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Introduction

This document represents a summary of the September 2002 conference that was sponsored by the National Bureau of Economic Research, the European Institute of Japanese Studies, the Center for International Research on the Japanese Economy, and the Centre for Economic Policy Research. Our organizations have been running a collaborative meeting once a year in Japan with the goal of collecting the best extant English language papers on the Japanese economy. Accordingly, this collection of papers represents the organizers' assessment of the most intriguing available analysis of the Japanese economy (without regard to a specific theme or topic). Full versions of most of these papers have just been issued as NBER Working Papers. Electronic versions can be found by searching under the authors name at www.nber.org/papers.

Each year we have supplemented the scientific program with some sessions on issues at the forefront of the current economic policy debate. For this conference the topic was the conduct of monetary policy, and the remarks of our three panelists are included at the end of the paper summaries. Likewise, we have established the tradition of having a prominent policy maker address the conference. In this case, Haruhiko Kuroda, at the time the Vice Minister of the Japanese Ministry of Finance, was the speaker. Mr. Kuroda was gracious enough to allow us to publish his remarks, which attracted considerable press attention at the time they were made.

We hope you find this summary useful and will follow our subsequent conferences via the Internet (or in person if your schedule permits). Our next gathering will be in Tokyo on September 19 and 20, 2003 and the program and links to the papers will be available on the NBER web pages by August.

Magnus Blomström, Jennifer Corbett, Fumio Hayashi, and Anil Kashyap (Organizers of the conference)

This volume has not been reviewed by the NBER Board of Directors. The opinions expressed in these papers are solely those of the authors.

Corporate Affiliations and the (Mis)Allocation of Credit

Joe Peek and Eric S. Rosengren

The severe economic crisis in Japan, associated with the collapse of the Japanese stock and real estate markets and the dramatic deterioration in the health of the Japanese banking sector, represents one of the major economic events of the late twentieth century. It is even more striking because the second largest economy in the world remained stagnant for more than a decade, and even today shows no evidence of returning to the robust health that characterized most of its postwar history. One potential source of difficulty in implementing major corporate restructuring has been the web of corporate affiliations that encourages lenders and affiliated companies to support firms that otherwise would have been restructured, sold, or liquidated. We show that a primary driver of lending to troubled firms has been the strength of corporate affiliations, and that lenders without such affiliations are much less inclined to allocate additional credit to deeply troubled firms. Further, as banking problems worsened in the latter half of the 1990s, evidence of lending in support of troubled affiliated firms became particularly evident.

Two forms of corporate affiliations that have distinguished Japanese bank-firm relationships are key contributors to the pattern of Japanese lenders supporting troubled firms. The first, the *keiretsu*, is characterized by firms having substantial cross-shareholding and extensive business ties, both explicit and implicit. The second is the “main bank system,” in which a firm has a strong relationship with its primary bank (the main bank) and the main bank has extensive shareholdings in the client firm, serving as a major source of short- and long-term financing and, in many instances, having a representative on the firm’s board of directors.

Previous work has documented the

importance of Japanese corporate affiliations. Many of these studies highlight the potential beneficial effects of these corporate affiliations, including the ability to reduce agency costs, maintain greater bank debt, and avoid restructuring through costly bankruptcy proceedings. A less benign view of these corporate affiliations is that they subvert corporate governance, insulating firms from the discipline that otherwise would come from outside directors, shareholders, and creditors, resulting in suboptimal business and financial decisions. By comparing affiliated and non-affiliated firms, previous studies have examined how corporate affiliations affect investment decisions, stock returns, and corporate governance decisions, but they have not directly examined how affiliations affect the allocation of credit.

This study uses a unique database that enables us to examine the patterns of firm borrowing from banks and nonbank financial firms to determine the extent to which such lending is affected by corporate affiliations, including the main bank and *keiretsu* relationships. Any influence of such corporate affiliations on the allocation of credit should be particularly apparent during times of economic stress, as has been the case in Japan with the continuing banking crisis and the inability of the macroeconomy to recover from the adverse shocks at the beginning of the 1990s.

Although strong corporate affiliations encouraged economic growth during the boom times, for example by making credit more available and investment less sensitive to internal cash flows, these same affiliations might inhibit an economic recovery when the economy needs major restructuring. Firms whose tradition is protecting employees and maintaining relationships with affiliated companies clearly

benefit from a lender willing to provide more flexibility and support than would be available in a more market-driven credit allocation process. However, the reality of banks placing relationships ahead of sound business practices that rely on credit risk analysis has contributed significantly to the lending policies that have resulted in bank failures, massive loan charge-offs, and the substantial volume of problem loans still remaining on Japanese bank balance sheets. Such behavior was reinforced by the perceived national duty of banks to support troubled firms, especially in favored industries.

In Japan, bank regulation and supervision policies provide banks with significant nonperforming loans and impaired capital and present little incentive to be strict with troubled borrowers. In fact, it is in the self-interest of banks to follow a policy of forbearance with their problem borrowers just to avoid pressure to increase their own loan loss reserves, further impairing their capital. This in turn leads to a policy of banks “evergreening” loans: banks extend additional loans to troubled firms to enable them to make interest payments on outstanding loans and to avoid or delay bankruptcy. By keeping the loans current, the banks can make their reported balance sheets look better; the bank is not required to report such problem loans as nonperforming loans. Finally, faced with a growing budget deficit and a voting public weary of funding bank bailouts, the government may prefer banks to continue their policies of forbearance in order to avoid the alternative scenario of massive firm, and perhaps bank, failure — and, in particular, the associated costs, both financial and political.

We investigate the impact of main bank and *keiretsu* affiliations on credit allocation during periods of firm and/or bank distress. Our goal is to determine the extent to which credit has been misallocated because of the pressures emanating from such corporate affiliations.

We find strong evidence that main bank and *keiretsu* affiliations have affected the allocation of credit in Japan during the 1990s, when both firms and banks were severely troubled. However, rather than lenders exploiting their superior information about affiliated firms to make additional loans to those firms with the best prospects, they were more likely than nonaffiliated lenders to provide additional loans to the weakest firms. We find that corporate affiliations, both from main banks and strong *keiretsu* ties, increase the likelihood of a firm receiving additional financing as its health deteriorates. Furthermore, this perverse effect does not occur when the lender is a nonbank without *keiretsu* ties to the firm. In addition, our results indicate that banks have practiced the evergreening of loans, particularly to affiliated borrowers. It also appears that Japanese banks may have been responding to government pressure to avoid a credit crunch or a precipitous decline in economic activity by extending credit to troubled firms. By supporting the weakest firms rather than those with the best prospects, these lenders have misallocated credit.

While many Japanese firms have been insulated from market pressures by their strong relationships with affiliated lenders, this is not necessarily good news for the Japanese economy. Just as forbearance by bank regulators has allowed the banks to be slow to restructure, bank support for troubled and noncompetitive firms has prevented the needed restructuring of nonfinancial firms. If scarce credit is allocated to uncompetitive and troubled firms, then Japan will not experience the natural cleansing that results from a major restructuring which typically occurs in an economic downturn. This will inhibit the ability of the Japanese economy to recover from the current economic malaise, and will adversely affect the longer-run growth potential of the economy.

Investment-Cash Flow Sensitivity and Bond Eligibility: Evidence from Japan

Patrick McGuire

The literature on relationship banking postulates that close bank ties can mitigate the asymmetric information and moral hazard problems that afflict public capital markets. Most notably, Hoshi, Kashyap, and Scharfstein¹ (hereafter HKS91) investigate the investment-cash flow sensitivity of bank affiliated and independent firms in Japan, and provide evidence that strong ties have helped to alleviate liquidity constraints. However, a body of work has emerged that focuses instead on the associated costs of “main banking” in Japan.² This paper builds on that literature by examining the investment-cash flow sensitivity of Japanese manufacturing firms, and uses the explicit bond issuing criteria in a simple test of whether firms enjoyed positive net benefits from close bank ties in the 1980s and 1990s.

The literature on investment-cash flow sensitivity rests on the idea that Tobin's Q is a “sufficient statistic” that governs firm investment, while other factors, liquidity in particular, should not be important. A positive and significant coefficient on liquidity is interpreted as evidence of financing constraints, because this correlation presumably reflects the degree to which firms rely on internal funds for investment. Typically, researchers speculate on the nature of financing constraints, and then compare the investment-cash flow sensitivity across firm groups. However, isolating truly constrained firms is difficult. Ideally, *exogenous* criteria should be used to identify financing constraints, but researchers often are forced to rely on behavioral variables, which can lead to endogeneity problems. Fortunately (for this analysis), Japanese capital markets were regulated for much of the post-war period, and firms had to meet explicit criteria to issue debt in the

domestic bond market in the 1980s. These criteria are the lynchpin upon which this analysis rests, and can be used to address the empirical difficulties.

There has been considerable research on Japanese firms in this area, typically in the context of assessing the benefits of affiliation with large domestic banks. In their seminal paper in both the Japan and Q literatures, HKS91 examine a panel of 145 manufacturing firms, and find that firms with strong bank ties exhibited significantly lower investment-cash flow sensitivity than did independent firms. Since main banks acquire inside knowledge of client firm's investment opportunities, the asymmetric information problems that force firms to rely on internal funds for investment are reduced. More recently, however, Hayashi³ re-examines the HKS91 firm sample (with different data); after excluding outliers, he finds *no significant difference* in the cash flow sensitivity of bank-affiliated and independent firms.⁴ While this discrepancy ultimately may be driven by econometric technicalities, it does cast a shadow on the robustness of the original HKS91 results, and calls for further investigation.

There is mounting evidence that bank affiliation did not come without costs to client firms. Deregulation during the 1980s provided firms with alternative funding sources for the first time in the post-war era. This expansion of non-bank financing options led to increased heterogeneity in capital structure across firms; researchers have been able to exploit this in identifying the costs of bank affiliation. Hoshi et al. (1990a) examine the shift toward non-bank financing for a sample of 109 firms, and find higher sensitivity for firms that *decreased* their reliance on bank debt. This suggests that the net benefit to firms of bank affiliation may

have been negative (at least in this period), since these firms presumably could have maintained close bank ties after deregulation.⁵ In a more direct test, Weinstein and Yafeh (1998) estimate a model in which banks can influence firm investment through shareholding and force firms to borrow as though their cost of capital is lower than it actually is. They argue that bank pressure induced artificially high loan flows and inefficient investment strategies, which in turn led to the over-capitalization of client firms.

Building on this literature, my paper investigates the investment-cash flow sensitivity of Japanese manufacturing firms during 1980-96. While similar in spirit to Hoshi et al. (1990a), it uses a much larger panel, includes the more detailed data described in Hayashi (2000), and uses the bond eligibility criteria as an exogenous firm-sorting mechanism. In addition, it relies on recently developed empirical techniques, and carries the analysis of cash flow sensitivity and profitability into the 1990s, when bond market deregulation was complete.

After separating firms into “Restricted” and “Unrestricted” groups, I show in the first section of the paper that sensitivity was *lowest* for those firms that were restricted from the bond market during the 1980s. This result is very much at odds with the standard prediction in the Q literature. That is, the investment of firms *known to have faced capital market restrictions* was less sensitive to measures of internal net worth than the investment of firms with a wider range of financing options. This result survives several robustness tests, including controls for negative observations as outlined in Allayannis and Mozumdar (2001), and may indicate that sensitivity analysis is not an appropriate technique for identifying financing constraints.⁶ However, restricted firms were, by definition, bank-dependent; this means that the results presented here are consistent with established

theory, and lend support to HKS91 (as opposed to Hayashi (2000)).

