is negative for TFP growth. These results hold in both OLS (Table 6) and instrumental variable regressions (Table 7).

Hence, local economies that rely on government loans more heavily tend to experience slower Total Factor Productivity (TFP) growth, even though their investment-to-output ratio tend to be higher. While one might conjecture that government financial institutions corrected some market failures, it is difficult to conclude from these results that they were able to generate efficiency gains in aggregate. On the contrary, taken as a whole, the results are consistent with the view that political considerations guided Japan's government financial institutions' lending decision, which, in turn, led to aggregate efficiency losses from overinvestment in declining industries.

4. Conclusions

This paper investigates the economic impact of government financial institutions on the quality of capital allocation in Japan. We find that local economies that were given preferential access to government loans tend to exhibit low elasticity of industry investment to value-added; that is, these local economies tend to invest less in growing industries and more in declining industries, compared to other similar local economies that do not receive as many government loans. Moreover, this negative correlation between government loans and elasticity of industry investment to value added is driven largely by declining industries. We find that those local economies with a large presence of government financial institutions also show low total factor productivity growth but high investment-to-output ratio. On aggregate, these results indicate that Japan's government financial institutions base their lending policies on political consideration and that they have helped declining industries at the expense of capital allocation efficiency and technical progress. The results also have an important policy

implication: Japan might be able to attain higher productivity if government financial institutions scale down its control over credit allocation.

References

Amyx, Jennifer, Harukata Takenaka, and Maria Toyoda. 2005. "The Politics of Postal Savings Reform in Japan." *Asian Perspective* 29: 23-48.

Andrianova, S., Demetriades, P., Shortland, A., 2012. Government ownership of banks, institutions and economic growth. *Economica* 79, 449–469.

Bagehot, W. (1873). *Lombard Street*, 1962 ed. Irwin, Homewood, IL.

Barth, J.R., Caprio Jr., G., Levine, R., 2001. Banking systems around the globe: do regulations and ownership affect performance and stability? In: Mishkin, F.S. (Ed.), *Prudential Supervision: What Works and What Doesn't*. University of Chicago Press, Chicago, IL.

Barth, James R., Gerard Caprio, and Ross Levine. 2004. Bank Regulation and Supervision: What Works Best? *Journal of Financial Intermediation* 13:205–48.

Barth, J., Caprio, G. and Levine, R. (2013) Bank Regulation and Supervision in 180 Countries from 1999 to 2011, *Journal of Financial Economic Policy* 5, 111-220.

Beason, R., and Dennis Patterson. 2004. *The Japan That Never Was: Explaining the Rise and Decline of a Misunderstood Country*. New York: State University of New York Press.

Beason, R., Weinstein, D.E., 1996. Growth, economies of scale, and targeting in Japan (1955–1990). *Review of Economics and Statistics* 78, 286–295.

Beck, T., Levine, R., Loayza, N. (2000). "Finance and the sources of growth". *Journal of Financial Economics* 58, 261–300.

Cargill, Thomas F., and Naoyuki Yoshino. 2003. *Postal Saving and Fiscal Investment in Japan: The PSS and the FILP*. New York: Oxford University Press.

Carvalho, D., 2014. The real effects of government-owned banks: evidence from an emerging market. *Journal of Finance* 69 (2), 577–609.

Cole, Shawn, "Fixing Market Failures or Fixing Elections? Agricultural Credit in India", *American Economic Journal: Applied Economics*, 1(1), 2009, pp. 219–250.

DeLong, J. Bradford and Lawrence H. Summers (1991). "Equipment Investment and Economic Growth," *Quarterly Journal of Economics*, 106, 2 (May), 445-502.

Demetriades, P. O., and K. A. Hussein. "Does Financial Development Cause Economic Growth? Time Series Evidence from Sixteen Countries." *Journal of Development Economics*, 51, 1996, 387–411.

Dinç, S., 2005. Politicians and banks: political influences on government-owned banks in emerging markets. *Journal of Financial Economics*. 77 (2), 453–479.

Doi, T. (2005). "Government Financial Institutions: What and How to Reform" in Ito T.; Patrick, H.; and Weinstein, D. E. eds. *Reviving Japan's Economiy: Problems and Prescriptions*. Cambridge, Mass: The MIT Press.

Gerschenkron, Alexander, 1962, *Economic Backwardness in Historical Perspective* (Harvard University Press, Cambridge, MA).

Goldsmith, R.W. (1969). *Financial Structure and Development*. Yale University Press, New Haven, CT.

Gurley, J.G., Shaw, E.S. (1955). "Financial aspects of economic development". *American Economic Review* 45, 515–538.

Imai, M., 2009, Political Determinants of Government Loans in Japan. *Journal of Law and Economics* 52, 41-70.

Jayaratne, J., Strahan, P.E. (1996). "The finance-growth nexus: Evidence from bank branch deregulation". *Quarterly Journal of Economics* 111, 639–670.

