

Directed Credit Programs for Agriculture and Industry

Arguments from Theory and Fact

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The motives behind government programs to provide directed credit to agriculture and industry can be traced to problems of asymmetric information in capital markets and, consequently, to benefits from relaxing the constraints on financing. In agriculture, directed credit programs that help farmers accumulate sufficient wealth to own the land they cultivate may improve the allocation of resources. In industry, the benefits of government credit may include product and factor market externalities, as well as the direct benefits from relaxing borrowing constraints. In both sectors, government credit can be useful in overcoming obstacles faced by private intermediaries when lending entails initial fixed costs that intermediaries cannot recapture.

Whether government intervention in credit markets can achieve legitimate objectives depends on the mechanism chosen to implement directed credit. In some cases influence-peddling and soft repayment constraints lead to inefficiencies from government involvement. In other cases these problems are avoided by establishing credible mechanisms that ensure the proper allocation and repayment of funds.

Evidence on industrial credit programs in Japan shows an apparent link between that country's success in directing credit to machine-tool producers and the decisionmaking process that governs the distribution of credit.

Recent research investigates the role that directed credit programs play in mitigating possible misallocations of capital caused by information asymmetries. In this paper we argue that the nature of such misalloca-

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tions is likely to be very different in agricultural and industrial sectors and, consequently, that government interventions in capital markets in these sectors should be different. We first discuss capital market allocations under asymmetric information and apply these theoretical concepts to the agricultural and industrial sectors. We provide some preliminary empirical evidence on the effects of Japan's directed credit programs for industry by reporting estimates from panel data vector autoregressions. These regressions reveal that in the 1980s Japanese government lending had substantial positive effects on investment by machine-tool producers.

Capital Allocation under Asymmetric Information

Recent theoretical models that relax the assumption of symmetric information have helped to sharpen our understanding of the role of capital market imperfections in determining investment behavior and creating financial intermediaries. One theme that runs through much of this literature is that good projects may not receive the funding they deserve because information problems make it difficult for investors to identify good projects and costlessly verify the actions of borrowers when the recipient can gain by deceiving the lender. In such environments some bad investments receive financing while some good ones do not, effort is not supplied optimally, and loans are generally mispriced and sometimes rationed (see Stiglitz and Weiss 1981; Gertler 1987; Calomiris and Hubbard 1990).

A second point in this literature is that borrowers' wealth affects their level of investment. When borrowers and lenders have symmetric information, the allocation of investment funds is independent of the distribution of wealth. Under asymmetric information—that is, when borrowers have better information than lenders—entrepreneurs who put their own wealth at risk can increase the confidence of outside lenders and thereby reduce the proportion of funding required from relatively costly sources of external finance (see Fisher 1933; Bernanke 1983; Calomiris and Hubbard 1989). There is a substantial body of microeconomic evidence supporting the proposition that external finance is relatively costly and hence that changes in internal finance can have allocative effects for investment (see Fazzari, Hubbard, and Petersen 1989; Devereux and Schiantarelli 1990; Gilchrist and Himmelberg 1992; Calomiris and Hubbard 1994).

The new theoretical literature on credit market imperfections also has implications for the form that financial arrangements take. In a world of full information, financial contracts would elaborately specify the payoffs under every possible contingency. Under asymmetric information more limited forms of financial contracting may be desirable, either because they affect the incentives of the borrower (by, for instance, reducing the gain from a high-risk strategy) or because they help the lender economize on the costs of monitoring. For example, simple debt contracts can be advantageous because they reduce the number of

states in which the lender must verify the firm's profit (see Townsend 1979) and because they limit problems of adverse selection (Myers and Majluf 1984; De Meza and Webb 1987).

There is also an important role for financial intermediaries in relaxing some of the constraints on borrowing caused by asymmetric information. Banks can economize on the costs of information in a variety of ways. They may be better equipped to identify good borrowers, monitor actions and outcomes, and enforce contracts (Campbell and Kracaw 1980; Diamond 1984; Ramakrishnan and Thakor 1984; Calomiris and Kahn 1991).

An interesting feature of the world of asymmetric information is its fragility in relation to the world in which there is full information. Under asymmetric information both the allocation of capital and the allocation of consumption are more vulnerable to disturbances: debt contracts dominate, banks originate and hold loans, substantial proportions of internal finance are required, and it is much harder to hedge diversifiable risk. The reliance on debt is a strategy that risks costly financial crises—even bankruptcies. For a number of reasons, investors and savers are not able to diversify fully: borrowers who issue debt absorb a disproportionate share of risk; self-finance limits a firm's ability to diversify; incentive compatibility limits a bank's potential for loan sales; depositors in banks without a wide branch network must hold claims backed by locally created assets; and, finally, bank failures reduce the financial system's ability to allocate capital efficiently (Bernanke 1983; Calomiris, Hubbard, and Stock 1986).

These works provide a framework for understanding observed choices of costly contractual and institutional structures, lack of diversification, and underinvestment that would be puzzling in the absence of such imperfections. Underlying the asymmetric information approach to financial markets and intermediaries is a common message: financial relations are not merely epiphenomenal. The composition and distribution of the borrowers' wealth, the particular forms of financial contracts, and the activities of financial intermediaries all affect the allocation of capital.

This approach has clear implications for policy: it is important to provide an atmosphere in which property rights, contracts, and financial institutions can thrive. What is less clear is how government-directed credit programs can improve capital allocations, particularly since such programs crowd out savings that would have been available through private channels. The rationale for such interventions and the forms they should take differ depending on whether one is lending in agricultural or industrial credit markets.

Agricultural Capital Markets and Policy

Economists have long recognized that considerations of asymmetric information are particularly relevant for the provision of credit to the agricultural sector, especially in developing economies. Akerlof (1970) argues that scarcity of credit

as a result of asymmetric information has been a major source of landlessness in India and elsewhere. Important contributions to the early literature on asymmetric information and credit rationing (see, for example, Braverman and Stiglitz 1982) focus on the consequences of "debt peonage" in underdeveloped agricultural communities in which local moneylenders take advantage of the lack of competition in rural credit markets.

Implicit in the analysis of credit scarcity and consequent monopoly rent extraction by wealthy landowners is the presumed absence of financial intermediaries in these areas. Opening a bank is costly, and the more sparsely populated the area, the larger the costs per loan. Moreover, banks operating in towns or cities can finance a wide variety of enterprises, while banks in agricultural areas are forced to specialize in undiversified portfolios of loans, making them extremely vulnerable to the effects of adverse prices and weather. Both problems can be alleviated somewhat by allowing banks to open branches, which have lower overhead and thus are less expensive to operate; see Calomiris, Hubbard and Stock (1986); Evanoff (1988); Calomiris (1993).

The allocation of capital in agricultural areas is also hampered by the difficulties farmers face in establishing and maintaining creditworthiness. This follows from two intrinsic problems. First, agricultural production requires large amounts of advance credit and entails long delays in repayment. Second, because farmers hold their wealth in the form of the land they cultivate, they find it difficult to diversify their asset risk. Under asymmetric information lenders have an incentive to encourage farmers to self-finance (Leland and Pyle 1977). Thus farmers are under pressure to own their own land when possible, although the value of the land depends on the highly variable prices paid for its produce.

Farmers may want to diversify even more than the typical consumer because their ability to invest hinges on continuing access to credit. But the benefits of reduced borrowing costs may outweigh those from diversification. It is an unfortunate irony that some of the riskiest assets in the economy are held as the sole form of wealth by some of the most risk-averse investors. Risk-averse farmers may even choose not to diversify their crop mix. An extreme case was the postbellum American South, where specializing in cotton, although extremely risky, offered the farmer the best chance of remaining in farming or moving up the agricultural ladder (Wright 1986).

Banks take account of the extent and riskiness of borrowers' collateral when deciding whether to enter new locales or to make new loans. In areas with volatile land prices, banks place lower limits on loans, charge higher interest rates, and are more reluctant to invest in information about new borrowers or to enter rural markets with little pre-existing wealth accumulation (see related arguments in Binswanger and Rosenzweig 1986).

The risk of undiversified assets in agriculture cannot be solved by combining corporate ownership of land with rentals to farmers. Although renting or sharecropping land would eliminate the risk to the farmer of a decline in the value of

the land, the fact that farmers who *can* own their land almost always choose to do so is *prima facie* evidence for the relative efficiency of land ownership. Studies of sharecropping (see Otsuka and Hayami 1988) point out that principal-agent problems (which could include costly verification of effort, output, or land conservation) make rental or sharecropping arrangements suboptimal. The same arguments could be applied toward rental markets for capital, which can limit capital intensity and technological progress.

Government-Directed Credit Programs for Agriculture

One possible answer to the problem in agricultural capital markets is government credit assistance to farmers. The U.S. government, for example, has provided direct loans, loan guarantees, and subsidized financing through the semi-public Farm Credit System. But there are several problems with this idea.

Although governments have different (collective) objectives and deeper pockets than private suppliers of credit, they typically do not have better information or better means of detecting and punishing undesirable behavior by borrowers. If private sector credit is scarce because of the high fixed cost (in a physical sense) of establishing intermediaries, government intervention to defray these costs may be beneficial if it improves the allocation of capital. If the shortage of credit is attributable to asymmetric information, and if the government's information is no better than that of private credit suppliers, government loans, guarantees, or loan subsidies may not provide assistance where it is needed most and may crowd out better uses of funds.