As effective firm monitors, banks may have facilitated the efficient use of capital, and helped firms to achieve and maintain their first-best investment path. On the other hand, high monitoring costs may have meant that firms paid a premium for bank financing. In a more sinister scenario, banks may have enjoyed information monopolies, or market power from the remaining capital controls, that allowed them to extract rents through higher interest rates, severe collateral demands, or compensating balance requirements. This is of particular concern because of the gradual nature of bond market deregulation; banks may have been able to capitalize on their market power over firms that did not meet the bond criteria. Thus, the results introduced above do not provide clear evidence on whether bank ties were a net benefit to firms. Sensitivity may have been lower for restricted firms because they enjoyed better access to funding (from close banks), although at higher effective costs. Alternatively, sensitivity may have been driven by artificially high loan flows if firms were pressured to borrow (Weinstein and Yafeh (1998)).

Splitting the sample using both a standard proxy for main bank affiliation and the bond criteria sheds light on this issue. As in Hoshi et al. (1990a), this section of my paper implicitly hypothesizes that if firms enjoyed a positive net benefit from close bank ties, then sensitivity should be lower for bank-affiliated firms, regardless of bond market access. In addition, there should be some ex post observable difference in performance between affiliated and independent firms that reflects the benefits of bank ties. If the net benefit accrued to banks (because of high monitoring costs or rent extraction) then bond-eligible, main bank-client firms may have had a stronger incentive to move to bond financing, even if this increased the likelihood of asymmetric

information problems. In other words, the implications of higher sensitivity may have been more palatable to firms than the bank relationship.

The evidence I present supports the latter case. For the four firm groups, sensitivity was *highest* for main bank-client firms with access to the bond market in the 1980s, and *lowest* for main bank-client-firms without such access. That is, the *spread* in sensitivity was larger for bank-affiliated firms than for independent firms, once external financing options were introduced. In addition, bank-affiliated firms accessed the bond market more often, and with (slightly) larger issues than did independent firms, despite their *lower* profitability.

These results are consistent with banks capturing the rents from main bank ties. With deregulation, mature and healthy firms chose to reduce bank dependence; this implies that internal financing (and its associated costs) was less than the cost of a main bank relationship. Importantly, these results do not imply that firms *never* benefited from having a main bank. Indeed, it is often argued that the bank-centered financial system was an important factor behind Japan's rapid growth prior to the mid-1970s, and only became obsolete once Japan reached the technological frontier. The lack of outside financing options in this earlier period precludes the firm division proposed in this paper.

¹ T. Hoshi, A. Kashyap, and D. Scharfstein, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics*, 106 (1991).

² For discussion of the costs and benefits of bank affiliation in Japan, see T. Hoshi, A. Kashyap, and D. Scharfstein, "Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships," in *Asymmetric Information, Corporate Finance, and Investment*, G. Hubbard, ed., Chicago: University of Chicago Press, 1990a, pp. 105-

26; R. Morck, M. Nakamura, and A. Shivdasani, "Banks, Ownership Structure, and Firm Value in Japan," *Journal of Business*, 73 (4) (2000), pp. 539-67; D. Weinstein and Y. Yafeh, "On the Costs of a Bank-Centered Financial System: Evidence from the Changing Main Bank Relations in Japan," *The Journal of Finance*, LIII (2) (1998); and others. T. Hoshi and A. Kashyap, *Corporate Financing and Governance in Japan: The Road to the Future*, Cambridge, MA: MIT Press, 2001.

³ F. Hayashi, "The Main Bank System and Corporate Investment: An Empirical Reassessment," in *Finance, Governance, and Competitiveness in Japan*, M. Aoki, ed., Oxford: Oxford University Press, pp. 81-98, 2000.

⁴ Hoshi counters that if the correction of the data is done systematically, the earlier results still hold. See T. Hoshi, "The Main Bank System and Corporate Investment: Further Robustness Tests," in *Finance, Governance, and Competitiveness in Japan*, M. Aoki and G. Saxonhouse, eds., Oxford: Oxford University Press, pp. 99-105.

⁵ The authors speculate on the nature of the costs of bank affiliation. Banks may require higher rates of return because of reserve requirements, and may require a premium on loans, which are less liquid than publicly traded debt. In addition, firms may incur indirect costs if banks (as debt rather than equity holders) encourage excessively conservative investment policies. See T. Hoshi, A. Kashyap, and D. Scharfstein, "Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships."

⁶ There is considerable debate about the use of sensitivity analysis. Most recently, Allayannis and Mozumdar overturned the Kaplan and Zingales critique of Fazzari et al., as well as the results in Cleary. They argue that firms with negative cash flow have driven investment down to its lowest possible level, making it unable to respond to further reductions (or small fluctuations) in cash flow. See Allayannis, G., and A. Mozumdar, "The Investment-Cash Flow Sensitivity Puzzle: Can Negative Cash Flow Observations Explain it?" *Virginia Tech Working Paper*

98-5, 2001; S. Cleary, "The Relationship Between Firm Investment and Financial Status," *The Journal of Finance*, LIV (2) (1999), pp. 673-92; S. Fazzari, G. Hubbard, and B. Petersen, "Financing Constraints and Corporate Investment," *Brookings Papers on*

Economic Activity, 1988 pp. 141-195; S. N. Kaplan and L. Zingales, "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics*, CXII (1997), pp. 169-215.

Market Share Dynamics in Japanese Manufacturing

John Sutton

How long does a typical “market leader” in an industry maintain its position? This question has attracted continuing attention in the (IO) industrial organization literature over the past generation. Two rival views have emerged. The first, associated with Alfred Chandler *inter alia*, asserts that leadership tends to persist for a “long” time. The rival view, sometimes labeled “Schumpeterian”, emphasizes the transience of leadership positions; an explicit version of this view is spelled out in Franklin Fisher’s model of “leapfrogging competition.” The central problem with this debate is that no benchmark is proposed relative to which the duration of leadership might be judged “long” or “short.” Thus, if it is observed that the typical market leader stays in place for 20 years, this can be interpreted as “long” by writers in the first group, and as “short” by those in the second.

This paper introduces a formal model of market share dynamics, and uses it to provide a benchmark case, corresponding to a “neutral” situation in which neither positive (“Chandlerian”) effects nor negative (“Schumpeterian”) effects are present. This model provides a natural benchmark against which empirically observed patterns of persistence can be gauged.

What degree of persistence should we expect on the basis of theory? Game-theoretic models offer little guidance on this question. The issue turns on the following consideration: suppose the market share gap between the leader and its (nearest) rival narrows, will this then induce an increase or a decrease in effort by the leader relative to the rival? It is easy to construct game-theoretic models which can go either way; whether they go one way or the other depends crucially on factors (such as the

belief of agents) that are notoriously difficult to measure, proxy, or control for in empirical investigations.

The central theme of this paper lies in the classic observation of William Feller to the effect that passage times in Markovian processes tend to be extremely long relative to what we might expect intuitively. Feller identifies this as the most surprising feature to emerge from the study of stochastic processes. In the light of this, it seems natural to inquire into the degree of persistence that we would get in a simple Markovian model. For much of the discussion, the literature pre-supposes that a “long” duration of leadership must imply that some “economically interesting” mechanism is at work to account for this persistence. What Feller’s insight suggests is that looking for such explanations may be inappropriate. Even if leader and laggard are equally lucky or equally capable, we will still see leadership persist for what appears intuitively to be a “long” time, and for reasons that are more a matter of arithmetic than economics.

Technicalities

From a statistical viewpoint, the duration of the leadership question translates into a question of the “first crossing times” of stochastic processes. In principle, the problem involves crossing times between a set of interdependent random walks. My analysis takes advantage of two striking empirical features of the data to arrive at a much-simplified representation of the problem. The first is that, for all but the four most highly concentrated of the 45 industries in the dataset, changes in market share for the first and second largest firm display a very low degree of correlation. The second feature relates

to the relationship between a firm's market share and the variance of changes in market share; this turns out to obey a simple scaling (power-law) relationship. Combining these two features, we can obtain a transformation of the data that allows the analysis to be carried out by reference to the (well-known) properties of crossing times for a simple random walk.

The Data

This analysis is based on a dataset consisting of annual observations of market shares for leading firms in 45 narrowly defined industries in Japanese manufacturing over the 25-year period 1974-99. These data were compiled using the annual volumes published by the Yano Company. This source covers a large number of industries, although occasional changes in coverage and presentation do occur. Thus it was possible to construct fairly complete and consistent series over the full 25-year period only for these 45 industries. A series of interviews with selected companies was used to check issues of interpretation and reliability of data.

Data of this kind would be very difficult to compile for a broad cross-section of industries in other countries; the availability of the Yano data was a primary reason for focusing on Japan. The second, equally important, reason for this focus lies in the rarity of mergers and acquisitions. For U.S. or U.K. data, for example, it would be difficult to study the distribution of first passage times over an extended period without having to confront the confounding influence of mergers and acquisitions. In the present dataset, only one merger involving "leading" firms occurs over the 25-year period in these 45 industries.

Results

A series of tests on the data indicates that we cannot reject the null hypothe-

sis of simple Markovian behavior (that is, no bias in either the Chandlerian or Schumpeterian direction). Why are market share dynamics "well represented" by a simple stochastic model? The central argument of this paper is that such a model in principle could be improved as a representation of any one industry by incorporating industry-specific features including a strategic representation of firms' competitive responses to market share changes. Once we aim at constructing a "richer" model of this kind, though, we find that "strategic effects" turn on various features, some of which are intrinsically "unobservable" as far as the outside economist is concerned. Most importantly in the present context, they include the beliefs of agents as to their rivals' private information, and their strategic responses to this information.

One implication of this is that, when we look across a broad spectrum of industries without access to this kind of industry-specific information, it may be useful to begin by seeing how far we can progress using the low-level description afforded by a simple "stochastic process" model of the kind used here: shocks to the variables underlying market shares are represented as exogenous. A more sophisticated model would retain exogenous shocks to underlying "technology and tastes" parameters, but would extend each firm's reactions beyond the price-quantity adjustments allowed for in our benchmark model to deal with changes in marketing and/or R and D outlays. In respect to these latter adjustments, subtle differences appear across different industries, seemingly driven by various factors, some of which are very difficult to measure, proxy, or control for in empirical studies. In the final part of the paper, this theme is developed by reference to six industries that exhibit widely different patterns of market-share dynamics.

Open Market Operations, Debt Management and Exchange Market Intervention: The General Case and the Japanese Case

Speech by Haruhiko Kuroda

Open market operations, debt management and exchange market intervention generally have been done by three independent (or semi-independent) authorities — namely, the monetary authority, the debt management authority, and the foreign exchange authority — without much coordination among them.

This happy situation has been brought about by the three authorities pursuing (apparently) independent objectives separately by using their own (apparently) independent policy tools. The current situation in Japan is nothing like this, and shows how things are more complicated with lots of potential conflicts among them.

The General Case

Open market operations are one of the three main tools of monetary policy (the other two are discount rate and reserve requirement policies). Basically, open market operations consist of the exchange of cash with short-term Treasury Bills (TBs). By selling or buying TBs in the market, the monetary authority (central bank) can control either the supply of cash (more accurately, base money, that is, cash in circulation plus commercial banks' balances at the central bank) or the short-term interest rate. By so doing, it aims to attain price stability.

- Some central banks also operate in the long-term Government Bond (GB) market.

However, such operations are considered exceptional.

- The monetary authority's objective might be more complex than simple price stability; asset prices could be a matter of concern, and general eco-

nomic conditions would be taken into account. Yet, price stability is surely the predominant objective of the monetary authority.