Kawaura, Akihiko. 2003. "Public Resource Allocation and Electoral Systems in the U.S. and Japan." *Public Choice* 115: 63-81.

Khwaja, A., Mian, A., 2005. Do lenders favor politically connected firms? Rent provision in an emerging financial market. *Quarterly Journal of Economics*. 120 (4), 1371–1411.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2002. Government ownership of banks. *Journal of Finance* 57 (1), 265–301.

Levine, R., 2006. Finance and growth: Theory, evidence, and mechanisms. In: Aghion, P., Durlauf, S. (Eds.), *Handbook of Economic Growth*. North-Holland/Elsevier, Amsterdam, pp. 865–934.

Meyer, Steven A; Naka, Shigeto. 1998. "Legislative Influences in Japanese Budgetary Politics." *Public Choice* 94: 267-88.

Micco, A., Panizza, U., Yanez, M., 2007. Bank ownership and performance. Does politics matter? *Journal of Banking Finance* 31 (1), 219–241.

Morck, R., Yavuz, M.D., Yeung, B.Y., 2011, Banking system control, capital allocation, and economy performance. *Journal of Financial Economics*, 100(2), 264-283.

Patterson, Dennis. 1994. "Electoral Influence and Economic Policy: Political Origins of Financial Aid to Small Business in Japan." *Comparative Political Studies* 27: 425-447.

Ramseyer, Mark J., and Frances M Rosenbluth. 1993. *Japan's Political Marketplace*. Boston: Harvard University Press.

Rioja, F., Valev, N. (2004a). "Finance and the sources of growth at various stages of economic development". *Economic Inquiry* 42, 27–40.

Rioja, F., Valev, N. (2004b). "Does one size fit all?: A reexamination of the finance and growth relationship". *Journal of Development Economics* 74 (2), 429–447.

Rousseau, P . L., and P . Wachtel. "What Is Happening to the Impact of Financial Deepening on Economic Growth?" *Economic Inquiry*, 49, 2011, 276–88.

Sapienza, P., 2004. The effects of government ownership on bank lending. Journal of Financial Economics. 72 (2), 357–384.

Stiglitz, Joseph E., 1993, "The role of the state in Financial Markets", *Proceedings of the World Bank Annual Conference on Economic Development*, Washington D.C. International Bank for Reconstruction and Development/World Bank, pp. 19-56.

Schumpeter, J.A. (1912). Theorie der wirtschaftlichen Entwicklung. Dunker & Humblot, Leipzig. The Theory of Economic Development translated by R. Opie. Harvard University Press, Cambridge, MA, 1934.

Wurgler, J. (2000). "Financial markets and the allocation of capital". *Journal of Financial Economics* 58, 187–214.

Figure 1: Geographical Distribution of Elasticity of Industry Investment to Value Added (Wurgler's η)