The social costs of government credit programs need to be taken into account as well. In particular, the distribution of funds has been motivated by political, rather than economic, goals (see Aleem 1985; Braverman and Guasch 1986). High rates of default and the misallocation of credit are not the only disadvantages of "throwing money at the problem" of rural credit scarcity. Such policies may also destabilize local land markets and thus make farm ownership even more difficult for worthy borrowers who are denied access to government programs. Carey (1989) argues that the government-subsidized credit boom of the 1970s in the United States caused a speculative bubble in the prices of farmland that set the stage for the collapse of land values in the early 1980s. Indiscriminate credit permitted the most risk-loving and optimistic segment of the population to determine the value of the land. In stock and bond markets short-selling allows both pessimists and optimists to participate in determining market prices, but short-selling in land markets is not feasible. According to this argument, government credit subsidies and direct loans can amplify agricultural risk, remove some of the information content from land prices, and crowd out liquidity-constrained farmers who do not have access to government credit.

Finally, as Braverman and Stiglitz (1982) and Bell (1988) emphasize, government credit relief to tenant farmers may not be effective in relaxing borrowing constraints if the landlord exercises substantial monopoly power. The benefits

of government programs may, for example, simply be passed on to the landlord in the form of higher rent, credit, or input costs. These considerations suggest that land redistribution will enhance the effectiveness of government credit programs and encourage competitive markets for inputs and credit.

Combining Government Funds with the Local Incentive Structure

In many countries governments are beginning to imitate and encourage traditional agricultural lending practices. Government credit programs typically offer financial contracts that are not nearly as rich as those offered by private local lenders. As much of the literature on asymmetric information suggests, outsiders often do best by relying on simple debt contracts, perhaps secured by collateral on land, while insiders with lower costs of screening applicants and verifying compliance can offer contracts that allow greater diversification of risk.

Aleem (1985, 1990) finds that lending by informal moneylenders in Pakistan was part of an intricate multidimensional contract between borrower and lender, including emergency aid, price insurance, and inputs. Informal moneylenders often served several villages and succeeded in diversifying across locations and activities. The typical lender, who had been in the market for about five years, invested about a day or two in screening and investigating a loan applicant. This step was taken even though the borrower and lender had conducted business transactions with one another for at least one previous season. The screening was further refined by a rejection rate of more than 50 percent. Lenders enhanced the effectiveness of the screening process by pooling information on defaulters, who were effectively eliminated from the informal credit market. (For a general review of the literature on informal moneylending, see Huppi and Feder 1990.)

As policymakers and economists have become more familiar with the functioning of informal markets, and more respectful of their relative success in providing funds and sharing risk, there has been a growing interest in finding ways to combine the objectives and wealth of the government with the incentive structure, enforcement powers, and information advantages of local networks of borrowers and lenders. One approach, which has been tried in Malaysia, calls for the government to employ local moneylenders (Wells 1978). The key to such arrangements is to link the compensation of the local moneylender to the performance of the loan portfolio. Under a system in use in Indonesia local managers of government credit schemes have substantial autonomy, and their compensation is tied to the results of their lending decisions (Yaron 1992; Chaves and Gonzalez-Vega 1993). This approach is controversial, however, since local moneylenders may act as monopolists and restrict access to credit. Even if interest rates are set by the government, the local agent can sell the rights to credit and thus earn monopoly rent.

An alternative practice relies on mutual insurance among borrowers to ensure that incentives are compatible. Stiglitz (1990) suggests that cosigning (group

lending) arrangements among rural borrowers can mitigate information problems by providing monitoring. The idea is that the whole group of borrowers stands to lose if any of them undertakes risky activities; therefore members of the group will be willing to monitor each other and enforce compliance. Stiglitz's argument extends to a dynamic context, where group loan performance might affect access to future loans and hence amplify the incentives to monitor (see related arguments in Basu 1986).

By creating an incentive for farmers to screen and monitor one another, the government can relax financing constraints without experiencing the problems associated with indiscriminate credit subsidies and government loans. This general idea has been employed with great success in a variety of countries (see Huppi and Feder 1990). Thailand's Bank of Agriculture and Agricultural Cooperatives (BAAC) and Bangladesh's Grameen Bank are two examples.

In the case of the BAAC the funds are lent to the group as whole, which is jointly liable for any defaults. The BAAC requires borrowers to repay the principal when the loan falls due, even though in the vast majority of cases both the bank and the borrowers expect the loan to be recontracted within a month after borrowing. Farmers with liquidity problems who are unable to meet their obligations are forced to turn to the more expensive informal credit market for a bridge loan—a practice that has ensured a record of repayment.

Bangladesh's Grameen Bank is another highly successful experiment that lends to the landless poor, who are organized into five-person groups. Here the mutual liability provision of the BAAC might be insufficient because the assets of the borrowers are too low. Instead, the Grameen Bank relies on borrowers' potential wealth as its "collateral." If a group defaults, all of its members lose future access to credit and are deprived of their only opportunity to make the transition from landless poverty.

The credibility of the enforcement of bank rules, including exclusion from credit in case of default, is buttressed by the bank's quasi-independent status. The government regulates and is a part-owner of the bank, but 75 percent of the stock is privately held, and the majority of the directors are privately appointed (Yaron 1992).

The Grameen Bank has been a phenomenal success since its humble beginnings in 1976. By February 1987 it was operating 300 branches covering 5,400 villages, with nearly 250,000 people participating. Its default rates are extremely low; recovery rates (as of February 1987) were 97 percent within one year of disbursement and 99 percent within two years (World Bank 1989, p. 117). The bank has had a substantial positive effect on the incomes of the rural poor in Bangladesh (Hossain 1984).

These examples are encouraging. They suggest that it is possible in practice, as well as in theory, to marry credible, locally administered incentive structures with government objectives and resources. For such schemes to work, however, several potential problems must be avoided. Success requires that individual participants benefit from monitoring and reporting the presence of cheating.

This in turn requires a small group size; otherwise the gains from monitoring are spread too thinly among participants to justify the individual effort to monitor.

Second, the group as a whole must have enforcement power over its members. Groups should be able to select their own members and eject those who are unwilling to play by the rules of the group.

Third, governments must impose hard, credible constraints on groups in the form of regular required repayment of principal and exclusion of defaulting groups from future loan programs. The abuses of government loans to farm cooperatives are discussed in Kislev, Lerman, and Zusman (1989). Their account provides a cautionary note for those who are impressed by cooperatives as such. In the groups of Israeli farmers they studied, the cooperative's dependence on the government and its expectation that it would be bailed out weakened the incentive of members to repay.

In sum, there may be valid reasons for the government to supplement private agricultural credit facilities with its own programs. Private intermediaries and governments have different objectives, and some of the advantages that come from relaxing credit constraints are not "internalized" by private suppliers. Governments care about equitable distribution of income and about the efficiency gains from superior capital market allocations that redistribution of wealth allows.

In channeling credit assistance to farmers, government should avoid several pitfalls. First, in contrast to loan or price support programs, aid should be concentrated in the hands of those who need and deserve it. Government transfers or indiscriminate subsidies to the rural poor are an extremely "leaky bucket" for transferring resources to productive, credit-constrained farmers. Second, funds should be channeled at the local level through groups of mutually liable farmers with proper incentives to screen, monitor, and enforce contracts. And finally, government credibility is essential. Unless the government enforces penalties and insists on the timely repayment of debts, local incentive structures will be useless. As with so many other aspects of government policy that can mitigate capital market imperfections—such as property redistribution and private contract enforcement—the government's credible commitment to play by the rules is the *sine qua non* of success.

Industrial Capital Markets and Policy

Capital market misallocations in industry as a result of asymmetric information can be quite different from those in agriculture. Industrial firms' needs are typically much larger and often involve substantial uncertainty about the demand for products and the costs of production, particularly in new, growing industries. Large-scale production of new products using new technologies creates special information problems for the financial system. Similarly, outsiders find it costly to monitor and control the management of large-scale enterprises engaged in complex production and distribution processes.

Clearly, delegation of monitoring and control to intermediaries is central to the successful mobilization of funds for industrialization. But intermediaries face unique problems in lending to industrial customers. The monitoring costs of infant industries are front-loaded toward the present, while the profit streams for these industries are back-loaded into the future. Under these circumstances it would be efficient for firms to postpone paying banks for their monitoring efforts. But firms and banks may not be able to credibly commit to a long-term relationship because a bank's decision to grant credit to the firm, and its subsequent renegotiations of credit terms, are publicly observable. Other banks, therefore, can free-ride; that is, learn about the firm's credit history as the firm becomes "seasoned" by the initial bank. If all banks can compete for a bank's customers as the neophyte borrowers mature, the initial bank may not be able to recoup its initial monitoring costs over time. Recent studies by Mayer (1988) and Calomiris (1994) suggest that banking systems which offer more control over lenders may be able to solve this problem and thus provide more funding to infant industries.