Debt management aims to minimize long-run debt servicing costs by changing the mix of short-term debt and long-term debt given the outstanding stock of national debt. It is said that “the government should borrow short when interest rates are high, and borrow long when interest rates are low.” Strictly speaking, the government should borrow short when the yield curve is steeper than normal, while it should borrow long when the yield curve is flatter than normal. In any case, by so doing, the debt management authority inevitably changes the shape of the yield curve toward the normal form. In other words, although the objective of debt management is minimization of debt service costs, its intermediate target could be the shape of the yield curve — or, the term structure of interest rates.

- If minimization of long-term debt servicing costs is the sole aim of debt management, then governments would seldom, if ever, issue long dated bonds, because over time the long-term interest rate must be higher than the short-term interest rate. Debt management therefore must have additional aims, including price stability and reduction of rollover risk; otherwise, government borrowing would be all short-term — in extreme cases, demand deposit or fiat money.

Exchange market intervention is usually done in the following way: in order to depreciate the currency, the foreign exchange authority sells domestic TBs (or, finance bills) to acquire cash, which will be sold to buy foreign

currency in the market, which in turn would be invested in foreign TBs. In order to appreciate the currency, exactly the reverse must be done. Therefore, exchange market intervention can be seen as the exchange of domestic TBs for foreign TBs. Its objective is exchange rate stability, or more precisely, avoidance of misalignment and reduction of volatility.

- If domestic TBs sold (bought) by the foreign exchange authority are bought (sold) by the monetary authority, or exchange market intervention is done by the monetary authority itself without any concomitant adjustment, then exchange market intervention is “not sterilized”; otherwise, it is “sterilized”. It is frequently argued that non-sterilized intervention is more effective than sterilized intervention.

- Some foreign exchange authorities invest in foreign GBs, corporate bonds and even equities. But this is a matter of investment policy and not of intervention policy.

In the (somewhat streamlined) general case, we have four assets (cash, TB, GB, foreign TB) and three relative prices (short-term interest rates, yield curve, exchange rates). So, the three authorities (monetary authority, debt management authority, foreign exchange authority) are pursuing the three objectives (price stability, debt service cost minimization, exchange rate stability) happily and independently.

The Japanese Case

In the current Japanese case, in which the short-term interest rate is practically zero, open market operations — in the sense of the exchange of cash with TBs — have completely lost the power to influence the short-term interest rate; the interest rate cannot be reduced below zero. As a result, the Bank of Japan (BOJ) switched its control target from the short-term interest rate to commercial banks’ excess reserves at the BOJ (the major part of

base money). Some economists have argued that the excess reserve target must be substantially raised to further ease monetary conditions, but the BOJ has argued that cash and TBs are currently almost perfect substitutes and its efforts to buy TBs have sometimes failed due to the lack of demand for them. Then, those economists have argued that the BOJ can more aggressively buy GBs, since it has been buying them for some time anyway. To this, the BOJ has argued that a further increase in the monthly purchase of GBs could undermine fiscal discipline and thus raise the long-term interest rate, and, in any case, it cannot bear so much market risk. Regarding the suggestion to buy equities or foreign TBs, the BOJ rejected the idea because of their risk and unorthodox nature. All in all, the BOJ contends that monetary policy is unable to stop price deflation.

If monetary policy is as constrained as the BOJ claims in the Japanese case, that is, if there are practically only three assets (cash=TB, GB, foreign TB) and two relative prices (yield curve, exchange rate), then the possibilities of two other policies to be used more imaginatively must be explored.

The scope of debt management possibly can be widened so as to pursue price stability more explicitly. Since the short-term interest rate is safely anchored at zero, the Japanese debt management authority can lower the long-term interest rate by shifting government debt issues from long- to short-end. This would surely contribute to reviving domestic demand and reducing deflationary pressure, although it might mean a compromise with the traditional objective of debt management.

- If Japan’s private sector is over-borrowed and must repay debt, then the money supply will fall unless banks increase those assets which are public sector liabilities. They are doing this, but not enough to create sufficient monetary growth to stimulate the economy because of the maturity risk inher-

ent in owning GBs. The policy to shift to short might alleviate the situation.

Another possibility is to use exchange market intervention for price stability. If the Japanese foreign exchange authority sells the yen and buys the foreign currency in a massive way, it could depreciate the yen and stop price deflation. It is, however, doubtful that such a policy, without other supportive policies, is accepted in the international community.

- It is generally accepted that the foreign exchange authority may intervene in the exchange market for exchange rate stability, and monetary policy might affect the exchange rate. However, it is not generally accepted that exchange market intervention can be used for price stability.

Concluding Remarks

The Japanese case reveals a particularly difficult situation in Japan as well as potential difficulty in the general case. In any country, if price deflation continues and the short-term interest rate becomes near zero, the Japanese case will appear. If the short-term interest rate and long-term interest rate are perfectly aligned through an expectations mechanism, the yield curve cannot be affected by debt management policy. If domestic TBs and foreign

TBs become perfect substitutes, sterilized intervention will become ineffective. Above all, the intricate relationship among open market operations, debt management, and exchange market intervention means a need for coordination among the three authorities despite their apparent independence.

What should be done in the current Japanese situation? The most radical solution would be to completely change the institutional arrangement surrounding the three policy authorities, such as the abrogation of central bank independence, or even the amalgamation of the three authorities.

However, it may be unwise to make such radical institutional changes because the current conditions of price deflation and zero interest rates may not continue indefinitely. Then, more serious rethinking of the three policies may be called for: first, the BOJ may adopt more non-traditional measures, including accelerated purchases of long-term GBs and/or inflation targeting. Second, if they are rejected or not possible, the debt management authority may shift debt issue decisively to the short-end. Third, if that is also difficult, the foreign exchange authority might be forced to use an internationally unpopular kind of exchange market intervention, which would be most unfortunate.

Is Foreign Exchange Market Intervention an Alternative to Monetary Policy? Evidence from Japan

Rasmus Fatum and Michael Hutchison

This paper explores the effectiveness of official Japanese intervention operations in moving the exchange rate and asks whether intervention might be a useful alternative to conventional monetary policy. The inter-bank interest rate in Japan has been virtually zero since early 1999 and the country recently has experienced very strong base money growth. By contrast, broad money growth has been slow and the *level* of bank credit has fallen sharply each year since 1996. This raises the specter that Japan may be in a “liquidity trap” so that monetary policy is ineffective in stimulating aggregate demand. Would sterilized (non-monetary) foreign exchange market intervention, by depreciating the exchange rate and inducing export-led growth, be an effective alternative to monetary policy under these circumstances?

Whether sterilized intervention is effective in moving exchange rates is a long-standing open question in the literature on international finance. Among the large industrial countries, this is especially true in Japan because to date empirical studies have not been able to analyze Japanese *official* intervention data — the Ministry of Finance (MoF) did not make this available publicly until July 2001.¹ The MoF now discloses, with a 1-3 month delay, the day of intervention, the amount of yen intervention (bought and sold by its agent, the Bank of Japan, BoJ), and the currency of intervention.

This new data shows that Japan, among the world’s governments, is the single largest actor in the foreign exchange market. Over the April 1991 — December 2000 period, the BoJ (acting as the agent of the MoF) bought (sold) U.S. dollars on 168 (33) occasions for a cumulative total of \$304

billion (\$38 billion). This dwarfs all other official intervention in the foreign exchange market. For example, Japanese intervention was greater than U.S. intervention over the same period by a factor of more than 30 and was much greater than Bundesbank intervention operations had been when it was responsible for exchange rate policy in Germany.

An important methodological component of this paper is the application of event study methodology in evaluating the effectiveness of intervention “episodes.” Almost all earlier empirical studies on intervention use time-series methodology. However, standard time-series techniques are not well suited to the task, because exchange rates are typically highly volatile on a day-to-day basis while official intervention operations are concentrated in sporadic clusters. Viewed in this light, it is perhaps not surprising that time-series based studies tend not to find strong evidence for a systematic link between exchange rate movements and intervention operations. Instead, the event study approach used in the finance literature seems to fit well so that, in this context, a cluster of intervention operations constitutes a natural candidate for identification as a single event.

We apply the event study methodology to the newly available Japanese data — as well as U.S. intervention data — on intervention operations in the USD/JPY exchange rate market over the April 1, 1991 to December 31, 2000 period. Focusing on daily Japanese and U.S. official intervention operations, we identify separate intervention “episodes” and analyze the subsequent effect on the exchange rate. Using the non-parametric sign test and matched-sample test, we find strong and robust evidence that sterilized intervention systemically af-

fects the exchange rate in the *short-run*.

What Determines a Successful Event?

Defining each day that the BoJ, the Fed, or both were active in the USD/JPY exchange rate market as a separate event is problematic because intervention frequently comes in “clusters”—several days in a sequence, not necessarily continuous. Therefore we define an event as a period of days with official intervention conducted by the BoJ, the Fed, or both, in the USD/JPY exchange rate market in one direction (in terms of purchases or sales), and possibly including a number of days with no intervention. How many consecutive days of no intervention (the “tranquillity” period) can occur while we still consider the surrounding days of intervention to be part of one and the same event? Given the structure of the intervention data, we choose a “tranquillity” period of five days for our baseline results (and let this number vary in the robustness checks).

The length of the pre-event and post-event periods, respectively, needs to be set long enough to capture a “normal” no-intervention performance of the exchange rate. If the length of the periods is set too long, however, a number of instances of overlap of pre- and post-event windows are created. We apply pre- and post-event window lengths of two, five, ten and fifteen days and find the results robust to either window length. The results with two-day event windows are our baseline, but the paper presents a summary of the results with other event window lengths.

We follow our earlier work (forthcoming in *The Economics Journal*)² and apply three alternative criteria for what constitutes a successful intervention event. The first criterion of success is simply whether the direction of the movement in the exchange rate is the same as the direction in which the cen-

tral bank was intervening, for example, does the value of the JPY relative to the USD increase after JPY are purchased? This measure of successfulness is referred to as the “direction” criterion. The second criterion defines a successful event as one where intervention is associated with a “smoothing” of the exchange rate movement.

The third criterion distinguishes between “leaning with the wind” and “leaning against the wind” events, conditioning each event on the exchange rate movement of the associated pre-event window. When the “direction” criterion is applied to “leaning against the wind” events only, the resulting measure of success has a clear meaning in terms of reversing the exchange rate trend that prevailed up until the intervention occurred. This particular measure is denoted the “reversal” criteria.

The Results of the Event Study

Focusing first on the two-day pre- and post-event window definitions (and the maximum 5-day “tranquillity” period), we identify 43 intervention events over the 10-year period. Comparing the direction of intervention during the event with the change in the exchange rate over the preceding period (the two-day pre-event window), 34 events appear consistent with a “leaning against the wind” intervention policy and, accordingly, nine events appear in line with “leaning with the wind.”

The direction of the change in the exchange rate during the post-event window was consistent with the direction of the associated intervention in 31 events. In other words, 31 of the 43 events were successful according to the “direction” criterion, and by application of the sign test (based on a binomial distribution with the probability of an individual success of 50 percent) randomness is rejected at the 99 percent significance level. Furthermore, 24 of the 34 “leaning against the wind” events were successful according to the

“reversal” criterion and, again, the sign test (based on the same 50 percent probability parameter) rejects randomness at 99 percent significance level. While 29 of the 34 “leaning against the wind” events were successful according to the “smoothing” criterion, the sign test of “smoothing” (based on a binomial distribution with the probability of an individual success of 75 percent) cannot reject randomness at any conventional significance level.