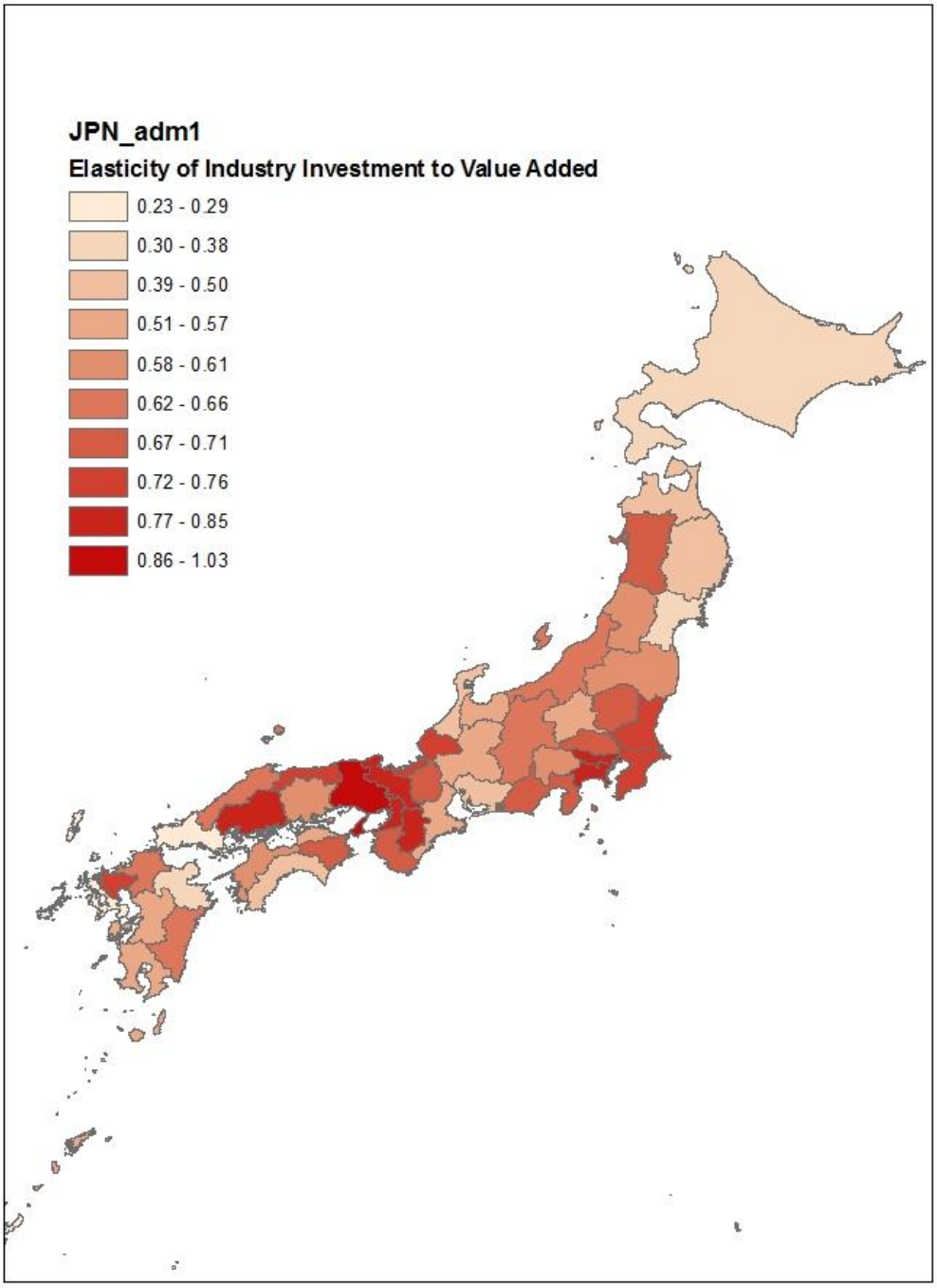

Figure 2: Geographical Distribution of Share of Government Loans

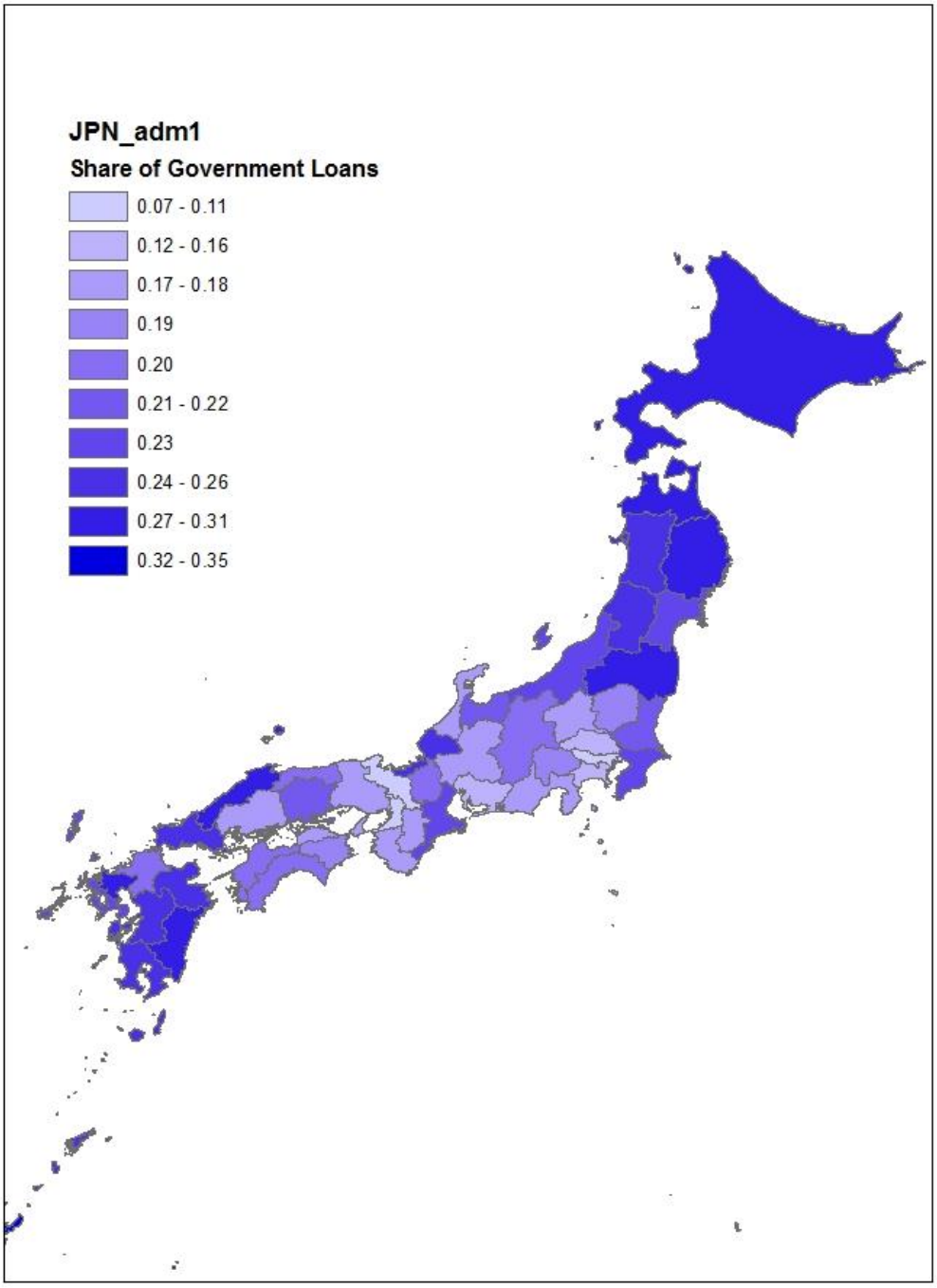

Figure 3: Elasticity of Industry Investment to Value Added (Wurgler's *η*) and Share of Government Loans

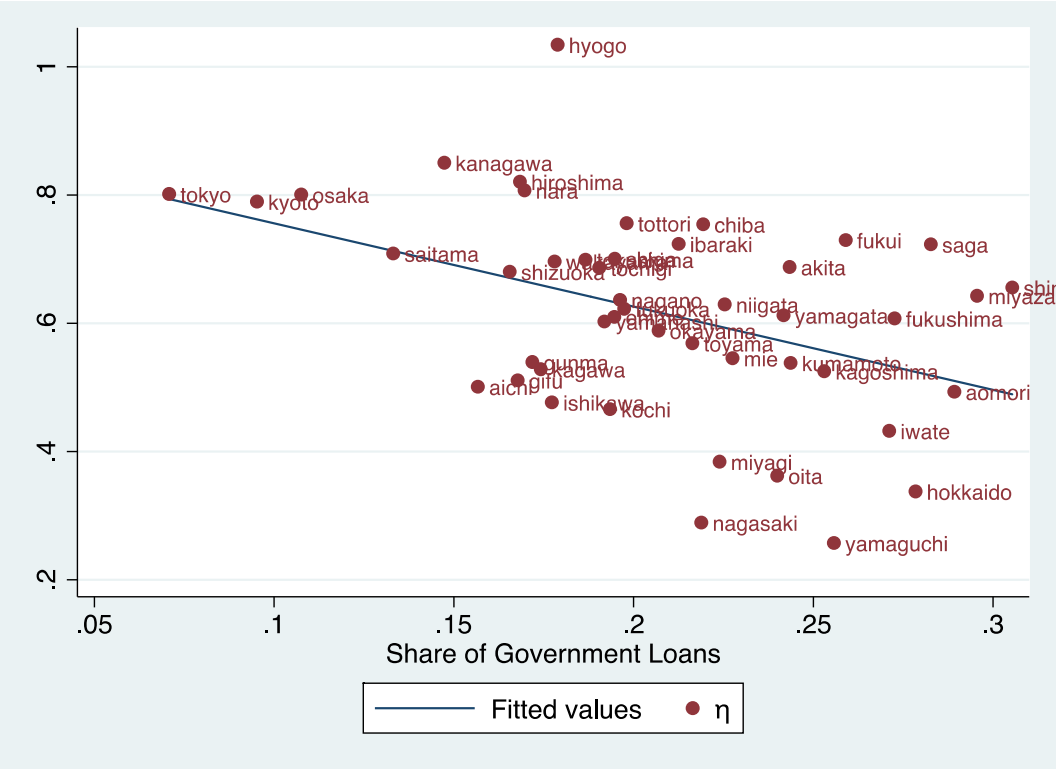

Figure 4: Elasticity of Industry Investment to Value Added (Wurgler's *η*) and Log of Initial Output per Capita (1975)