A final, important difference between industrial and agricultural sectors is that in the industrial sector credit constraints have a cost in addition to their direct effect on constrained entrepreneurs: they restrict the development of firms that would generate positive externalities for other businesses. For example, if advances in technology spill over to other firms or industries, the long-run benefits to relaxing capital market constraints and improving the allocation of capital may be more important in industry than in agriculture.

Empirical Evidence on Industrial Capital Markets

Are capital market imperfections empirically important for industry? The experiences of a wide variety of countries suggest that they are. Throughout the world, internal finance and bank debt are the dominant sources of corporate finance. The United States is exceptional in its reliance on securities markets for commercial and industrial finance (Calomiris 1993). Other countries rely on a small number of nationwide banks to lend money for those activities not financed through retained earnings.

In the United States, small, growing enterprises are most dependent on internal finance (Butters and Lintner 1945; Fazzari, Hubbard, and Petersen 1989). Numerous studies show that the investment behavior of firms depends on the availability of cash flow far more than perfect access to capital markets would imply. These studies supply important evidence that the heavy reliance on internal funds observed in most firms is driven by capital market imperfections (see Hoshi, Kashyap, and Scharfstein 1991; Gilchrist and Himmelberg 1992; Calomiris and Hubbard 1994). Evidence also shows that research and development expenditures are "excessively" reliant on internal funds (Himmelberg and Petersen forthcoming). Moreover, there is strong evidence of a substantial cost differential between internal and external sources of funds.

Recent studies show that banks have better information than “outsiders.” Using data on publicly traded Japanese firms, Hoshi, Kashyap, and Scharfstein (1990a, 1991) show that the sensitivity of investment to cash flow is much greater for firms without close links to their “main bank.” Main banks are the firms’ largest creditors and own substantial stock in the companies. As a large, junior claimant on the firm, the main bank has the incentive and the ability to monitor and discipline member firms and to provide credible “insurance” during financial distress. This insurance takes the form of debt write-downs by the bank, the orchestration of demand for the firm’s product by other member firms, and the improvement of managerial decisionmaking. Calomiris (1994) argues that Germany’s universal banking system provided similar advantages for industrial lenders around the turn of the twentieth century and provided German firms with access to industrial finance on cheaper terms than their counterparts in the United States.

Banks also reduce the costs of distress, for three reasons. First, bank-reliant firms have fewer creditors to coordinate when designing a workout plan. Second, banks’ powers of asset seizure (or “offset”) can serve to threaten the firm—or its recalcitrant creditors (Garber and Weisbrod 1991). And third, banks have superior information about the state of the firm and hence about the desirability of a particular workout plan as compared with bankruptcy (Gilson, John, and Lang 1990; Hoshi, Kashyap, and Scharfstein 1990b).

The available evidence on capital market imperfections provides important support for the theoretical description of capital markets noted earlier. In particular, there is ample evidence that capital market failures are as important for industrial credit markets as they appear to be for agricultural credit markets.

Government-Directed Credit Programs for Industry

Many government policies toward industry are noncontroversial. These include protecting property rights and avoiding unwise regulation. But beyond these obvious policy prescriptions, is there a role for government intervention in capital markets? Specifically, is there a theoretically defensible role for policies that directly allocate credit to firms through public or quasi-public financial intermediaries? The first justification is that directed credit may be the most effective mechanism for correcting product and factor market externalities. A second possibility is that directed credit may be an effective mechanism for correcting capital market failures.

PRODUCT AND FACTOR MARKET EXTERNALITIES. Perhaps the most compelling economic justification for industrial assistance programs is provided by recent research on externalities that affect growth. This literature provides new theoretical understanding and empirical evidence on the impact of production externalities (Caballero and Lyons 1989), research and development externalities (Griliches and Lichtenberg 1984; Jaffe 1986; Bernstein and Nadiri 1990), learn-

ing externalities (David 1975; Krueger and Tuncer 1982), and factor market economies of agglomeration or diseconomies of congestion (David and Rosenbloom 1990).

Externalities in product or factor markets can justify any of a variety of mechanisms for subsidizing industry. In some cases credit policy is one of many equally attractive means for providing incentives for investment. But if firms are credit-constrained, directed credit may be more potent than relative price incentives (subsidies) for generating investment.

DIRECT BENEFITS FROM RELAXING CAPITAL MARKET CONSTRAINTS. Under some circumstances, governments may be better able to provide credit than private agents. Stiglitz (1990) argues that government programs may be justified because the costs of enforcing compliance are lower. This is a debatable point. It is possible that government can track down firms better and perfect a lien on firm assets through special legal prerogatives and police powers, but private intermediaries often have special legal rights too (Garber and Weisbrod 1991).

Second, taxation authority may provide advantages to the government as an intermediary. As discussed in various models of banking (Leland and Pyle 1977; Calomiris and Kahn 1991), intermediaries may be hard to organize because insufficient concentrations of wealth in the hands of prospective bankers may render banking infeasible. This problem may be especially relevant in developing countries. Tax-financed government banks provide solutions to this problem.

Third, recall from our previous discussion that private intermediaries sometimes lack the incentive to finance "unseasoned" infant firms because of the inability of firms to enter a credible, long-run relationship with the bank. Without such a commitment from the firm, other banks may be able to free-ride on the efforts of the bank that provides costly early assistance to the unseasoned firm. A government lender, however, will be able to provide financing in this case—if it is efficient to do so—and will be able to tax to finance its monitoring costs.

One can also argue in favor of credit assistance to mature, declining industries. For example, recent theoretical models (Ghemawat and Nalebuff 1985) identify efficiency gains from coordinated capacity reductions. In this view government subsidies are a means of overcoming an inefficient "prisoner's dilemma." Without coordinated reduction, firms would maintain inefficiently high capacity as part of a competitive dynamic strategy to maintain market share in a declining industry.

The fact that one can imagine justifications for government credit policies to support industries does not mean that such policies are a good idea. It is not clear that the assumptions necessary for justifying government involvement are met. Furthermore, economies with relatively sophisticated private capital markets may offer little opportunity for beneficial government involvement. Even more important, governments do not always "do the right thing," even if they

have legitimate objectives or comparative advantage. Capital market programs often result in rent-seeking, corruption, and crowding out. Even if successful examples of government industrial credit programs exist, countries with different political systems may not be able to imitate them. This is particularly important in any attempt to apply lessons from Japan's experience with directed credit programs to developing countries today. One distinguishing feature of Japanese government credit programs has been the unusually low rate of default. This has led some to argue that Japan is a special case.

Finally, industrial credit programs must be evaluated from a general equilibrium perspective. Even if a program leads to growth in a particular sector, it may do so by crowding out growth in other sectors. Similarly, if growth is achieved through special privileges or the imposition of special government regulations (such as Japan's consumption taxes), one must weigh the direct costs to consumers against the alleged benefits achieved by targeting particular firms and industries.

Industrial Credit Policies in Japan

Government-directed credit to industry traces its intellectual origins to the aftermath of World War II. Japan Development Bank (1993) describes the history of early attempts to organize directed credit programs during this period, culminating in the establishment of the Japan Export-Import Bank and the Japan Development Bank (JDB), the two most important vehicles for providing credit assistance to industry. Credit assistance in Japan has always been guided by the government's five-year plan, which outlines the sectors to be assisted. Credit is only one arm of industrial policy: tariff policy, subsidies, and other government interventions combine with credit policy to meet the overall objectives of the government's plan.

The details of sectoral credit allocation are worked out through an elaborate consultative process that involves "deliberative councils" and other advisory bodies composed of industrialists, workers, academics, bankers, politicians, and bureaucrats. Participation by virtually the entire economy in this process is compulsory. Representatives of various sectoral interests must make a case for prioritizing their needs in this national forum for debate. In contrast to the American political process, where congressional committees are primarily influenced by special lobbying interests, competing interest groups in Japan are forced to obtain national consensus. Once the broad guidelines are set in place, firms applying for credit must meet the credit standards of the individual lending agencies, which pride themselves on independence from government pressure in determining which borrowers are worthy of credit.

The stated goals of the programs have been quite compatible with defensible theoretical objectives. A recent policy statement by the Overseas Economic Cooperation Fund (OECF 1991) refers specifically to externalities in production, technological development, and factor markets and to the benefits of relaxing

financing constraints faced by growing enterprises. According to the OECF statement, government involvement is warranted in the following cases:

- When the investment risk is too high for a particular business (owing to the need for large-scale, long-term, innovative activities)
- When there is a significant discrepancy between private and social benefits (leading, for example, the government to favor industries that increase job opportunities in rural areas and prevent migration to urban regions)
- When a given industry saves on foreign exchange and thus relieves the balance of payments constraint on other growth sectors
- When an investment has benefits for pollution control and environmental protection
- When infant industries face large setup costs
- When information problems discourage lending to small- and medium-scale industries.

Clearly, there is a close correspondence between the stated rationale for industrial policy intervention and the theoretical motivations discussed above.

A similar list of objectives appears in Japan Development Bank (1993). Interestingly, the JDB places particular emphasis on its role as a “pump primer.” From Mayer’s (1988) perspective, one could argue that pump-priming requires a substantial government investment in monitoring costs, which are recouped through the public benefits of helping firms to develop creditworthiness. The JDB explicitly sees monitoring and seasoning as its key role in lending to infant industries and prides itself on the rapid technological advancement and high rates of growth that targeted industries have achieved.