Comparing these findings to the sign test results based on window lengths of five days, we find the latter to be stronger. With respect to every criterion of success, randomness was rejected at the 99 percent significance level using the 5-day event window. In short, over a period of 5 days, the success of intervention operations is striking. In particular, it is noteworthy that the “smoothing” criterion is also met for intervention success with the 5-day event window.

As a further test of successfulness according to the “smoothing” criterion, the matched sample test is applied to the 34 “leaning against the wind” events and these were, on average, associated with a reversal of the preceding trend. Splitting up the sample in USD purchases and USD sales, we can strongly reject (at the 95 percent significance level or higher) the null hypothesis of no difference in means in both cases — that is, intervention appears to have had a smoothing effect on exchange rate changes.

To address the concern of a high degree of kurtosis (“fat tails”) in the exchange-rate series, we regress our sample of leaning against the wind “matched pair” differences (for both USD sales and USD purchases) on a constant term using White’s (1980) heteroskedasticity-consistent (robust) stan-

dard errors. With rejection at the 99 percent significance level, these regressions are fully consistent with the matched sample tests based on the normal distribution.

Conclusion

We find support for *short-run effectiveness* of intervention. Our horizon for the baseline results was for an effect measured from 2-5 days; an extension of the framework showed effects lasting for up to two weeks. Intervention also is effective in the short-term even if not accompanied by supporting interest rate change and regardless of whether intervention is “secret” (in the sense of no official reports or rumors of intervention reported over the newswires). This suggests that the Bank of Japan could indeed engineer exchange rate depreciation (thereby counteracting deflation and recession) even though interest rates cannot be moved downwards further. An important caveat, however, is that intervention in our study only appears effective in moving the exchange rate over a short horizon (up to two weeks), clearly limiting its usefulness as a substitute for an effective monetary policy instrument.

¹ *The only paper using the newly available Japanese intervention data that we are aware of is a study by Ito: T. Ito, “Is Foreign Exchange Intervention Effective? The Japanese Experience in the 1990s,” NBER Working Paper No. 8914, April 2002.*

² *R. Fatum and M. M. Hutchison, “Is Sterilized Foreign Exchange Intervention Effective After All? An Event Study Approach,” UCSC Working Paper No. 02-02 (August 2001). Forthcoming in The Economic Journal, April 2003.*

Is Foreign Exchange Intervention Effective? The Japanese Experiences in the 1990s

Takatoshi Ito

In July 2001, the Japanese Ministry of Finance (MoF) disclosed daily intervention records (date, amount, currency pair) for April 1991 to March 2001. In the future, the intervention record will be disclosed in the same format four times a year. (MoF home page: www.mof.go.jp/english/e1c021.htm). The intervention decision is made in the MoF and the special account of intervention maintains the balance sheet composed mainly with short-term government securities, Financial Bills, liabilities, and foreign assets as assets.

An examination of the data reveals the following features. There were 200 instances of yen-dollar intervention in the ten years, of which 165 occurred before June 20, 1995, the day Mr. Sakakibara took charge of intervention, and 35 after that date. The dollar was sold and the yen was bought when the yen depreciated vis-à-vis the dollar and vice versa. No dollar-selling intervention was conducted below 125 yen/dollar. The buy-low-sell-high strategy has been profitable, as the yen fluctuated widely between 80 and 145 yen/dollar.

Profits from interventions are the sum of: 1) realized capital gains, profits realized by buying and selling U.S. dollars; 2) unrealized capital gains, that is the difference between the mark-to-market value of the (accumulated) dollar assets at the end of March 2001 compared to their average purchase cost; and 3) realized carrying costs, that is profits/losses resulting from the difference between the interest costs of maintaining the (accumulated) yen liability and the interest income from holding the (accumulated) dollar assets, summed over the ten years.

The estimates are realized gains of 981 billion yen; unrealized gains of

3,665 billion yen; and interest profits of 3,975 billion yen; the sum is 8.6 trillion yen during the ten-year period. So, the interventions indeed were hugely profitable. According to a view that profitable intervention is stabilizing, the Japanese authorities thus contributed to stabilizing the yen-dollar fluctuations.

Next, I analyze the effectiveness of intervention by looking at the 24-hour yen-dollar movement on an intervention day. Of 119 instances of the lean-against-the-wind interventions following yen appreciation, only about half were successful in reversing the trend. If the standard for success is relaxed to be less appreciation because of intervention, then interventions were successful almost 70 percent of the time. There were 19 cases of lean-against-the-wind operations in an attempt to stop yen depreciation. Of those 19 interventions, 10 of them reversed the trend and 17 were successful in at least slowing down the pace of yen depreciation.

Out of 49 interventions to sell the yen as part of lean-in-the-wind operations, the yen depreciation accelerated only 11 times. More than half of the time, the yen appreciated then depreciated on the day of yen-selling interventions that followed some yen depreciation. This may be counter to the conventional wisdom that it is easier to go with the market than against the market. There were only 13 cases of lean-in-the-wind interventions attempting to appreciate the yen, but they were successful in accelerating the yen appreciation, or at least maintaining yen appreciation, more than 60 percent of the time.

Interventions generally were effective, except for a period when the yen appreciated from 100 to 80 in the first half of 1995. The failure of interven-

tions in 1994 through June 1995 may be attributed to too strong a force for yen appreciation despite repeated interventions, or because of a less-than-effective style of intervention. The interventions after June 1995 did tend to be effective. The first intervention in over a week has a larger impact than subsequent interventions. And, the Japan-U.S. joint interventions were the most powerful.

Finally, I estimate a reaction function of Japanese intervention. A large movement on the day before, and the deviation from 125 yen/dollar, tend to

prompt intervention. A reaction function in the first half of the period is better estimated than during the second half. Interventions in the second half were much more difficult than in the earlier period.

In sum, Japanese interventions were profitable in the 1990s, and effective in the second half of the 1990s. The joint intervention is much more powerful than the unilateral intervention. And, the success is in part due to unpredictable, infrequent interventions, that is, to large surprises at work.

Panel Discussion

Speaker: Robert Alan Feldman

The economics profession has been deeply divided on the issue of how to deal with deflation in Japan. Indeed, there has been great confusion and frustration at the inability of the profession to create a unified explanation and prescription. The explanation for such broad disagreement appears to be that the underlying models used to explain deflation differ widely among economists, and therefore the prescriptions differ as well. There are four such models that are the chief contenders in this debate. In addition, there are different models of policy formation that must be grafted onto the economic models in order to help us judge whether monetary policy has been correct.

The Monetarist Approach

The first model for deflation is the monetarist one. The Fisher equation ($MV=PY$) is its basis, and is restated in its modern form of $M/P=kY$. Next, a money multiplier process is added, so that base money (H), which the central bank controls, enters the equation. Thus, the usable equation becomes

$$mH/P = kY$$

The main contention of the monetarists is that H has not risen enough, and therefore that P is dropping.

The counter-arguments are both theoretical and empirical. The theoretical counter-argument is that with an unstable financial system, both the money multiplier (m) and the demand coefficient for real money balances (k) are unstable. Any rise in H is automatically countered by a drop in m or k . Hence, raising H will not solve the problem. The empirical argument follows from this. In fact, base money has risen by 80 percent since 1Q97, and the BoJ balance sheet by 120 percent. Broader

aggregates also have risen, although only by about 20 percent. Hence, the multiplier is clearly unstable. In addition, the sharp acceleration of the BoJ balance sheet and of base money have been answered by equally sharp declines in the multiplier in recent years. The sharp shifts in the composition of broad money (from quasi-money into M1) also suggest that liquidity preference indeed has been unstable, in light of instability in the financial system.

Thus, if one asserts that even more aggressive increases in H would stop deflation, one must explain why, from this point onward at least, one expects the money multiplier to stabilize and/or the demand coefficient for real balances to stabilize. Without such an explanation, the assertion that “more H means less deflation” rings hollow.

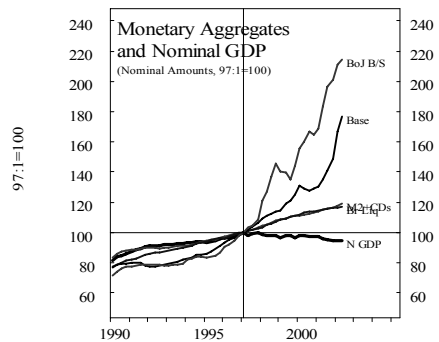


Figure 1. Monetary Aggregates and Nominal GDP

The IS-LM Approach

Since the IS-LM model assumes prices to be fixed, it cannot be used directly as a tool for explaining deflation. However, if one's implicit model of prices relates changes in inflation to the degree of excess demand, then the key to stopping deflation clearly becomes demand management. The proponents

of the IS-LM approach believe (in my view correctly) that Japan now faces a liquidity trap, and therefore that the LM curve is flat. Therefore, according to their view, the only alternative is IS policies. Thus comes the assertion that more government spending will end deflation.

The counter-arguments again are both theoretical and empirical. There are several theoretical objections. First, since the IS-LM framework has no explicit inflation model, the policy conclusion is only implicit. Second, the alternative effects of fiscal policy (for example, preserving excess supply) are ignored. Third, the effects of fiscal policy on the bond market also are ignored; this is particularly important in Japan today, when fiscal deficits are galactic, and jittery bond markets can explode (as occurred at the end of 1998) when adverse news is announced. The empirical objection is that fiscal expansion has been tried several times in the last decade, and has brought only temporary relief. Indeed, some commentators (myself included) believe that the temporary relief has dulled the edge of structural reform policies, which even the Keynesians agree are necessary.

The AS-AD Approach

The third approach uses the aggregate-supply (AS)/aggregate demand (AD) framework. The AD side is simply a restatement of the IS-LM model, whereby increases in demand correspond to lower price levels in equilibrium. (The reason is that increased demand requires higher real money balances; with a fixed level of nominal money supply, an increase in real money balances must come from lower prices.) Thus, the AD curve is downward sloping, with output on the horizontal axis and the price level on the vertical axis. The aggregate supply curve comes from the relationship between nominal wages (and other cost compo-

nents) and the price level. At a given level of nominal wages (or interest costs, or oil prices), a higher level of prices would imply higher profits, and therefore more output. Thus, the AS curve is upward sloping relative to the axes just mentioned. The intersection of AD and AS curves generates an equilibrium. In order to raise the price level (that is, to stop deflation), one can use either the AD or the AS curve. This is where things get interesting.

Traditionally, the AD curve responds more to monetary and fiscal policy than the AS curve. (Indeed, the latter is assumed to be inert with respect to policy changes.) However, this is precisely the assumption that appears to fail in Japan today. Indeed, fiscal policy over the last decade was aimed largely at keeping inefficient producers (in construction and real estate) in business, thus artificially pushing the supply curve far to the right side of the diagram, while pushing the demand curve only slightly to the right. The small movement in the AD curve may be attributable to Ricardian equivalence, which pulled private demand inward when government demand moved outward, and low return on capital, which lowered the multiplier effects of government programs. Ironically, according to this view, both monetary and fiscal policies actually *worsened* deflation.

The counter-arguments to this view are chiefly empirical. While it is theoretically possible that the effects of expansionary monetary and fiscal policy could be perversely contractionary, the empirical evidence for the actual existence of this phenomenon is weak. There is anecdotal evidence, for example, the rapid recovery of the economy in Texas once the RTC began aggressive real estate sales. At an aggregate level, however, the evidence is thin. On the more practical side, any policy to stop inflation by shifting the supply curve inward would cause a massive recession and might not be politically sustainable.