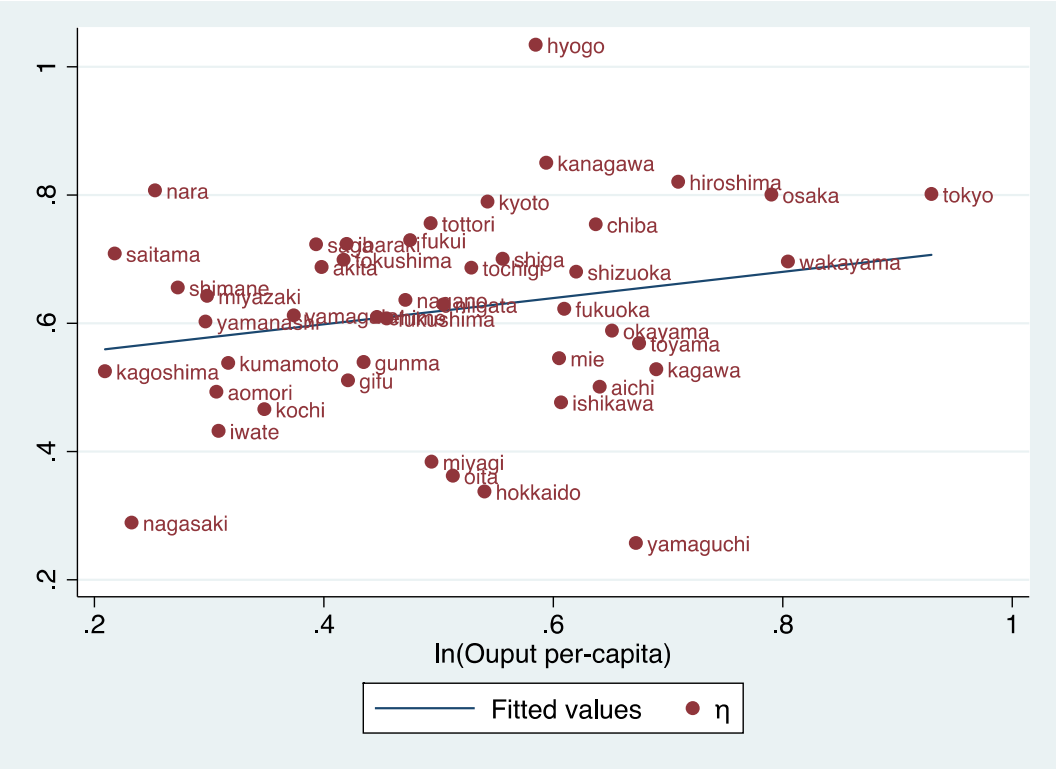

Figure 5: Elasticity of Industry Investment to Value Added (Wurgler's *η*) and Number of Banks per Capita

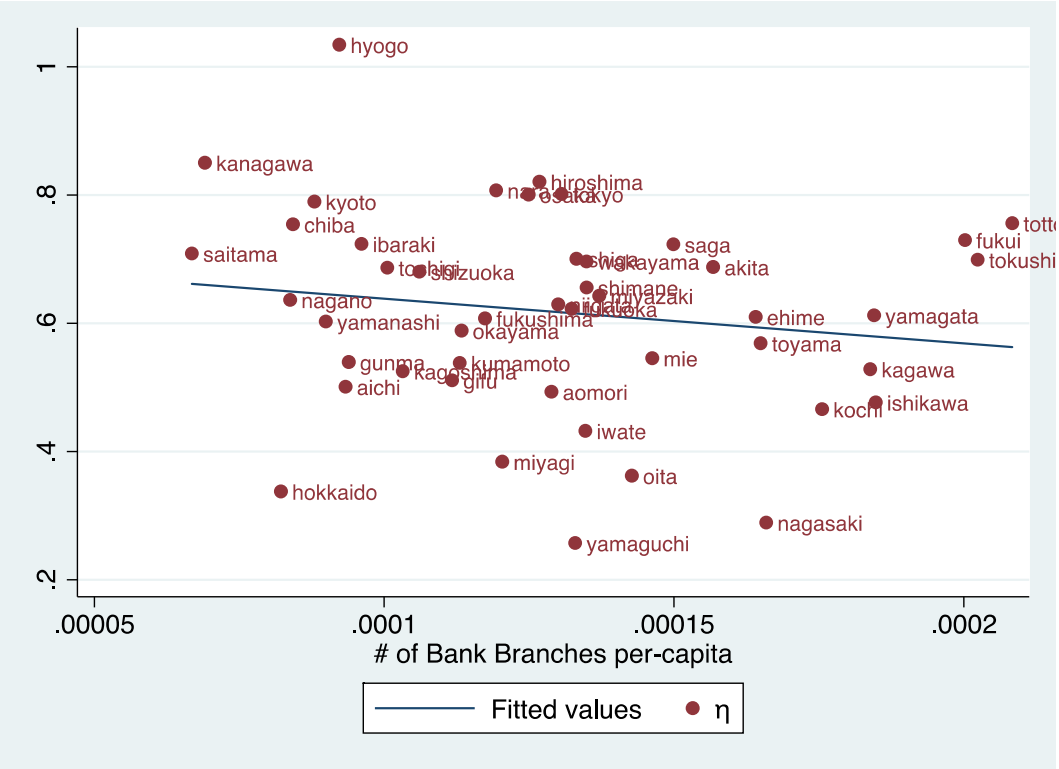

Figure 6: Elasticity of Industry Investment to Value Added (Wurgler's *η*) for Growing Industries (dV > 0) and Declining Industries (dV < 0)