The same study reveals that anticipated product and factor market externalities were central to the sequence of the assistance given to different industries. In the 1950s the “basic” industries—electricity, iron and steel, shipbuilding, and coal mining—received the bulk of funding. Once those industries were developed, the government targeted manufacturing industries—notably, machine tools and automobile parts—that were viewed as likely to provide spillover benefits to other industries through technological changes and improvements in capital goods. More recently, high-technology electronics firms have been supported for the same reasons.

In addition to providing assistance for growing firms, the Japanese government has provided credit to declining industries. More recently, credit has been provided as part of a government program to encourage capacity reduction. Unlike the case in many countries, where declining industries receiving credit never seem to disappear, in Japan declining industries like coal mining have been forced to shrink as their workers were retrained for other occupations.

Despite these apparent successes and the consonance between the theory of welfare-improving government intervention and the official stated policies, there is cause for skepticism about the benefits of these credit programs (see Vittas and Wang 1991; Calomiris and others 1992). First, the Japanese “main bank sys-

tem” is exceptionally well suited to internalizing the long-run benefits of financing unseasoned firms because the banks’ corporate control devices prevent deviation by firms. Second, the apparent success of credit-targeted sectors can be explained by other factors. It is possible that other aspects of industrial policy targeted the same favored sectors that were receiving credit assistance.

Analysis of these programs has been handicapped by an absence of data on the links between government assistance and the growth of the firm. Even if directed credit did promote growth in the targeted firms, the mechanism through which credit operated is unclear. Did it help by overcoming credit market failure, or simply by convincing private lenders that the government was, in fact, ensuring the future of the recipient and thus reducing the lenders’ credit risk?

To answer these questions, we employ a microeconomic analysis of the relative marginal contributions of government and private credit, isolating the effects of credit assistance by type of industry. The analysis examines the connections between government credit and economic performance of firms in machine-tool industries, focusing on the period 1982–91. Data for the 1950s and 1960s, the years in which credit assistance peaked, are not yet available.

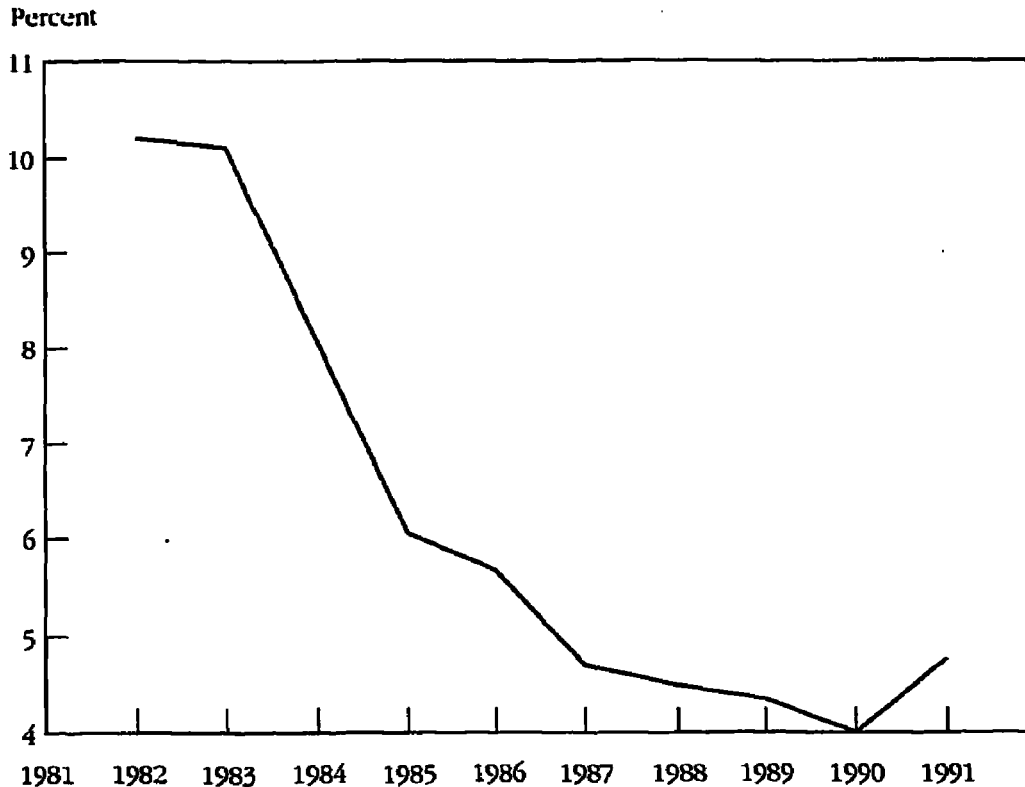
Fortunately, the declining aggregate levels of government assistance during this period do not hinder our ability to draw inferences about the effects of credit on performance because there is still considerable cross-sectional variation in the distribution of these funds. Well over half of the firms in these industries received no government credit at all, while a fraction of firms in the upper tail of the distribution received relatively large loans. Hence, even though the aggregate level of government credit is small, there is substantial scope for discovering credit effects through changes in the cross-section over time.

Machinery manufacturers were among the primary targets of industrial policy plans in the 1960s and 1970s. The sample includes three industries: general machinery (170 firms), electrical machinery (165 firms), and precision instruments (35 firms). These industrial classifications correspond to the three-digit industrial codes 025, 027, and 031 as defined by the Japan Development Bank.

Figures 1 through 3 show that the general magnitudes and trends over time were roughly the same across these industries. The aggregate level of government credit as a fraction of the gross aggregate debt of general and electrical machinery manufacturers is about 10 percent in 1982 and declines to about 5 and 1.4 percent, respectively, in 1991. The level of funding of precision instrument makers, which is 3.5 percent at the beginning of the sample period, temporarily rises to 5.5 percent in 1983 before declining to less than 1 percent by the end of the decade.

In addition to the similarities in the time-series behavior of the ratio of government to total debt across these industries, there are also similarities in the cross-sectional distribution of the ratio within these industries. In all three industries the median firm receives zero government financing. In fact, the lending activity of government banks and agencies appears to be concentrated primarily on

Figure 1. Government Debt as a Share of Total Debt for Manufacturers of General Machinery, 1982-91



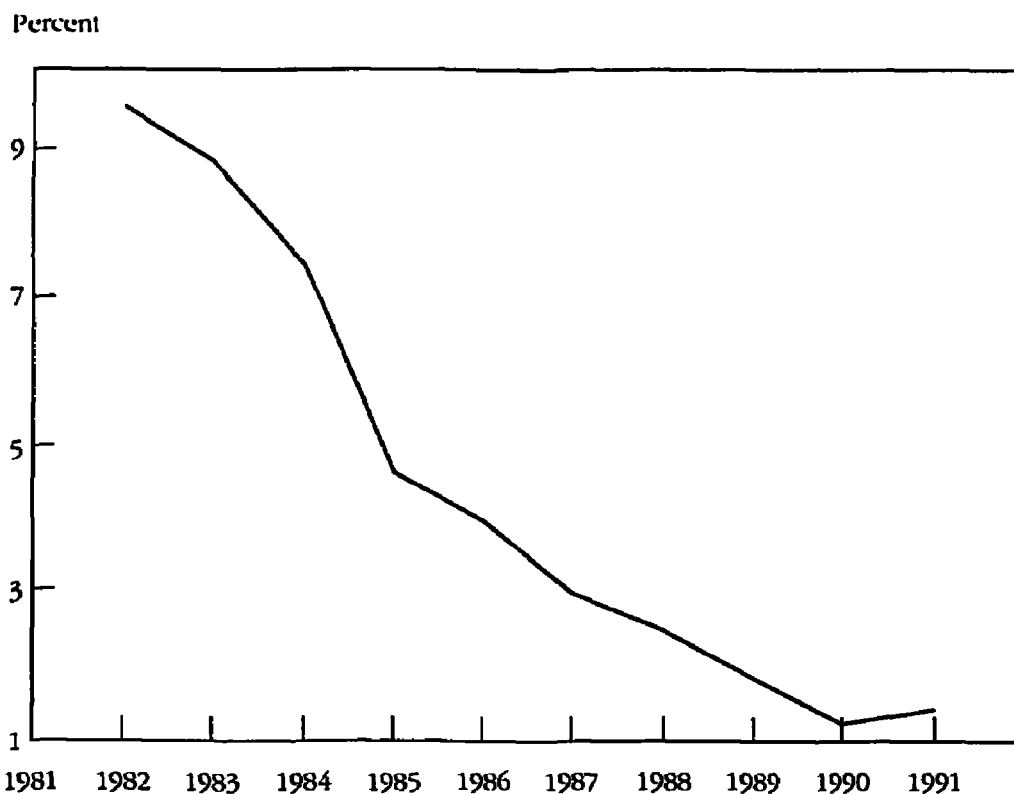
Source: Authors' calculations.

roughly one-third of the firms in each industry. In the general machinery category the firm at the ninetieth percentile has a government-to-debt ratio of 17 percent in 1982 and 8 percent in 1991. Electrical and precision instruments record similar patterns. At higher and lower percentiles of this ratio, the downward trend appears uniformly across the distribution. Hence the time-series behavior of the aggregate ratio is explained by the fact that a relatively constant fraction of firms is receiving government credit over this period but that the relative importance of government credit for most of those firms is declining.