The Trade Theory Approach

The issue of deflation can be approached from a completely different angle as well, that of trade theory. The approach focuses on the effect of changes in relative prices on the measured price index. For example, if tradable goods prices are falling, but non-tradable prices are not rising enough to offset this fully, then the aggregate price index is declining. This can occur even though consumer welfare is improving as a result of increased trade. In terms of the Heckscher-Ohlin model, a change in international prices can leave an economy producing inside the production possibility frontier when resource transfer is not smooth. The consumer welfare of the country actually can improve when the terms-of-trade change is positive enough to offset the waste of resources.

The challenge here is to link a trade model (which deals with multiple goods but only in relative prices) to a macro model (which deals with only a single good and absolute prices). When the essence of the economic problem is changes in relative prices, the use of one-good macro models will mislead. There is very little theory that addresses how macroeconomic policies should deal with distortions in relative prices. Indeed, the one-good assumption in the structure of macroeconomics makes it incapable of addressing the issue. The only possible solution is an implicit model that links unemployed resources (that is, the degree to which the economy is inside the production possibility frontier) to the deflation rate. Without an explicit model, however, the trade theory approach to deflation is incomplete.

There are several counter-arguments to the trade theory approach as well. First, the lack of an explicit linkage to deflation is a fault. Second, the absence of any nominal quantities in trade models makes the application of standard macro theory impossible. Third, the fact that one of the major distortions is in

the land market means that one factor of production is mispriced, and not a good.

Policy Models

Most academics acknowledge that policy coordination is also difficult when separate bureaucratic interests are involved. The question for a monetary authority is whether to adopt a globally optimal policy that hinges on other actors doing their jobs optimally, when in fact the other actors are not doing so. This is a problem of game theory. Should the BoJ “do the right thing” (assuming that it knows the right thing), even if other actors refuse to do their parts?

The work of Robert Axelrod (in *The Evolution of Cooperation*, Basic Books, 1984) explores this issue. Axelrod posits an infinite prisoners dilemma game, and explores what strategies generate the best score against a broad range of other strategies, with a broad range of payoff matrices. The answer is that a “tit-for-tat” strategy is best. Players should cooperate on the first move, and the decision at time t should mimic the action of their counterpart at time $t-1$. This strategy does not always generate good outcomes. But it does generate the best average outcome. In subsequent work, Axelrod and other scholars isolated four criteria for successful strategies in game theory situations (see Duncan Watts, *Small Worlds*, Princeton University Press, 1999). The four criteria are that the strategy must be *nice* (it must not pick fights), *retaliatory* (it must retaliate against attacks), *forgiving* (it must stop fighting when the counterpart stops), and *transparent* (the counterpart must know how the player will react in any given situation).

In light of these results, the best policy appears to be retaliation in the face of exploitation by counterparts. For this reason, even though the BoJ has been quite accommodative, the BoJ’s refusal to move to full inflation targeting has probably been a good decision.

Panel Discussion

Speaker: Takatoshi Ito

The Japanese economy is in a difficult situation to say the least. First, the growth rate has been low. The average growth rate was 1 percent for the last ten years — thus nicknamed a lost decade. Second, deflation, that is, a negative inflation rate measured in the GDP deflator and CPI, has been going on for the last five years, and worsened in the last two years. Third, asset prices, including stock and land prices are one-third to one-quarter of the level of their 1989 peak; put differently, they are at the level of almost 20 years ago — a lost two decades. The nonperforming loans problem that has plagued the Japanese economy for the last ten years is yet to be resolved. Japanese banks, once regarded as mighty institutions dominating international financial markets, are struggling to survive, as their capital has been depleted by writing off nonperforming loans and unrealized losses from equity holdings. The government debt-GDP ratio has reached 140 percent, the worst among the Group of Seven, and government bonds are credit-rated below Botswana's.

The traditional macroeconomic weapon has become either impossible or ineffective. The nominal short-term interest rate has been zero since 1999. Monetary policy, in terms of manipulating the nominal interest rate, cannot be strengthened because the nominal interest rate cannot be negative. Given that the inflation rate is negative, the real interest rate remains positive despite very weak aggregate demand. The situation is a liquidity trap that has been observed only in macroeconomic textbook since the 1930s. The traditional policy for overcoming a liquidity trap is fiscal policy — deficit financing will raise aggregate demand and induce private-sector demands. However, after several attempts at such prime-pump-

ing in the last ten years, private sector spending remains weak and the large debt is becoming a threat for the future. Fiscal sustainability is being questioned.

Three large banks failed in 1997 and 1998, and most of the major Japanese banks received capital injections in 1998 and 1999. The Japan premium, the higher interest rate charged to Japanese banks in the international financial market reflecting their weak financial positions, was quite high in 1997 and 1998 but returned to normal in April 1999. Several mergers and affiliations of the large banks were announced and carried out between 1999 and 2002. But, vulnerability reappeared in 2002, when a special examination by the supervisory agency found more nonperforming loans, and stock prices went down sharply in 2001 and 2002.

[*Japanese banks traditionally hold a large amount of equities on their balance sheet, partly because of long-term, cross-shareholding with borrowers. During the first half of the 1990s, even when declining stock prices were hovering at around half of the bubble peak, banks were sitting on a large amount of unrealized capital gains attributable to the low book value of equities, and they were counted toward tier II capital for the purpose of international capital adequacy standards. However, when the stock prices went down further to one-fourth of the bubble peak (the Nikkei 225 index below 10,000), unrealized gains of equity portfolio disappeared and became unrealized losses that had to be deducted from the capital adequacy ratio.*]

Faced with prolonged, weak economic conditions and a lack of traditional policy tools, several economists have floated untraditional policy tools, including inflation targeting, depreciation of the yen, cuts in fiscal spending,

and nationalization of weak banks. Inflation targeting is proposed to raise the expected inflation rate, provided that the announcement of a positive inflation rate target is credible. When the expected inflation rate becomes positive, there is a chance that the real interest rate can become negative. The debate centers on whether the Bank of Japan has instruments to stop deflation. Proponents of inflation targeting argue that inflation or deflation is basically a monetary phenomenon, so that when a central bank provides enough monetary base to the economy, inflation has to occur. Not only long-term bonds but also other assets, such as listed stock mutual funds and real estate investment trusts, can be purchased as a part of open market operations. Critics, including the Bank of Japan, argue that the Bank's policy has provided ample liquidity and monetary base, with increased purchase of long bonds, in the past two years without measurable effects. They also argue that purchasing stocks and real estate funds, providing unlimited liquidity, would put the Bank of Japan's balance sheets at risk and create a situation that would result in uncontrollable inflation.

Another front for policy debate is the effectiveness and desirability of fiscal policy. Those who argue that fiscal policy is still potent have three rationales. Past fiscal policy, when measured correctly, shows strong effects. With monetary policy difficult, fiscal policy should be employed. Fiscal sustainability is not an immediate problem, since the interest rate is low, reflecting strong confidence among investors, and bondholders are mostly domestic investors, so there is no threat of refinancing uncertainty. Critics argue that fiscal spending has created wasteful infrastructures — bridges and highways — that will produce more deficits in the future as their maintenance costs exceed revenues. Cutting back these public works will not be contractionary and instead will free resources to a

more booming sector. It is indeed an unconventional view, though, that cutting back fiscal spending could be stimulative. The traditional textbooks argue that a balanced-budget multiplier is one: spending one million yen financed by a tax increase of one million yen would raise GDP by the same amount. However, in the current situation in Japan, this may not be the case. Reducing the size of wasteful public works combined with a tax cut that would stimulate private-sector research and development investment should be desirable for the economy, at least in the medium run.

Apart from the debate on public spending, some proposals on tax reform have been debated: some tax policy that would not raise deficits, when aggregated for several years, can be implemented to stimulate immediate aggregate demand. One proposal calls for the reduction of the consumption tax (VAT) rate now, say from 5 percent to 2 percent, followed by a step by step increase, say 1 percent every 6 months, reaching a level higher than the current rate, say 7 percent in several years. This will create an immediate spending boom followed by a spending rush every six months.

Resolution of nonperforming loans has become the major initiative of the Koizumi government. The market has become quite skeptical about whether Japanese banks could earn enough profits to write off nonperforming loans and increase capital. Weak banks may have to be recapitalized, again. Some banks also may have to be nationalized, if their true balance sheets are almost insolvent. Prompt corrective action needs to be implemented more than ever.

Without stopping deflation, the economy will remain weak and borrowers will continue to suffer from larger-than-expected real debts. New nonperforming loans will continue to climb. Banks will not lend and corporations will cut costs by not investing and

by laying off workers. The pessimistic outlook makes consumers save rather than consume. Further deflation will result. In order to cut the links that form this deflationary chain, a policy package is needed. It is important that a package of several policies be implemented simultaneously so that a side effect of one policy will be cancelled by the other policies. Once and for all resolution of

nonperforming loans may have a deflationary impact because some corporations may have to close down. Unconventional monetary policy, especially inflation targeting, may be introduced to stop deflation. Some tax measures that would stimulate the economy will reinforce monetary policy in stimulating demand.

Panel Discussion

Speaker: Nobuyuki Nakahara

I was initially reluctant to give a public speech so soon, less than six months after my term as board member expired in March 2002. But here I am, because my old friend from Harvard days, Albert Ando, was scheduled to chair the session and also because of the insistence of one of the organizers (Fumio Hayashi). It is a real pleasure to speak to this audience nonetheless.

First let me introduce myself. I did graduate study at Harvard. I am a member of the Mont Perlin Society, as well as a life member of the Royal Economics Society. The annual prize awarded by the Japanese Economic Association (the Japanese equivalent of the John Bates Clark Medal) bears my name as founder. Before serving on the BOJ's board, I was the CEO of Tonen, a major Japanese oil refining company.

Now let me go straight to the issue of monetary policy. My view has been clear and consistent: the Japanese economic situation is more serious than commonly supposed and the BOJ should be more aggressive in easing. You can see this from my press conference remarks on the very first day of my term on April 1, 1998, and the proposals for policy directives I put forth at numerous BOJ policy board meet-

ings. Let me elaborate by focusing on several major turning points in the decisionmaking by the policy board.

The Belated Rate Cut of September 1998

At board meetings starting with the June 12, 1998 meeting, I proposed to cut the overnight call rate (the Japanese equivalent of the federal funds rate). At each of those meetings, my rate cut proposal was voted down. The argument against the cut was to wait and see the effect of the fiscal stimulus package announced in late April. I argued then, and repeatedly thereafter, that monetary and fiscal policy should be synchronized in their implementation. On September 9, 1998 the board made a 180-degree turn and voted to cut the rate to 0.25 percent, precisely the level I had proposed in the previous board meeting.

The Start of the Zero-Interest Rate Policy (ZIRP) in February 1999

Despite the rate cut, the Japanese economy showed no sign of recovery. My proposal from November 1998 on was to cut the overnight rate further.

On February 12, 1999 I took a further step and proposed a directive calling for *quantitative* easing by setting the overnight rate as low as possible, initially at 0.10 percent and then at lower levels. The governor's proposal at that board meeting — namely, to set the overnight rate initially at 0.15 percent and then lower — made no reference to quantitative easing. Nevertheless, it was obviously a step in the right direction, so I voted for it. I think the quantitative easing that actually took place in late February to early March contributed greatly to the rapid recovery of stock prices and the subsequent economic recovery.

The Monetary Base Targeting with Inflation Targeting

The proposal that I put forth beginning on February 25, 1999 had two components: to set an inflation target and to set a target for a specific amount of excess reserves consistent with a 10 percent — and subsequently higher — growth rate of the monetary base. My proposal was voted down repeatedly.