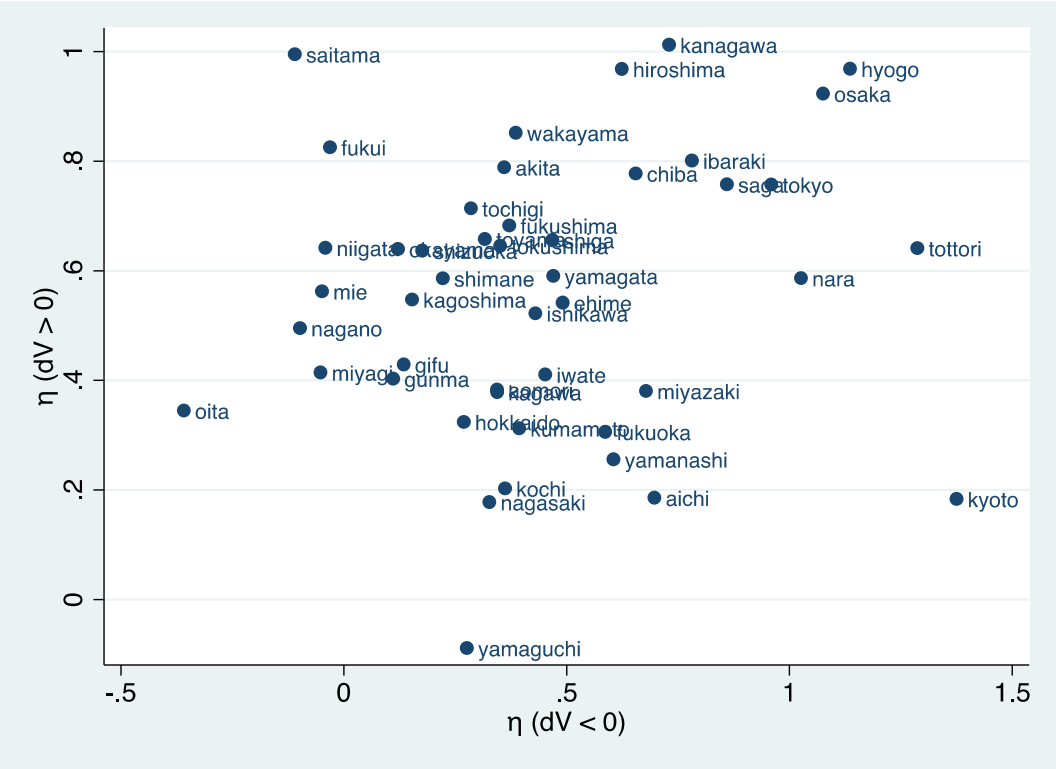

Figure 7: Share of Government Loans and LDP Vote Share

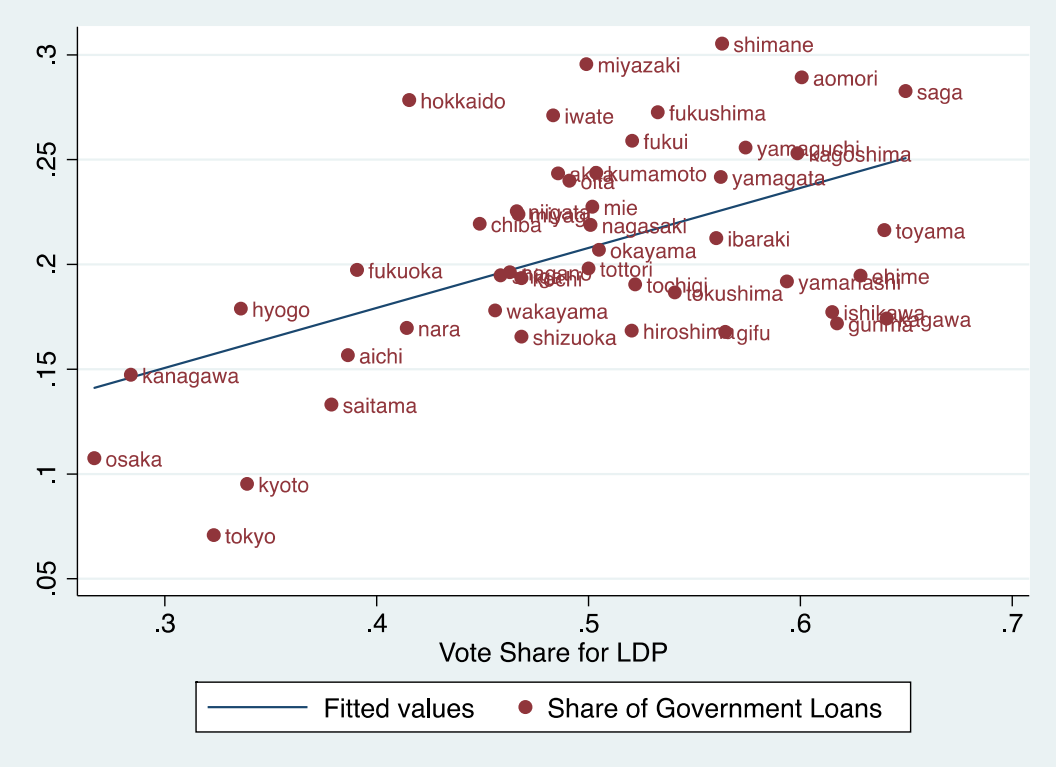

Table 1: Wurgler's η for Prefectures in Japan

Wurgler's η, the elasticity of industry investment to value added, is estimated based on the following regression