Of those firms that had a positive amount of government debt on their balance sheets in 1981, more than 75 percent had reduced their debt by 1991, and of those, two-thirds had reduced their government debt obligations to zero. Only 25 percent received additional credit from the government. Of those firms that had zero government debt in 1982, 9 percent had received government credit by 1991.

These facts are consistent with the view that government lenders withdrew credit once firms had earned access to private credit markets and that these agencies extended new credit to new borrowers rather than to pre-existing borrowers. This evidence appears to rule out the possibility that a few politically

Figure 2. *Government Debt as a Share of Total Debt for Manufacturers of Electrical Machinery, 1982-91*

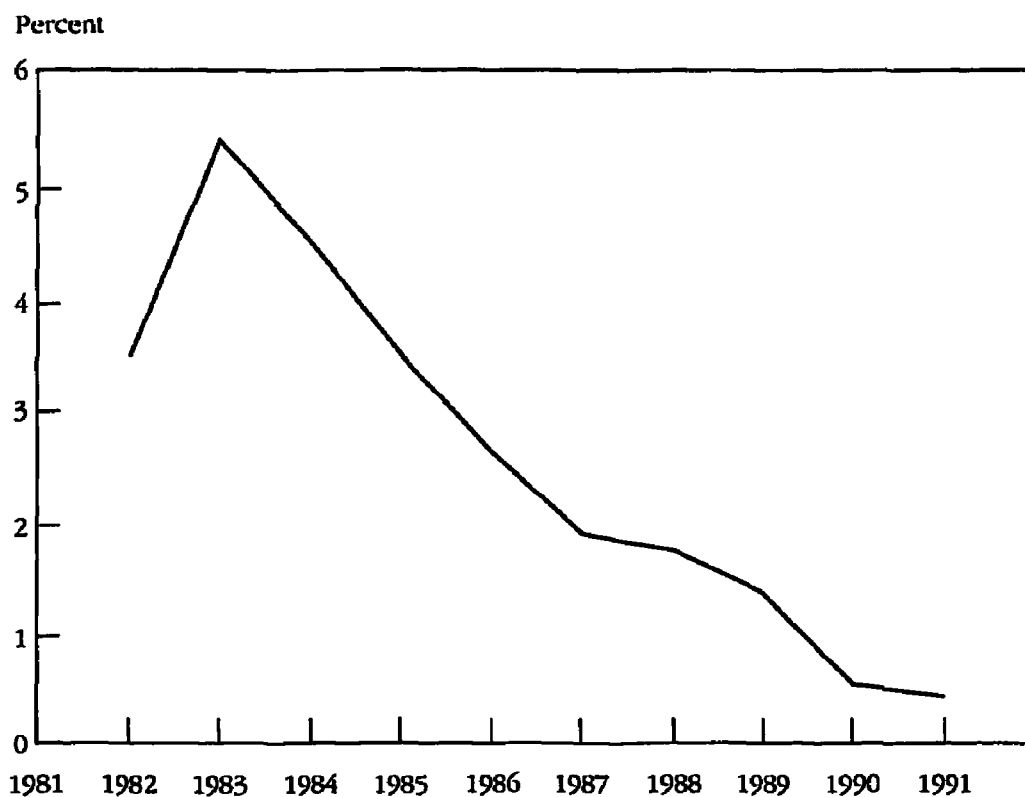


Source: Authors' calculations.

well-connected firms were gaining and maintaining access to government credit, but it is consistent with (although certainly not conclusive for) the claim that government credit was being allocated according to objective lending standards.

The study indicates that assistance was targeted toward the firms most likely to generate technological externalities. Firms that received increases in government funding in 1982 had higher rates of investment and higher growth of sales. They also had much higher ratios of research and development (R&D) expenditure to capital in that year: 6 percent, as against 3 percent in firms that recorded declines in government funding. The net annual investment rate in 1982 for firms receiving increased financing from the government averaged 18 percent, while firms with declining government credit had net investment rates of 11 percent. Annual sales grew 1 percent in those firms that received government funding, compared with -1 percent for firms with declining government credit. More formal econometric results using estimates of panel data vector autoregressions are presented in the appendix. These regression results provide strong evidence that the above differences in investment rates and growth per-

Figure 3. *Government Debt as a Share of Total Debt for Manufacturers of Precision Instruments, 1982-91*



Source: Authors' calculations.

formance are directly attributable to the differences in government credit assistance.

Our findings also show that increases in government debt predict large increases in private debt. Indeed, the cumulative increase in private debt in response to an increase in government debt is twice the cumulative increase in gross investment, suggesting that increased government credit raises the proportion of investment financed by privately issued debt. This is consistent with the "pump-priming" effect discussed above.

Although the reduced-form results (as described in the appendix) are not conclusive evidence that government credit relaxed borrowing constraints on firms and helped firms to become seasoned credit risks, they are suggestive. Further work needs to be done to isolate the source of the influence of government credit. For example, it is important to distinguish the direct effects of government lending through relaxation of borrowing constraints from the possibility that government credit is implicitly providing risk insurance to private lenders, hence reducing the firm's costs of financing.

Nonetheless, our findings provide evidence in favor of the argument that credit market interventions in Japan have been an important component of industrial policy. Possibly because of the institutional structure of these lending programs, it appears that economic logic rather than political capture motivates policy-based lending decisions. Government credit is withdrawn quickly from seasoned firms, is targeted toward growing, research-intensive firms, and is associated with substantial increases in investment and access to private credit.

Conclusion

We have discussed the theoretical justifications for government-directed credit programs and have argued that, at least in some cases, directed credit has achieved legitimate objectives of public policy. We have also argued that the problems differ by sector, particularly between agricultural and industrial capital markets. In agriculture, the government may be able to help farmers achieve efficiency gains associated with accumulating a critical level of wealth by helping to organize and fund credit cooperatives. In industry the government can help to overcome problems caused by free riding on investment in monitoring or by externalities in product or factor markets.

These arguments do not constitute a blanket endorsement of government interventions in credit markets. Indeed, in many cases government interventions have generated large costs through the funding of inefficient borrowers and the crowding-out of private credit intermediaries.

A key determinant of the successes we have outlined here is the institutional mechanism through which policy objectives are translated into government programs. The agricultural credit programs of Thailand and Bangladesh and the industrial credit programs of Japan are constructed to minimize crowding-out of private sources of credit and to minimize problems of moral hazard. In Japan the priorities of credit policy are determined as part of a national plan, with broad participation; once priorities have been established, lending decisions by agencies are shielded from political pressures. In political systems that lack the ability to make and enforce credible exclusionary rules for agricultural credit or that cannot produce and implement effective plans for the distribution of industrial credit, government-directed credit programs may create more problems than they solve.

Appendix

Tables A.1 and A.2 report regressions of the rate of investment on lags of the supply of government credit financing. In more precise terms, this regression is a single equation from a three-lag vector autoregression (VAR). To accommodate the panel structure of our data, the specification we estimate includes both firm

Table A.1. Vector Autoregression Results, Gross Investment Machine Tool Industries (Groups 025, 027, and 031), 1986–91

Regressors	Specification 1	Specification 2
(Investment/capital) _{t-1}	0.0551 (1.5121)	0.0449 (1.2761)
(Investment/capital) _{t-2}	-0.0188 (-1.1250)	-0.0184 (-1.1502)
(Investment/capital) _{t-3}	-0.0492 (-3.6009)	-0.0556 (-4.4716)
(Sales/capital) _{t-1}	0.0158 (1.7245)	0.0141 (1.4906)
(Sales/capital) _{t-2}	0.0029 (0.8439)	-0.0011 (-0.4104)
(Sales/capital) _{t-3}	0.0075 (1.8472)	0.0108 (2.2220)
(Income/capital) _{t-1}	0.0588 (0.9133)	0.0223 (0.628)
(Income/capital) _{t-2}	0.0018 (0.0517)	-0.0342 (-1.0604)
(Income/capital) _{t-3}	0.0295 (0.7764)	-0.0384 (-0.9571)
(Government debt finance/capital) _{t-1}	0.3536 (1.2193)	0.1128 (0.3514)
(Government debt finance/capital) _{t-2}	1.2449 (4.7945)	1.0473 (5.1366)
(Government debt finance/capital) _{t-3}	0.6250 (4.0542)	0.6474 (5.3547)
(Nongovernment debt finance/capital) _{t-1}		0.0459 (2.9972)
(Nongovernment debt finance/capital) _{t-2}		-0.0099 (-0.6803)
(Nongovernment debt finance/capital) _{t-3}		0.0155 (1.0992)
(Year dummies, not included)		
Number of nonmissing observations	1,618	1,618
Hansen's test (<i>p</i> -value)	0.221	0.262
Granger tests (<i>p</i> -values)		
Excluding government finance	0.000	0.000
Excluding private finance		0.002

Note: Numbers in parentheses are *t*-statistics. They are adjusted to correct for heteroskedasticity.

and year effects. We also estimate *t*-statistics and Wald tests that are adjusted to allow for time-varying and cross-sectional conditional heteroskedasticity in the error term. Since the VAR approach imposes no structural restrictions and allows a very general specification of the investment equation, we view these regression results as a useful first step and a parsimonious set of statistics for summarizing the partial correlations in the data.