The Removal of the ZIRP on August 11, 2000

At a board meeting in November 1999, I was the first to point out that a recovery was underway. Nonetheless, I believed that further easing was needed and stuck to my proposal of the base-and-inflation targeting, because the deflation gap was still substantial. The majority view of the board was more optimistic, and became even more so in the spring of 2000. On August 11, 2000 the governor proposed to end the ZIRP by raising the overnight rate to 0.25 percent. The government's request to postpone the vote, after a heated discussion about the nature of BOJ independence, was rejected by the board, with the only assenting vote coming from myself. Regarding the governor's proposal to end the ZIRP, I cast a dis-

senting vote. I stuck to my position in all subsequent meetings by dissenting to the board's decision to maintain the 0.25 percent rate.

The Introduction of Quantitative Targeting on March 19, 2001

With falling prices and output, it became clear that the termination of the ZIRP was a grave mistake. In February, the board reversed its course by a cut of the overnight rate to 0.15 percent, the level that prevailed in the initial phase of the ZIRP. Finally, on March 19, 2001 it voted for quantitative easing. For the first time in its 120-year history, the BOJ decided to do what it had been saying was impossible, namely, to target reserves instead of the overnight rate. The policy directive also stipulated that this policy last until the CPI inflation rate becomes zero or positive. This is not genuine inflation targeting, because neither the upper bound nor the time horizon is specified. Nevertheless, the directive incorporated the fundamental change that I had been advocating all along. The board finally came through. I was deeply moved.

The Reserve Target Remained too Low

The degree of quantitative easing since the regime change of March 19, 2001, however, was not enough because the adopted reserve target of 5 trillion yen is the minimum amount required to maintain zero interest rates. This is just a ZIRP in disguise! My proposal to raise the target well above that amount was voted down repeatedly. The majority view of the board is none other than the so-called BOJ doctrine: that a central bank should act passively, supplying reserves merely to accommodate demand. Hence their insistence, which later proved plain wrong, that there is a unique level of reserves consistent with zero interest rates and that a central bank cannot increase the supply of

reserves over and above that upper bound. But again, the board turned around my way and increased the target to the 10 to 15 trillion yen range in December 2001 (I cast a dissenting vote because the target should be a level, not a range, and because the range was far too wide). Thanks to the increased reserve target, the monetary base, which grew 14 percent on year-on-year basis in September 2001, picked up its pace and grew 36 percent in April 2002. Regrettably, the growth rate since then has been declining (about 25 percent in September, and 20 percent in December 2002). So, despite initial resistance, most components of my proposal eventually were incorporated in the board's directive. Let me conclude with my current view on monetary policy. First, the BOJ should adopt

the rest of my proposal, namely inflation targeting and more active and aggressive easing, particularly when excessive bank lending has rapidly been corrected. Second, the quantitative easing should proceed continuously, without letups. The quarter-to-quarter growth rate of the base should be about 5 to 6 percent. Third, to end current deflation, there should be an accord between the government and the BOJ to engineer a monetization of government deficits needed to finance additional government spending that would raise the productivity of the Japanese economy. That is, the government should increase spending and the BOJ should match it by conducting an open-market purchase of an amount equal to the increased spending.

Financial Distress and Employment: The Japanese Case in the 90s

Kazuo Ogawa

It is often argued that financial distress was mainly responsible for the long stagnation of the Japanese economy in the 1990s. This paper is an empirical attempt at examining this argument. Specifically, I estimate the extent to which employment in Japanese firms is affected by high leverage in the corporate sector and bad-loan problems in the banking sector.

There are two elements to this study. First, I analyze the relationship between debt accumulation and employment using firm-level panel data. I construct a panel dataset from the Annual Report of Financial Statements of Incorporated Business, or *Hojin Kigyo Tokei Nenpo*, of the Ministry of Finance. The virtue of this dataset is its extensive coverage of corporations of various sizes, including unlisted small firms, for all industries except finance and insurance. The sample period is 1993 to 1998 and includes the time of financial turmoil in Japan.

Second, I deal not only with financial leverage in the corporate sector but also with bad loan problems in the banking sector. Lingering bad loans on a bank's balance sheet might lead to fewer bank loans, which might in turn affect employment in bank-dependent firms. In general, it is quite difficult to estimate the effect of loan supply on employment simply from observed data of bank loans because of problems in the identification problem of supply versus demand conditions. Therefore, it is necessary to select a variable that purely represents the supply of loans. I rely on the Short-term Economic Survey of Corporations, called *Tankan*, by the Bank of Japan. This survey reports a diffusion index of "banks' willingness to lend" which can be a good proxy for the supply of loans. Using this

data, I examine the impact of the supply conditions of loans on employment.

The impact of financial distress can be examined empirically by estimating a dynamic labor-demand equation for a firm. The firm maximizes the present value of its earnings, net of the quadratic adjustment cost of hiring/firing labor. It turns out that the demand for labor is a function of the real wage rate, output, financial distress, and lagged employment. Incorporating the degree of financial distress into the model requires two variables: one corresponds to the leverage of the firms and is represented by the ratio of debt to total assets. The other is a proxy for the bad loan burden on banks, which is represented by the lending attitude of commercial banks. One would expect that the harder the bad loan problem hits the bank, the more severe the bank's lending attitude becomes.

The degree of financial distress affects employment through two channels: first, by changing the external finance premium facing the firm; high debt outstanding relative to total assets and/or a severe lending attitude on the part of banks raises the external finance premium under asymmetric information between lenders and borrowers; this in turn leads to an increase in the effective interest rate or a decrease in the discount factor. Second is the disciplinary role of debt. Firm managers have an incentive to cut employment when the debt-asset ratio is high. Faced with increasing debt, managers will make every effort to cut back labor and raise efficiency, because in the case of bankruptcy, those managers may be fired. In other words, managers realize that the adjustment cost of labor is less costly, thus prompting the managers to

adjust employment quickly. The financial distress variables affect not only the employment level but also the adjustment process of employment.

Using the panel dataset constructed from the Annual Report of Financial Statements of Incorporated Business, I estimate a dynamic labor demand equation using the two-step GMM estimation proposed by Arellano and Bond. My estimates are for four cases classified by industry (manufacturing and non-manufacturing) and firm size (small to medium-sized firm and large firm groups). The large firms are defined as those whose equity capital in 1993 is larger than 1 billion yen.

I find that financial distress has a negative effect on the firm's employment. The effects are notably larger for small firms. As for corporate leverage and employment, the debt-asset ratio has a significantly negative effect on employment for small firms in both manufacturing and non-manufacturing industries. However, the manner in which the debt-asset ratio affects employment differs between these two industries. For manufacturing industries, a higher debt-asset ratio increases the speed of adjusting employment toward equilibrium. On the other hand, the debt-asset ratio directly and negatively affects the current level of employment for non-manufacturing industries.

Lending attitudes also have a statistically positive effect on employment for all firm groups, irrespective of industry. A severe lending attitude raises the adjustment speed of employment for all firm groups in manufacturing industries and for large firm groups in non-manufacturing industries, while similar attitudes lead to a direct reduction of current employment for small firm groups in non-manufacturing industries. Further, the impact of financial distress on the overall adjustment process of employment is not quantitatively large, but its effect on small firms is quite large. This finding may be inter-

preted as follows. The external finance premium might be raised by the debt-asset ratio for small firms because they do not have large collateralizable net worth helping them to diversify unobservable idiosyncratic risk as large firms do. Moreover, a number of large firms in Japan belong to industry groups known as *keiretsu*, where a main bank plays a central role in mitigating the informational asymmetry between lenders and borrowers. Small firms have only relatively loose ties with main banks. As is emphasized by Masahiko Aoki, the main bank system is institutionally complementary with the Japanese employment system in which employees embodying firm-specific training are kept within a firm over quite a long term. Moreover, large firms tend to retain a higher proportion of employees with firm-specific training. Therefore, the labor resources of large firms, embodying firm-specific training, fluctuate less with the temporary adverse shocks since the main banks financially support even troubled firms.

In addition, the disciplinary role of debt may be more potent for small firm groups: the managers of small firms on the verge of bankruptcy feel threatened by the reduction in bank loans and/or are fired easily by their parent firms. Therefore, these managers have good reasons for making every effort to reduce employment and to improve production efficiency. Finally, small firms are more bank-dependent, so the lending attitude of banks has a much stronger effect on the employment of small firms.

My findings that financial distress has an adverse effect on employment, notably for small firms, have important policy implications. Since labor resources in a firm embody new technology that raises production efficiency, reducing corporate debt and wiping out banks' bad loans is urgent if the Japanese economy is to attain sustained long-run growth.

Household Portfolios in Japan: Interaction between Equity and Real Estate Holdings over the Life Cycle

Tokuo Iwaisako

This paper provides a summary of the portfolio allocation of Japanese households in recent years and studies the relationship between portfolio choice and age for Japanese households. It uses micro data and pays particular attention to the interaction between decisions to hold stocks versus real estate.

The relationship between age and portfolio structure has been a focus of attention among economists for several reasons. First, this relationship is directly related to the various issues of an aging economy. The potential effects of the aging of the population on the level of national saving and the level of household wealth have drawn much attention. At the same time, the composition and the riskiness of the wealth of older Japanese are equally important in understanding the welfare implications of an aging economy. On a more practical level, how individuals allocate their portfolios is relevant to the debate concerning defined contribution pension plans that allow participants some discretion in their investment choices. How Japanese households allocate their wealth, and how that may change, are also very important in understanding the Japanese Big Bang, that is, the ongoing structural change in the Japanese financial system. Many macro and financial economists, most notably Hoshi and Kashyap, view the bubble economy in the second half of the 1980s and the prolonged economic and financial turmoil since the early 1990s as intimately related to the structural changes in the Japanese financial system — specifically, the shift from a bank-oriented system to a market-oriented system. In current discussions, changing corporate financing decisions and corporate governance

have been the main focus of analysis. However, if the way that firms raise funds for their business (that is, the supply structure of financial assets) changes, then the way households allocate their funds (the demand structure of financial assets) also must change. So, studying the portfolio structure of Japanese households is essential to understanding the changing Japanese financial system as a whole. Finally, dynamic portfolio choice recently has re-emerged as a major research topic in finance. Recent theoretical developments allow us to analyze dynamic portfolio choice when stock returns are predictable and in the presence of uninsurable labor income risk. In response to these theoretical developments, some recent empirical studies — such as Amerkis and Zeldes (2001), Bodie and Crane (1997), Poterba and Samwick (1995, 1997), and the papers in the volume edited by Guiso, Haliassos, and Jappelli (2001) — investigated household portfolio choice in the United States and major European countries by emphasizing its relationship to age.

My paper investigates the relationship between age and portfolio structure of Japanese households using annual survey data published by Nihon Keizai Shimbun, data known as Nikkei Radar. Nikkei Radar has some important limitations: in particular, the data covers only the Tokyo metropolitan area. For Japan as a whole, there is some work on household asset allocation that uses Nikkei Radar and other datasets. But the previous work emphasizes the uniqueness of Japanese household portfolios, or structural changes in investment behavior, from a microeconomic point of view. This paper is the first of its kind, using Japanese data, on the age-related pattern

of stock investments and its relationship to real estate holdings.