$$\ln\left(\frac{I_{ipt}}{I_{ipt-1}}\right) = \alpha_p + \eta_p \ln\left(\frac{V_{ipt}}{V_{ipt-1}}\right) + \varepsilon_{pit}$$

where i represent industry, t year, p prefecture, I industry investment, and V industry value-added.

Investment and value-added data are available from 1975-2005 at industry-level for 47 prefectures from the Cabinet Office of Japan.

The data set covers 10 industries: 1. Agriculture, fishery, and forestry, 2. Mining, 3. Manufacturing, 4. Construction, 5. Utility, 6. Sales, 7. Finance, 8. Real estates, 9. Transportation and communication, and 10. Service.

prefecture	η	se	R-sq	rank of η
hokkaido	0.338	0.144	0.018	44
aomori	0.493	0.182	0.023	38
iwate	0.432	0.136	0.032	41
miyagi	0.384	0.140	0.024	42
akita	0.688	0.148	0.065	17
yamagata	0.613	0.160	0.046	25
fukushima	0.608	0.140	0.058	27
ibaraki	0.724	0.126	0.096	11
tochigi	0.687	0.175	0.048	18
gunma	0.540	0.143	0.044	32
saitama	0.709	0.155	0.063	13
chiba	0.754	0.113	0.126	9
tokyo	0.802	0.174	0.065	5
kanagawa	0.851	0.194	0.059	2
niigata	0.630	0.137	0.064	23
toyama	0.569	0.161	0.039	30
ishikawa	0.477	0.155	0.030	39
fukui	0.730	0.147	0.074	10
yamanashi	0.603	0.194	0.030	28
nagano	0.637	0.152	0.054	22
gifu	0.511	0.188	0.023	36
shizuoka	0.681	0.163	0.054	19

aichi	0.501	0.184	0.023	37
mie	0.546	0.135	0.051	31
shiga	0.701	0.192	0.042	14
kyoto	0.790	0.198	0.049	7
osaka	0.801	0.255	0.031	6
hyogo	1.035	0.119	0.198	1
nara	0.807	0.191	0.055	4
wakayama	0.697	0.096	0.146	16
tottori	0.756	0.159	0.069	8
shimane	0.656	0.144	0.063	20
okayama	0.589	0.143	0.052	29
hiroshima	0.821	0.154	0.084	3
yamaguchi	0.258	0.126	0.013	46
tokushima	0.699	0.139	0.075	15
kagawa	0.529	0.152	0.038	34
ehime	0.610	0.142	0.056	26
kochi	0.466	0.180	0.021	40
fukuoka	0.623	0.163	0.045	24
saga	0.723	0.150	0.071	12
nagasaki	0.289	0.133	0.015	45
kumamoto	0.538	0.130	0.052	33
oita	0.362	0.185	0.012	43
miyazaki	0.643	0.146	0.059	21
kagoshima	0.525	0.142	0.042	35
okinawa	0.227	0.153	0.007	47

Table 2: Impact of Government Loans on Capital Allocation Efficiency

	(1)	(2)	(3)	(4)	(5)
Share of Government Loans	-1.298***		-1.285***		-1.222**
	(0.358)		(0.467)		(0.519)
ln(Ouput per-capita)		0.205	0.00832		0.0180
		(0.130)	(0.149)		(0.159)
# of Bank Branches per-capita				-697.0	-311.6
				(646.8)	(667.8)
Constant	0.886***	0.517***	0.879***	0.708***	0.901***
	(0.0719)	(0.0651)	(0.152)	(0.0894)	(0.148)
Observations	46	46	46	46	46
R-squared	0.186	0.048	0.186	0.026	0.190

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Growing Industries vs. Declining Industries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	η (dV > 0)	η (dV > 0)	η (dV > 0)	η (dV > 0)	η (dV < 0)	η (dV < 0)	η (dV < 0)	η (dV < 0)
Share of Government Loans	-1.094		-0.734	-0.665	-2.713**		-2.665*	-2.795*
	(0.767)		(1.102)	(1.082)	(1.095)		(1.517)	(1.458)
ln(Ouput per-capita)		0.340	0.228	0.239		0.437	0.0300	0.00994
		(0.229)	(0.323)	(0.324)		(0.286)	(0.405)	(0.394)
# of Bank Branches per-capita				-343.1				644.0
				(1,022)				(1,677)
Constant	0.786***	0.392***	0.599	0.624	0.993***	0.217	0.968*	0.922
	(0.170)	(0.113)	(0.369)	(0.393)	(0.242)	(0.148)	(0.502)	(0.551)
Observations	46	46	46	46	46	46	46	46
R-squared	0.052	0.052	0.069	0.072	0.137	0.037	0.138	0.141