Table A.2. Vector Autoregression Results, Net Investment Machine Tool Industries (025, 027, and 031), 1986-91

<i>Regressors</i>	<i>Specification 3</i>	<i>Specification 4</i>
(Investment/capital) _{t-1}	-0.0845 (-2.4466)	0.0033 (0.1117)
(Investment/capital) _{t-2}	-0.0417 (-2.1543)	-0.0159 (-0.9832)
(Investment/capital) _{t-3}	-0.0463 (-2.5419)	-0.0289 (-2.0122)
(Sales/capital) _{t-1}	0.0446 (5.6247)	0.0331 (4.8201)
(Sales/capital) _{t-2}	0.0108 (3.3710)	0.0042 (1.7860)
(Sales/capital) _{t-3}	0.0112 (2.8306)	0.0131 (3.8675)
(Income/capital) _{t-1}	-0.1239 (-2.1764)	-0.1646 (-3.0853)
(Income/capital) _{t-2}	-0.0371 (-1.3459)	-0.0210 (-0.8492)
(Income/capital) _{t-3}	-0.0442 (-1.3943)	-0.0868 (-3.5701)
(Government debt finance/capital) _{t-1}	0.9109 (3.9242)	0.9043 (3.9217)
(Government debt finance/capital) _{t-2}	0.5046 (2.6596)	0.5812 (3.1297)
(Government debt finance/capital) _{t-3}	0.2358 (1.5432)	0.2718 (1.9984)
(Nongovernment debt finance/capital) _{t-1}		0.0013 (0.1086)
(Nongovernment debt finance/capital) _{t-2}		-0.0117 (-1.1246)
(Nongovernment debt finance/capital) _{t-3}		-0.0022 (-0.1729)
(Year dummies, not included)		
Number of nonmissing observations	1,618	1,618
Hansen's test (<i>p</i> -value)	0.224	0.289
Granger tests (<i>p</i> -values)		
Excluding government finance	0.000	0.000
Excluding private finance		0.444

Note: Numbers in parentheses are *t*-statistics. They are adjusted to correct for heteroskedasticity.

In the estimated equations, all variables are scaled by the beginning-of-period level of the capital stock. To control for various influences on investment, we include lags of sales, operating income, and investment. We then add to this list a government credit policy variable, which we measure by the change in level of government credit outstanding (scaled by the stock of capital). The resulting equations are estimated using all available observations, from which we remove observations with missing data. When we remove the first three lags for the VAR

(plus an additional lag for instruments, as required by the procedure in Holtz-Eakin, Newey, and Rosen 1988), we are left with a panel of 370 firms covering six years from 1986 through 1991. This panel yields 1,618 observations.

The specifications reported in tables A.1 and A.2 are identical except that table A.1 uses gross investment while table A.2 uses net investment (gross investment net of active retirements). In each table the first column reports a regression in which the only external-financing variable is net government financing. In the second column we report the same specification with the addition of a nongovernment debt-financing variable, measured by the change in the stock of nongovernment debt outstanding. This variable is included to provide an indication of the extent to which lags of financing activity may simply be forecasting future growth opportunities and hence higher investment rates. Put another way, if we found that the lag coefficients for both public and private sector debt financing were large and statistically significant for investment, this would imply that debt financing as such, rather than government finance in particular, predicts investment behavior. If we found strong causation for government financing but not for private financing, this would suggest that government finance plays a unique role in financing these firms.

All four of the specifications reported in tables A.1 and A.2 provide strong evidence that government debt financing has a large, positive, and statistically significant marginal effect on both gross and net investment. For each of the specifications, Hansen's test of the model's overidentifying restrictions is insignificant, providing support for the adequacy of the VAR specification. In table A.1 the sum of the lag coefficients on government debt finance in specification 1 is 2.22, indicating that the three-year cumulative effect of an additional dollar of debt financing is more than two dollars of additional gross investment in fixed capital assets. In the second specification the lag coefficients sum to 1.81.

We estimate similar, although lower, magnitudes for net investment. In specification 3 the three lag coefficients sum to 1.65, while in specification 4 the coefficients display a similar pattern and sum to 1.76. In striking contrast, the relative magnitude of nongovernment debt financing is close to zero. For nongovernment finance the lag coefficients are 0.001, -0.011 , and -0.002 and are all statistically insignificant.

Additional formal evidence for the importance of government debt finance is provided by Granger causality tests, reported at the bottom of each table. The numbers reported in the tables are the p -values associated with a Wald test of zero restrictions on the lags of the indicated variables. For specification 1 in table A.1 the p -value of 0.000 indicates that we can strongly reject the hypothesis that the coefficients on three lags of government debt finance are jointly zero. Hence we can say that (conditional on lags of sales, operating income, investment, firm effects, and year dummies) government-debt financing Granger-causes gross investment. This test also indicates that nongovernment debt finance Granger-causes gross investment (although the economic magnitude suggested by the coefficients is low).

The results of the Granger tests for net investment in table A.2 provide more contrast. Here again, we find a p -value of 0.000 for government debt financing, indicating Granger causality. But for nongovernment debt financing the p -value is 0.444, indicating that we cannot reject the hypothesis that the three lag coefficients are jointly zero; that is, the difference between government and nongovernment debt financing is dramatically different. We also estimated, but do not report, similar VAR models for the flow of private debt. We found that increases in government debt predicted large increases in private debt. Indeed, the cumulative increase in private debt in response to an increase in government debt is twice the cumulative increase in gross investment, suggesting that increases in government credit raise the proportion of investment financed by private debt. This is consistent with the “pump-priming” effect discussed in the paper.

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COMMENT ON "DIRECTED CREDIT PROGRAMS FOR AGRICULTURE AND INDUSTRY," BY CALOMIRIS AND HIMMELBERG

Koichi Hamada

I am pleased to be a discussant of this paper for two reasons. First, it is extremely informative and gives a well-balanced overview of the theoretical and empirical issues concerning directed credit programs for agriculture and industry. It complements nicely Stiglitz's theoretical survey of incomplete capital markets and McKinnon's historical account of capital markets in socialist regimes.

Second, I am gratified that Japan's financial policies are now being given serious consideration, not as objects of curiosity or exoticism, but rather in an attempt to determine whether there are lessons that can be learned from this experience. It seems important to realize that classical laissez-faire policy, which would be the ideal prescription under perfect information, may not be the only sensible approach in developing countries in which the market is intrinsically incomplete.

My main impression of this paper, as well as of today's discussion, however, is that there is a tendency to idealize Japan's financial practices and to give them an uncritically favorable assessment. Ironically, the Reagan and Bush administrations were highly critical of the role the Japanese government played in promoting economic development. Industrial policy was viewed as inconsistent with free markets. Now, however, the Clinton administration has changed course: it has a high regard for industrial policy and has even suggested that the Japanese government resume certain practices, such as the imposition of quantitative targets on imports.

Having acknowledged the merits of this paper, I would like to register a slight complaint about its organization. The authors cover so many points that the main messages are not sufficiently emphasized. For example, the following questions do not seem to have been answered. What is the exact contrast between credit policy in agriculture and in industry? What do the authors consider to be

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the most crucial aspects of the numerous intricately discussed theoretical results, conjectures, and policy issues? Each tree is carefully drawn, but I cannot see the forest. And I think that the sources of data could have been pruned.

Both this paper and Stiglitz's study convince us that market outcomes in the financial sector may not be efficient in the presence of asymmetric information, monitoring costs, and enforcement difficulties. But many questions remain to be answered before we reach the conclusion that a particular form of government intervention in the financial sector is justified.

The first question is, can the government correct inefficiencies in capital markets? This will be possible only if the government has the necessary information and administrative power to induce private agents to support its objectives. We need to distinguish between the two situations that call for government intervention—externalities and incomplete capital markets. The case for interventions can be made rather easily where there are obvious externalities; economics has taught us that government intervention is necessary to adjust for the effects of external economies or diseconomies. But whether the government has sufficient information and an adequate policy package to correct deficient market mechanisms depends on the situation.

I was told by a retired executive of Japan's environmental agency that in one instance he was able to persuade domestic automobile manufacturers to share technical information on pollution standards. Because, apparently, the industry trusted the government—and, I suspect, because of the fear of possible sanctions—companies agreed to share this highly confidential information. This intervention, which led to the adoption of an appropriate pollution standard, is an example of the positive influence of the government.

It is more difficult to assess whether the government can provide remedies for problems caused by incomplete markets and information asymmetry. Can the government monitor and disseminate information in order to correct problems of moral hazard and adverse selection? Although the authors provide a number of reasons to support their affirmative answer to this question, we know far less about this matter than we do about issues of externalities. I think the answer must depend on the individual situation.