Stock holdings by Japanese households, measured by shares of equities in households' financial wealth, increased during the years of the bubble economy, from 25 percent in 1987 to more than 35 percent in 1990. After the bubbles in the Japanese asset market burst in the early 1990s, the shares of equities declined continuously: 18 percent in 1993, 12 percent in 1996, and as low as 7 percent in 1999. Participation in the stock market, measured by the fraction of the population owning any equity, also increased in the second half of 1980s, from 26 percent in 1987 to 30 percent in 1990. It then decreased in the first half of 1990s, down to 24 percent in 1996, and has remained at a similar level since then. Given the very poor performance of the Japanese stock market through the 1990s, the decline of stock holdings by Japanese households may seem natural. But Japan is an exception among OECD economies. In most countries, household participation in the stock market has increased in the last ten years.

On the other hand, the basic pattern of the relationship between portfolio choice and age for Japanese households has been stable and is quite similar to that of western countries. Equity shares in financial wealth have a humped-shape pattern: they increase with age among young households, peaking in middle age, then decline. The significant difference in the data reported in Amerkis and Zeldes (2001) is that the peak of equity shares comes at a much later stage of life. Also, the decline of equity shares after retirement age seems to be much slower in Japan than in the United States. The proportion of the U.S. population owning equity displays a hump-shaped pattern with age, and equity shares in financial assets conditional on ownership are mostly constant with age. I confirm that these patterns also exist in the Japanese data. As in the United States, the age-related pattern in

the share of equity in Japanese households' financial wealth can be explained mostly by the decision to own (or not to own) stocks.

I go on to discuss the pattern of real estate holdings by Japanese households. The same age-related pattern, with the life-cycle variation, is found for real estate holdings in Japan. The age-related pattern of real estates shares in total household wealth is hump-shaped and is explained mostly by the decision to own (or not to own) real estate (mostly owner-occupied housing). In fact, this age-related pattern is even clearer with real estate shares/holdings.

On the other hand, no age-related pattern in equity holding is observed for households that do not own real estate. These findings suggest that the age-related pattern observed in stock holding can be explained by household's tenure choice of housing: younger households tend to accumulate their wealth in safe assets to save for purchasing houses. After they purchase a house, they are restrained from taking risks in financial investments because of their highly leveraged positions in housing loans. The demand for equity must be more elastic in terms of wealth level for homeowners than for non-owners. Only after they have purchased places to live do households begin to make risky financial investments. This can explain why stock holdings by very young households are so low in Japan. Also, since Japanese land prices are so high, average down payments and housing loans are larger in Japan than in the United States. So the shares of real estate in total wealth naturally are higher in Japan than in the United States. This explains why Japanese households own less equities than U.S. households and why the peak of their stock holdings comes at a later stage of life. Therefore, any serious attempt at modeling Japanese households' dynamic portfolio choice should incorporate the effect of housing tenure choice.

Despite high land prices, there are

strong incentives for Japanese households to own rather than to rent housing. In the second half of my paper, I emphasize and discuss the sources of such incentives. First is overprotection of tenants in the Japanese legal system. It is difficult for landlords to raise rents and even more difficult for them to remove tenants. Such overprotection makes landowners afraid of large investments that might turn sour and of the re-development of old, existing rented houses. As a result, the supply of rental housing in Japan is limited and the quality of that supply is worse than for owner-occupied houses. The average size of owner-occupied houses is almost the same in Japan, France, and Germany, but the average size of rental houses in Japan is only two-thirds that of those in Europe. Such inefficiencies in the Japanese housing market limit the supply of quality rental housing, forcing households to hold very large shares of their assets in the form of owner-occupied housing and to take risky positions in their portfolios. Thus, the willingness of households to take risky positions in the financial market is intimately related to their positions in the housing market.

My paper also emphasizes the problem with the Japanese bequest tax. The inheritance tax burden in Japan is much heavier than in the United States and most developed economies. At the same time, if one plans a bequest, it is preferable from the standpoint of tax saving to hold real estate rather than financial wealth. This is because financial assets are valued at market value and real estate historically has been valued at below market value in bequest tax assessment until the early 1990s. So, there is a strong tax incentive for Japanese households to hold real estate and to take out housing loans: the latter is tax deductible at market value if one is planning a bequest. Also, for residential real estate there are huge tax deductions in general. This tax system explains why Japanese households prefer to hold

owner-occupied houses rather than to rent houses. It also helps to explain why the elderly in Japan retain houses and other real estate until their death.

In Japan, policy recommendations have been made in recent years to promote household stock investments by changing the tax systems and removing obsolete regulations. However, one potentially important explanation for why Japanese make few stock investments is that, since they have already taken extreme positions by purchasing their residence, they simply cannot take risky positions in financial investments. If so, then removing obstacles to stock investment alone will not be sufficient to induce individual investors' equity holdings. Legal and structural reforms in the housing market might be important in promoting stock investments by individuals and in enhancing the efficiency of the financial system in Japan. It has been suggested that high real estate prices and large down payments provide some explanation for the high household saving rate in Japan (Hayashi, Ito, and Slemrod, 1988). My paper suggests that, in addition to the effect on savings pointed out by Hayashi et al, high land prices and housing market imperfections very likely affect the allocation of Japanese households' financial wealth. This result has policy implications and should be explored more carefully in future research.

Finally, the investment behavior and the tenure decisions of Japanese households are related to the Japanese employment system. When the average household takes out housing loans, the lender has to be convinced about the prospects of the household's future loan payments. In Japan, it is not unusual that the monthly repayment of housing loans exceeds half of household expenses. Although the housing loan is usually backed by a mortgage, if the household becomes unemployed, it will immediately experience serious financial trouble because housing accounts for such a large proportion of living expenses.

So, given the high real estate prices in Japan, it is very important that workers have a relatively stable and safe future labor income in order to finance housing purchases. Without the conventional lifetime employment system, this will

be very difficult. The collapse of the lifetime employment system, combined with the lingering recession of the 1990s, is thus likely to depress demand for stocks by Japanese households.

Idiosyncratic Risk and Creative Destruction in Japan

Yasushi Hamao, Jianping Mei, and Yexiao Xu

The chronic stagnation of the Japanese economy is a big puzzle. Once a shining light for both developing and industrialized nations, it has now become a case for bubble economies. Twelve years after its stock market bubble burst, a great country — an economy with a strong labor force, large capital endowment, advanced technology, and stable government — is still operating far below its potential productive capacity. While numerous arguments have been advanced to explain the recent plight of the Japanese economy, most have focused on lack of consumer demand, collapsing asset values, and non-performing loans. This paper offers a unique perspective by studying the roles of Japanese equity markets. In particular, we document a sharp fall in firm-level volatility and turnover and a noticeable increase in Japanese stock market volatility following the crash. We explore the possible causes of these events as they relate to information efficiency and the lack of corporate restructuring after the crash.

Campbell, Lettau, Malkiel, and Xu¹ were the first to provide a comprehensive study of idiosyncratic risk for U.S. stocks. During the period from 1962 to 1997, there was a noticeable increase in firm-level volatility relative to market volatility. Accordingly, correlations among individual stocks and the explanatory power of the market model for a typical stock declined. Moreover, they found that all volatility measures (market, industry, and firm) move together counter-cyclically in the United States. In other words, firm-level volatility tends to *increase* during a recession. Contrary to U.S. results, this paper finds a sharp *reduction* in firm-level volatility relative to market volatility immediately following the Japanese market crash. Accordingly, correlations among indi-

vidual stocks have increased. As a result, there is a reduction in market information efficiency using the R^2 measure developed by Durnev, Morck, and Yeung². In addition, we find that while market-wide volatility has increased, there is a significant drop in the variation of systematic risk across firms.

In order to understand the abnormal behavior of idiosyncratic risk in Japan, we examine the impact of Japanese bankruptcy as well as business group affiliation on firm-level volatility. If idiosyncratic volatility conveys signals about asset reallocation, then an increase in corporate bankruptcies should improve information efficiency. In fact, we discover a positive correlation between changes in aggregate firm-level volatility and corporate bankruptcies. There is also some evidence that increasing bankruptcies after 1997 have led to higher firm-level volatility. These results suggest that the sharp fall in firm-level volatility during 1990-6 could be attributable to a lack of corporate restructuring.

By comparing firm-level volatility of *keiretsu* (group-affiliated) firms and non-*keiretsu* firms, we find that a decrease in industrial production growth tends to increase the difference of firm-level volatility between non-*keiretsu* and *keiretsu* firms. That is, the lower the growth, the higher the firm-level volatility of non-*keiretsu* firms compared to *keiretsu* firms. This means that during the recession in Japan, there was a greater disparity in stock performance among non-*keiretsu* firms, indicating the presence of protection among group-affiliated firms. We find similar results when comparing the firm-level volatility between firms with main banks and firms without main banks. Thus, idiosyncratic volatility for firms with business group and main bank affiliations is

much less responsive to economic conditions than that of firms without such affiliations. This suggests that weak firms with business group and main bank affiliations may have been protected during most of the 1990s.

This anomalous behavior of firm-level volatility in Japan may help us to understand the poor performance of the Japanese economy over the last decade, because disaggregated volatility measures could affect aggregate output in several ways. First, macroeconomic models of “cleansing recessions,” such as those described by Caballero and Hammour³ or Eden and Jovanovic⁴, emphasize the impact of firm-level volatility on resource allocation during recessions. A recession may increase the arrival rate of information about management quality and thus increase resource reallocation from low-quality to high-quality firms. Such resource reallocation is enhanced in the United States, because firm-level volatility moves counter-cyclically. To the extent that Japanese market downturns are accompanied by a *reduction* in firm-level volatility, and thus a reduction in the arrival of firm information, it is more difficult for investors to distinguish low-quality from high-quality firms, thereby reducing the effectiveness of the cleansing mechanism. This view is consistent with recent empirical studies conducted by Durnev, Morck, and Yeung, who find that firms in industries with greater firm-specific return variation exhibit higher quality capital budgeting: their profitability indices (marginal Q ratios) are closer to one (or to a tax-adjusted benchmark).

Second, a reduction in firm-level volatility, as well as in the variation of systematic risk among firms, leads to a more homogeneous firm valuation. This implies that Japanese stocks were treated much less discriminatingly after the crash. Thus, both low-quality and high-quality firms had a similar cost of capital. As a result, high-quality firms were not able to leverage their advan-

tage in obtaining low-cost capital as long as low-quality firms continued to have similar access to equity capital. In short, the bad firms were not held accountable, and the good firms were not rewarded. The “creative destruction” observed in the United States cannot take hold in Japan. This is consistent with a recent study by Wurgler⁵, showing that countries with stock markets that impound more firm-specific information into individual stock prices exhibit a better allocation of capital. Wurgler suggests that efficient secondary information market prices can help investors and managers distinguish good investments from bad ones.

The reduction in firm-level volatility also may explain the increasing trend in market-wide volatility. When idiosyncratic volatility drops, firms face increasing difficulty in raising additional financing from banks and securities markets. It becomes harder to distinguish the good from the bad firms. As a result, more and more companies are treated like “lemons” in financial markets, weakening their ability to sustain any economy-wide shocks. Such increasing vulnerability of firms to economic shocks induces higher market volatility.

¹ J.Y. Campbell, M. Lettau, B.G. Malkiel, and Y. Xu, “Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk,” *Journal of Finance*, 56 (2001) 1:43.

² A. Durnev, R. Morck, and B. Yeung, “Dr. Jekyll and Mr. Hyde: Stock Return Variation and the Quality of Capital Budgeting Decision,” *New York University Working Paper*, 2001.

³ R. J. Caballero and M. Hammour, “The Cleansing Effect of Recessions,” *American Economic Review*, 84 (1994), pp. 1350–68.