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Impact of Government Loans on Capital Allocation Efficiency (Instrumental Variable)

Panel A: Second Stage Regression

	(1)	(2)	(3)
VARIABLES	Wurgler's η	Wurgler's η	Wurgler's η
Share of Government Loans	-2.397***	-2.856**	-3.078**
	(0.866)	(1.201)	(1.491)
ln(Ouput per-capita)		-0.232	-0.266
		(0.230)	(0.287)
# of Bank Branches per-capita			276.7
			(829.1)
Constant	1.112***	1.322***	1.349***
	(0.179)	(0.350)	(0.388)
Observations	46	46	46
R-squared	0.053	-0.020	-0.079
First Stage F Statistic	13.96	8.950	6.934

Panel B: First Stage Regression

	(1)	(2)	(3)
VARIABLES	Share of Government Loans	Share of Government Loans	Share of Government Loans
Vote Share for LDP	0.286***	0.223***	0.207**
	(0.0766)	(0.0744)	(0.0787)
ln(Ouput per-capita)		-0.112**	-0.115***
		(0.0421)	(0.0420)
# of Bank Branches per-capita			85.46
			(193.2)
Observations	46	46	46

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Growing Industries vs. Declining Industries (Instrumental Variable)

VARIABLES	(1) η (dV > 0)	(2) η (dV > 0)	(3) η (dV > 0)	(4) η (dV < 0)	(6) η (dV < 0)	(7) η (dV < 0)
Share of Government Loans	-2.318	-2.358	-2.567	-5.010**	-5.943*	-7.718**
	(1.569)	(2.176)	(2.536)	(1.952)	(3.210)	(3.759)
ln(Ouput per-capita)		-0.0203	-0.0524		-0.471	-0.743
		(0.390)	(0.455)		(0.685)	(0.761)
# of Bank Branches per-capita			259.8			2,205
			(1,252)			(2,125)
Constant	1.039***	1.057*	1.082	1.467***	1.892*	2.108*
	(0.333)	(0.628)	(0.665)	(0.408)	(0.996)	(1.077)
Observations	46	46	46	46	46	46
R-squared	-0.013	-0.017	-0.039	0.039	-0.015	-0.180
First Stage F Statistic	13.96	8.950	6.934	13.96	8.950	6.934

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Impacts on Investment-Output Ratio and TFP Growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Investment/Output	Investment/Output	Investment/Output	Investment/Output	TFP Growth	TFP Growth	TFP Growth	TFP Growth
Share of Government Loans	0.168***		0.200***	0.201***	-4.786***		-4.513***	-3.980***
	(0.0449)		(0.0540)	(0.0601)	(1.274)		(1.151)	(1.289)
# of Bank Branches per-capita				-4.396				-2,653
				(75.53)				(1,617)
ln(Ouput per-capita)		-0.0102	0.0204	0.0205		0.863	0.173	0.256
		(0.0173)	(0.0141)	(0.0146)		(0.521)	(0.410)	(0.413)
Constant	0.138***	0.178***	0.121***	0.122***	1.723***	0.310	1.582***	1.774***
	(0.00879)	(0.00802)	(0.0151)	(0.0152)	(0.285)	(0.235)	(0.326)	(0.356)
Observations	46	46	46	46	46	46	46	46
R-squared	0.246	0.009	0.275	0.275	0.320	0.107	0.323	0.368

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Impacts on Investment-Output Ratio and TFP Growth (Instrumental Variable)

VARIABLES	(1) Investment/Output	(2) Investment/Output	(3) Investment/Output	(4) TFP Growth	(5) TFP Growth	(6) TFP Growth
Share of Government Loans	0.300***	0.401***	0.475***	-6.236***	-6.492**	-4.485
	(0.0734)	(0.115)	(0.140)	(2.081)	(2.893)	(2.908)
# of Bank Branches per-capita			-91.09			-2,492
			(99.27)			(1,736)
ln(Ouput per-capita)		0.0511**	0.0624**		-0.130	0.178
		(0.0222)	(0.0260)		(0.630)	(0.562)
Constant	0.111***	0.0647*	0.0558	2.022***	2.139**	1.896***
	(0.0148)	(0.0338)	(0.0365)	(0.434)	(0.858)	(0.735)
Observations	46	46	46	46	46	46
R-squared	0.095	0.008	-0.188	0.291	0.282	0.365
First Stage F Statistic	13.96	8.950	6.934	13.96	8.950	6.934

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1