A second question is whether the Japanese government's interventions in its financial market moved it in the right direction. The empirical findings, on the basis of Granger tests, that government credit to the machine tool industry caused subsequent investment during 1982–91 is quite curious. It is curious, first of all, because the Japan Development Bank (JDB) did not have a particularly strong role during that period. In any case, the increase in investment might be attributed to the government's having picked the wrong firm, which led to increased investment because otherwise the firm would not have qualified. Thus the appeal to the De Long-Summers argument is essential to justify the authors' contention that the JDB lending was beneficial to the national economy.

A similar analysis of the periods 1954–60 and 1961–67 by Horiuchi and Ohtaki (1987) reports mixed results. First, government lending went predomi-

nantly to mining, coal, fisheries and agriculture, and the merchant marine, all of which were decaying; the JDB did not pick many promising industries. Second, according to Horiuchi and Ohtaki's causality test (based on Granger causality and with six-quarter lags) from the fourth quarter of 1954 to the fourth quarter of 1967, JDB lending led to an increase in private lending in only three industries: steel, fisheries and agriculture, and land transport. Simultaneous linkages between JDB lending and an increase in private lending are found in the electrical and merchant marine industries. Thus the study did not detect a strong "cow-bell" effect indicating that JDB lending served as an information signal for private bankers. Yet Japan Development Bank (1993), which the authors cite in their paper, gives many convincing arguments for the effectiveness of JDB lending. Therefore we seem to need further empirical studies, particularly for the earlier periods.

A third question is whether the government's low-interest-rate policy helped to allocate credit more effectively. In the 1950s the answer was probably affirmative. In the process of recovery, when the construction of infrastructure was vital, this inducement seems to have helped industrial allocation. The JDB's predecessor, the Reconstruction Finance Bank, was instrumental in channeling scarce funds to sectors in which development was urgently needed. Credit rationing was a useful device. After 1965 foreign trade was liberalized, and monetary policy was conducted according to market principles. Interest rates determined by financial markets are now able to efficiently allocate credit without government intervention. Commercial lenders are able to meet the credit needs of these sectors, and they complain that they have to compete with the JDB.

Of course, there are also costs involved in a low-interest-rate policy with credit rationing; in this case the costs are borne by depositors. Until the 1980s the government imposed a rigid ceiling on the interest paid on savings deposits. Implicit interest rates in the form of gifts were paid to consumers to circumvent regulation, although these side payments were also restricted by agreement among the major banks. Low interest rates that facilitated credit rationing and channeled funds to designated sectors skewed the distribution of income in favor of industrial lenders at the expense of depositors. But in the long run, I should admit, depositors benefited indirectly from Japan's rapid industrial growth.

Because interest rates were regulated, bankers worked hard at soliciting more deposits. Brilliant university graduates were hired, but they were not trained in modern financial management skills because, under the regulated-interest-rate system, a bank needed a simple accumulation of deposits to stay in business. The current strain in Japan's financial markets suggests that financial entrepreneurship has lagged behind the quantitative accumulation of financial savings.

A final question is whether a similar system of government intervention can be adapted by other countries. Government interventions through financial institutions such as the JDB have been supported by the unique organizational and informational features of Japan's business community. As convincingly argued

by Aoki (1984) and Koike (1984), information flows in Japanese organizations are generally horizontal. Without this type of informational infrastructure, subtle and implicit communication networks such as those that exist among commercial banks, the JDB, government bureaus, and industrial firms may not work smoothly in other countries.

As for the risks, rationing credit by setting interest rates below the market rate creates a shadow price for these funds that can be a hotbed for bureaucratic corruption. The Ministry of Finance (MOF), for example, possesses de facto legislative, administrative, and judicial powers. It can exert legislative power because Japanese politicians rarely draft legislation. In the recent securities scandal officials of the security division of the MOF noticed—but overlooked—the dubious practices of securities companies; the National Tax Bureau, which is attached to the MOF, indicted the firms for tax evasion (and announced the actions to the newspapers); and the securities division punished the companies, imposing punitive measures outside the formal judicial process. Moreover, the MOF has set up within the agency a surveillance unit equivalent to a securities and exchange commission.

The temptation for corruption is at least partly controlled through a system called “descending from heaven,” which refers to the movement of retired government officials to jobs in public corporations and banks (such as the JDB or the Japan Export-Import Bank). The assumption is that the officials’ conduct in the bureaucracy will enhance their prospects for lucrative executive jobs, which means that they are unlikely to dispense special favors during their government career. Is it easy to embed this kind of incentive mechanism in other countries?

I do not disagree with the authors’ contention that government intervention in credit markets can have positive effects. It is, however, important to remember that realizing those advantages is only feasible in limited circumstances.

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COMMENT ON "DIRECTED CREDIT PROGRAMS FOR AGRICULTURE AND INDUSTRY," BY CALOMIRIS AND HIMMELBERG

Benno J. Ndulu

This paper discusses the theoretical rationale for government intervention in credit markets and evaluates the effectiveness of government's response to capital market failures in agriculture and industry. It draws important distinctions among the underlying causes—and the extent—of these failures and points out the prominent role of externalities in explaining the use of directed credit programs in industry.

The problem of asymmetric information in credit markets, particularly with respect to long-term finance, underlies much of the authors' discussion of market failure in agricultural credit. Ample evidence has been presented in this and other papers to show that private agricultural credit markets are highly segmented; they offer inadequate long-term credit and at very high rates of interest. Low-income borrowers are particularly starved of credit. The earlier explanation for this constraint, which was commonly used to justify strong government intervention in the market, was the existence of usurious monopolies. More recent theoretical developments point to the high costs associated with screening to assess the risk of default and to ensure that borrowers have adequate incentive to repay. This "new" explanation justifies government intervention but calls for changes to make these programs more effective. The high rates of default on government-subsidized agricultural loans suggest that the government faces the same problems in implementing lending arrangements as do private lenders.

The authors cite the "free rider" problem as the key explanation for capital market failures in lending to industrial borrowers, and they argue that the problem arises because of the time-inconsistency in the costs and benefits of monitoring investments in infant industries. They suggest that in the absence of a mechanism to exclude other creditors from free-riding, there is little incentive for the lender to incur the front-loaded costs of monitoring loans, and so to

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curtail supplies of private credit for long-term investment. Combined with the large externalities for product and factor markets that are prevalent in industry, capital market failures in this sector provide an even stronger case for the government to intervene so that society can reap the social benefits.

Except in countries that have *main* banks with strong ties to industrial firms or that have highly developed stock markets to provide finance, government intervention appears to be necessary. The question is how to intervene efficiently. Japan's experience, discussed in the paper, shows how it can be done successfully through carefully selecting targets, avoiding political capture, applying objective rules and sanctions, and maintaining a "pump-priming" function in line with the infant industry argument. Most other attempts at intervention have led to massive defaults, have tended to create permanent infants, have been prone to political capture, and have been associated with poor industrial performance. These facts underline the need for a hard look at ways to implement directed credit programs and to provide the required supportive policy and political environments.

The issues I would like to raise pertain to the lessons from past interventions, particularly in the agricultural sector. In developing countries several features affect the availability of private credit. First, equity markets are weak and markets for bonds are either nascent or absent. Second, a large number of individuals and enterprises face credit rationing. Third, because banks historically have specialized in short-term commercial loans, long-term finance is unavailable. And fourth, private credit markets are not able to make provisions against the high social risks associated with internal or external macroeconomic shocks. These shortcomings have created a gap in financing development activities.

In Africa, for example, efforts to promote agricultural development have relied heavily on state intervention to provide credit to modernize agriculture. Given the initial lack of services, the paucity of investible resources, and the underdeveloped state of technology, the state assumed the key role of a "modernizing agent." Invariably, it applied an integrated approach, providing services vertically, through crop development agencies, or horizontally, through the regional integration of such institutions as state-sponsored cooperatives. Production inputs, credit, extension services, and physical infrastructure were provided through these organizations.

It has been argued by Hoff and Stiglitz (1990) that a rise in the levels of productivity and income, as well as a reduction in the volatility of earnings, reduces the risks of default, hence lowering the costs associated with information asymmetry in rural credit markets. Technological advances, legal developments in land tenure, dissemination of market information, and improved infrastructure play an important role in this regard.

To the extent that they were successful, government programs targeted at these improvements indirectly promoted the efficient operation of rural credit markets and reduced the costs of monitoring. Since they also facilitate the expansion of rural private credit markets, such efforts should be strengthened.

Theoretically, vertical integration should reduce the cost of monitoring and the probability of default because it provides the opportunity to tie the recovery of credit to the control of product markets. The same response, it could be argued, applies to horizontally integrated cooperatives. In fact, however, even these types of programs have registered high rates of default. Political, economic, and managerial deficiencies have been the primary reasons for failure. The widespread perception that grants—rather than loans—were being provided undermined loan repayment. Furthermore, given that those who benefited from the programs were the rich and politically powerful, political capture made it impossible to enforce repayment or to curtail support for the program. Patron-client networks in some countries reinforced this problem. The failure of the state to enforce repayment in spite of its monopoly over coercive power undermined the credibility of the government.

In industry, directed credit programs were closely linked to import substitution programs and public enterprise schemes. The state typically financed these enterprises through equity participation, budgetary subventions, subsidized credit (from domestic development finance institutions that served as conduits for foreign finance), and prescribed allocations both from other banks and from contractual savers such as pension funds, which are often required by law to invest a proportion of their funds in government instruments.