⁴ B. Eden and B. Jovanovic, “Asymmetric Information and the Excess Volatility of Stock Prices,” *Economic Inquiry*, 32 (1994), pp. 228–35.

⁵ J. Wurgler, *Financial Markets and the Allocation of Capital*, *Journal of Financial Economics*, 58 (2000), pp. 187–214.

Sources of Funds and Investment Activities of Venture Capital Funds: Evidence from Germany, Israel, Japan, and the United Kingdom

Colin Mayer, Koen Schoors, and Yishay Yafeh

Promotion of entrepreneurship and innovation has become one of the primary industrial policies of developed economies around the world. The development of a venture capital (VC) industry often is regarded as a significant component of this policy. The question that this raises is to what extent the VC industry plays a similar role in different countries, and how large is the influence of its sources on its activities.

The present paper is an industry study, focusing exclusively on the VC sector and posing the question of how the structure of VC funds, and especially their financing sources, relate to their investment activities. We report results from a newly constructed database consisting of about 500 venture capital firms in four countries: Germany, Israel, Japan, and the United Kingdom. The data provide unique insights on both the types of investments made by financial institutions by stage of activity, sector, and location and on the sources from which they raise their finance. Therefore it is possible to undertake new analyses of how financing relates to institutions' investment allocations and to undertake comparisons across countries.

Our analysis of the VC industry itself differs from the existing literature in several respects. First, the existing empirical literature is almost exclusively focused on the United States. VC activity is growing rapidly elsewhere and there is increasing interest in the performance of the VC industry outside of the United States. This paper considers four countries — Germany, Japan, Israel, and the United Kingdom — all of which have significant and/or rapidly growing VC industries. The

spread of countries is interesting because it includes two bank-oriented systems (Germany and Japan), one (non-U.S.) market-oriented system, the United Kingdom, and one major high technology success story, Israel, with supposedly the largest concentration of VC investments outside of California and Massachusetts. Within Europe, Germany and the United Kingdom are particularly important for the study of the VC industry, because these two countries together account for over half of all VC investments in the Continent.

Second, most analyses of VC in different countries report aggregate statistics. In this paper we employ disaggregated data at the individual fund level. Third, to the extent that disaggregated data have been used, they have focused on firms. We focus on the VC funds themselves rather than on financed firms, posing the question: to what extent can differences in individual fund activities (in particular, the technological stage of financed firms and their sector focus) be associated with differences in the sources of finance? For example, is it the case that VC firms that are funded through banks invest in firms at different stages of their development from those that are funded by private individuals? To the best of our knowledge, no study has yet examined the relationship between sources of funds and investment strategies in the VC industry.

Our empirical analysis proceeds in four stages. We first provide descriptive statistics of the VC industries in the four countries. We then analyze the correlation between sources of finance and the types of activity financed, focusing on the technological stage of companies receiving VC finance. We

examine a variety of regression specifications explaining VC activity, measured by stage, sector, and geographical focus of investment. Initially, we assume that there are similar relationships between sources of finance and activities across countries. We then relax this assumption and allow the relationships to be country-specific. This permits us to evaluate whether financial markets are integrated across countries or whether financial systems in different countries bear on the relationships between sources of finance and activities. For example, are the activities of bank-backed VC firms different in the bank-oriented financial systems in Germany and Japan from those in the market-oriented system in the United Kingdom? Our analysis sheds light on possible reasons for differences in VC activity across different funds within a country and between countries.

The results are striking. First, there are substantial differences across countries in terms of the stage of finance of VC firms. They are much more focused on early stage investments in some countries, most notably Israel, than others, in particular Japan. There is a remarkably close similarity in stage of finance between Germany and the United Kingdom, despite the frequently cited differences in their financial systems. Secondly, there are significant differences in VCs' sector focus. While biotechnology and life sciences receive a substantial level of attention in all four countries, a much larger fraction of VC firms in Israel and Japan focus on information technology (IT) and software than in Germany and the United Kingdom, where the manufacturing sector receives more attention. VC investment in electronics appears to be relatively uncommon in Japan.

Turning to institutional differences across countries, we find that there are substantial variations in the sources of finance of VC firms. Banks are a major source of external finance in all coun-

tries, particularly in Germany and Japan. Pension funds are much more significant in the United Kingdom than in the other three countries. Corporations are a more important source of finance of VC firms in Israel than elsewhere.

We find that there are significant relationships between sources of finance of VC firms and their investment activities within countries. In particular, banks, insurance, and pension fund-backed VC firms invest in later stage activities, and VC firms relying on private individual investors and corporations favor earlier stage activities. Individual and corporate-backed funds invest more in IT, software, and electronics in preference to manufacturing sectors, while the reverse holds for insurance and pension fund-backed funds. Bank and pension-backed funds invest domestically, while individual and corporate-backed funds invest globally. Financial intermediary-backed funds, therefore, are focused on late-stage investments in relatively low-tech domestic industries, while individual and corporate-backed funds invest globally in early-stage activities in high-tech industries. Finally, we find a strong focus of government-backed funds on domestic investments.

There are significant differences in the relationships between financing and investment stage across countries. While bank-backed VC firms in Israel and the United Kingdom invest in later-stage activities relative to other sources of finance, this is not the case in Germany and Japan. In contrast, investment in early-stage activities by corporate-backed funds is a feature of Germany and the United Kingdom, not of Israel and Japan. Early-stage investment by individual-backed funds is a feature of Germany and Japan, but not of Israel and the United Kingdom.

We believe that these relationships may have important implications for theories of corporate finance. In particular, they support theories that suggest that banks are associated with invest-

ments in less innovative, more traditional activities that benefit from active screening and monitoring, requiring geographic proximity to investments. The cross-country variations indicate that this is less pronounced in some countries — those with bank-oriented financial systems where long-term relationships between banks and firms may be associated with more innovative invest-

ments — than elsewhere. Individual and corporate-backed funds are associated with more innovative and higher-technology industries and greater international diversification. There is some evidence suggesting that this feature may be more pronounced in bank-oriented systems where there is less emphasis on diversification through financial instruments and markets.

A Search for Multiple Equilibria in Urban Industrial Structure

Donald R. Davis and David E. Weinstein

Are events like the terrorist strike of September 11, 2001, likely to have a permanent impact on New York? Can enterprise zones, special tax breaks, and other urban policies permanently alter the location of economic activity? These are questions that lie at the center of urban, regional, and even international debates about economic policy.

Traditionally, economists tended to focus on inherent characteristics of locations as the explanation for the structure of production. Industrial policy might alter the location of industries while a subsidy was being offered, but traditional analysis held that if the policy intervention ceased, things would return to their initial conditions.

This simple view of the world has come under attack in recent years. Indeed, one of the central themes of modern economics is the phenomenon of multiple equilibria. In macroeconomics, this is viewed as a potential explanation of the business cycle (Cooper and John 1988); in development, this is the source of poverty traps (Murphy, Shleifer, and Vishny 1989); in urban and regional economics, this is a potential account of differences in spatial density (Fujita, Krugman, and Venables 1999); and in international economics, it is viewed as a potential explanation for the division of the world economy into an industrialized North and a non-industrialized South (Krugman and Venables 1995).

Theories of multiple equilibria carry within them an important temptation. If multiple equilibria are possible, it is tempting to intervene to select that equilibrium deemed most advantageous by the policymaker. If thresholds separate radically different equilibria, then the resolute policymaker can change the whole course of regional development or strongly affect the industrial compo-

sition of a region, even with limited and temporary interventions. Implicitly, such views are at the base of regional and urban development policies in Europe, the United States, and elsewhere.

While recent decades have seen a robust exploration of the *theoretical* conditions that might give rise to multiple equilibria, very little work has explored *empirically* the question of whether such multiple equilibria are a salient feature of real economies. Our paper explores precisely this question in the context of urban industrial structure.

One difficulty in exploring the question is the inability of the economist to conduct controlled experiments. In an ideal experiment, we would subject an economy to large, variable, exogenous, and temporary shocks. In this paper, we approximate this with a “natural experiment” that examines data on the Allied bombing of Japanese cities and industries during World War II. These shocks were clearly large: eliminating 90 percent of Japanese manufacturing. Moreover, there was considerable variation across cities because of the fact that many large cities, for example, Kyoto, were not bombed, while others, like Hiroshima, were devastated. Although the United States targeted the biggest cities that were within range, exogeneity is established by very low correlations between destruction and pre-war growth. Finally, there is little question that the shocks were temporary.

The central problem is to consider how we would determine whether the results of this bombing are consistent with a unique versus multiple equilibria. Our approach to this is very simple. First, consider the possibility that there is a unique and stable equilibrium. If we could partition time into two periods — the first the period of the shock and the second the period of the recovery

— then the unique equilibrium model makes a very simple prediction. Starting from equilibrium, whatever shock there is in period one will simply be undone in the second period. If we were to plot this on a graph where the axes were the periods of shock and recovery, then the data should lie on a line with slope minus unity through the origin.

Next, consider the possibility that, rather than a unique equilibrium there are indeed multiple equilibria. If we assume the initial equilibrium is locally stable, then for “small” shocks, the periods of shock and recovery look precisely as in the case of the globally unique stable equilibrium: whatever shock there is in period one will simply be undone in the second period. In the locally stable interval, we can again plot this in a graph where the axes are the periods of shock and recovery, and the data should again lie on a line with slope minus unity through the origin.

In the model of multiple equilibria, large shocks (positive or negative) shift the economy past thresholds and eventually toward a new equilibrium. If by chance the shock moved the economy past the threshold precisely to the level of the new equilibrium, then in the recovery period, there would be no further change. If the period one shock fell short or exceeded the new equilibrium value for the economy, then the recovery period would complete this deficit or undo the excess *relative to the new equilibrium value*. That is, in the space of two-period growth rates, we again would have a line with slope minus unity; however, on the horizontal axis it would pass through the *new* equilibrium. In effect, a system with multiple equilibria generates in this space a family of lines with slope minus unity, each of which passes through an equilibrium on the horizontal axis.

If we know on an *a priori* basis the points of thresholds, then this would provide a very simple empirical strategy: group the data by the magnitude of the initial shock delimited by these

bifurcations and estimate a line through each, which should have a slope of minus unity but different intercepts. For a low equilibrium (large negative shocks), the intercept should be significantly below that for shocks in the initially stable region; for a high equilibrium, the estimated intercept should be significantly above that for shocks in the initially stable region.

This leaves one key problem to solve — how to identify the breaks. Here, we try to allow the data to pick the relevant thresholds. We can develop a sequence of partitions of the data and ask whether for any of the partitions we can find the above stated pattern of significantly different intercepts. If yes, then this will be evidence in favor of multiple equilibria; if no, then this would count as evidence instead of a unique equilibrium.

The results yield unambiguous support for a single equilibrium. We confirm on population, manufacturing, and detailed industrial data that economic activity in cities is highly robust to temporary shocks even of gargantuan size. These results are robust to allowing for a large number of possible equilibria or allowing the equilibria to only be relevant for shocks of a very narrow range.

Our results yield an important lesson for policy: the temptation to use limited and temporary interventions to select advantageous equilibria is a chimera. The fact that cities have a very strong tendency to return not only to the prior level of manufacturing activity but also to recover the specific industries that previously thrived there, even in the aftermath of overwhelming destruction, is very strong evidence that temporary interventions of economically relevant magnitude are extremely unlikely to alter the course of aggregate manufacturing or even to strongly affect industrial structure in a given locale. Small and temporary interventions to reap large and permanent changes in levels and composition of regional economic activity is an idea that — in the data — is utterly bankrupt.

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