Theoretically, the costs and benefits of monitoring are by and large internalized in cases in which public industrial enterprises are financed predominantly by the above arrangements, and the enforcement of repayment should have been more effective. However, in a large number of cases the default rate was high, and lenders, particularly development finance institutions (DFIs), became overburdened with nonperforming loans. In a large number of cases the enterprises had inadequate equity capital and relied instead on costly external finance (which fluctuates with inflation, movements in exchange rates, and so on). The fact that both the enterprises and the DFIs were state-owned compounded the problem. Sanctions could not be enforced, and cheap credit contributed to a tendency to overinvest.

We should note the importance of the overall policy environment within which directed credit programs operate. In some cases such programs may reinforce existing distortions related to macroeconomic instability and protectionist trade regimes. This has been shown to be the case in many instances (World Bank 1989).

The issue at hand is not so much whether intervention in credit markets is justified but what explains the large differences in the success of such interventions across countries and sectors. The degree of market failure is influenced by the level of development of related institutional structures, as well as by the level and stability of incomes. The state has an important role in promoting technological development, improving the availability of market information, and providing and enforcing a legal framework to support markets for credit. Of equal importance is the objective enforcement of foreclosures and sanctions and the need to avoid political capture.

Three key features of the ongoing economic and institutional reforms are worth noting in the context of problems associated with government-directed credit.

First, abandoning protection and the accompanying price distortions has helped to identify permanent infants and unprofitable ventures. These enterprises have had either to wind up their activities or to undertake restructuring for survival. In any case the survivors have become much better propositions for creditors, including governments. In addition, governments are now making deliberate efforts to identify those ventures that offer significant social benefits rather than providing blanket support.

Second, financial liberalization has provided a fresh start for insolvent credit institutions and enterprises. The schemes for relieving credit institutions of non-performing loans will help strengthen their portfolios. The subsequent enforcement of prudential rules will enable these institutions to pursue more viable financial conduct and will relieve them of the burden imposed by political pressures. This process, however, has exposed the gross undercapitalization of public enterprises and has highlighted the need to raise equity capital and reduce industry's reliance on outside finance. The development of capital markets has become a concomitant part of this agenda.

Third, institutional innovation is essential. This includes the strengthening of property rights, the establishment of a legal framework to permit the wider use of collateral, and the creation of institutions to help overcome the lack of information.

Although the problems of asymmetric information in credit markets will persist, these measures will go a long way toward mitigating them and will enhance the effectiveness of well-designed directed credit programs.

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COMMENT ON "DIRECTED CREDIT PROGRAMS FOR
AGRICULTURE AND INDUSTRY," BY CALOMIRIS AND
HIMMELBERG

Millard Long

Directed credit is an area of considerable importance to the World Bank and has been the subject of a major policy statement. This paper, however, tells us more about the theory of asymmetric information than about directed credit.

For those not familiar with the concept of asymmetric information, let me give an illustration. Two strangers meet at a bar in New York City. One says he has a ruby for sale. The other is interested. They haggle over the price and finally reach an agreement. After the transaction the seller turns to the buyer and says, "If anyone tells you that ruby is false, don't believe him." To which the buyer replies, "If anyone tells you those dollars are counterfeit, don't believe him."

When two parties enter a contract, one may have information that would—if it were known to the other party—change the nature of the contract. That is the theory of asymmetric information. It is particularly important in financial contracts, which are time-spanning agreements. The future is uncertain; if one person knows something and the other does not, the first person may be able to influence the future and bend the situation to his advantage. Knowing that this is a possibility, the other party—usually the supplier of funds—may refuse to enter certain contracts. This market imperfection can lead to misallocations of capital, in the sense that an entire class of potential projects is not funded.

The notion that one party to a financial contract may not have all the relevant information has, in academic circles, overwhelmed the possibility that neither party may have the information. I have just visited Morocco and Tunisia, countries that are subject to droughts. Lenders there are reluctant to lend to farmers

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because they know about drought, not the reverse. In an uncertain world there are many risks that have nothing to do with asymmetric information.

Proper government intervention can lessen the impact of imperfections in financial markets brought on by information asymmetries and other causes. (For a more complete discussion of financial market failures, see Stiglitz, in this volume.) But overcoming the risk from asymmetric information is only one reason for directed credit programs. Other reasons include income redistribution, regional development, export promotion, creation of industries in the areas of the "commanding heights," coverage of losses in state enterprises, and budget deficits. Theories about asymmetric information give us little insight into whether these other programs, which account for the majority of directed credit programs in developing countries, are justified.

Even where asymmetric information exists, directed credit programs, as the authors recognize, may not enhance welfare. As they note, "The fact that one can imagine justifications for government credit policies to support industries does not mean that such policies are a good idea. It is not clear that the assumptions necessary for justifying government involvement are met." This probably has more to do with the "hows" of directed credit than with the "whys." And the paper has little to say about the "hows"; it gives us no insight into the appropriate size of directed credit programs as a percentage of total credit, about whether interest rates should be subsidized, about whether programs should cover savings mobilization and lending for nonfarm activities as well as agriculture, about whether such programs are feasible in periods of macroeconomic disturbances or in countries with distorted financial or nonfinancial markets, and so on. That is, most of the issues of concern to those working on the concrete programs of directed credit are not covered by the theory of asymmetric information.

Because of lack of time, I would like to focus here on agricultural credit. In agriculture it is so costly for banks to get information and to monitor the use of funds by small farmers that small farmers are poorly served by banks. But according to Calomiris and Himmelberg, governments have no advantage over the private sector either in assessing risk or in monitoring the behavior of small farmers, and hence they cannot address the problems directly. What governments should do, the authors say, is to lend to a group of farmers rather than to individual farmers and get the group to assess risk and monitor behavior. Because the group is responsible for the loan, the other farmers will select as borrowers members they know to be reliable and will monitor their behavior to be sure they pay. Why private lenders cannot do exactly this—if, indeed, it is the best approach—is not made clear in the paper. Furthermore, if the lender does not enforce sanctions, group lending may be perverse, as apparently it was in Israel. If more than a small percentage of the group defaults, it may be more advantageous for the others to default than to cover the loan losses. If we consider such programs worldwide, group lending suffers from as many failures as successes. Culture seems to be a very important

factor, as the authors recognize in commenting on industrial credit policies in Japan.

As I have said, the Calomiris-Himmelberg paper offers not a theory of directed credit but rather an application of asymmetric theory to directed credit. The same is true of the evidence cited. The authors do not discuss directed credit programs but instead refer to isolated cases in agriculture for which asymmetric theory may provide some insights and to some preliminary work on industrial finance in Japan. So another paper is needed to tell us whether current thinking in the area of directed credit makes sense. Fortunately, a critical review on World Bank lending for agricultural credit and rural finance has recently been completed (World Bank 1993). The Bank has made 683 loans valued at \$16.5 billion in support of agricultural credit over the past forty-five years. Because we have supported nearly every major agricultural credit program in the developing countries, a critique of these programs is a critique of what is happening in these countries.

What are the facts in relation to the Calomiris-Himmelberg prescription? According to the authors, to succeed in agricultural lending, governments should lend to small, voluntarily formed groups, and the loans should be short term, as group monitoring of term loans is likely to be less effective. In practice, the World Bank has not supported short-term group lending programs to small farmers. Most of the programs provided long-term loans to individual farmers (of medium size in the context of their own countries) to enhance production, not to relieve poverty. Only in two of the many cases did the preponderance of the lending go to farmers in the lower income deciles.

Thus, in almost every aspect the programs differed from the authors' recommendations. Was the Bank wrong, and was there no justification for the programs financed? Or is it just that the theory of asymmetric information simply does not address the issues? I suspect it is the latter. Interestingly enough, the World Bank's programs were designed to alleviate what we thought was the most significant financial market failure in both agriculture and industry: the shortage of term finance. The authors do not address the many questions raised about actual credit programs: Did they reach the target group? Was the credit used as intended? Did credit enhance output? Were the credits inappropriately subsidized? Why were repayments so low? What does it take to build viable financial institutions? These questions are covered in the 1993 World Bank paper, which I strongly recommend to anyone interested in the practical issues and the practical facts of directed credit in agriculture.

Prior to the 1980s the World Bank was quite interventionist in its approach to credit allocation. In the early 1980s we discovered that the institutions through which we were lending were all bankrupt and that the entire financial system of many countries had been damaged by directed credit programs. After thoroughly rethinking its approach to the financial sector, the Bank turned against directed credits and, I suspect, overshot the mark. A reevaluation is under way,

and papers like those by Stiglitz and by Calomiris and Himmelberg will contribute to a more balanced view. But the new approach must consider not only the benefits of directed credit but the potential costs as well. In the search for a new paradigm, the lessons learned in the 1980s must not be forgotten.

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FLOOR DISCUSSION OF THE CALOMIRIS-HIMMELBERG PAPER

If their paper seemed insufficiently skeptical about the potential pitfalls of directed credit programs, said both Calomiris and Himmelberg, they should revise it, for they shared the discussants' skepticism. They had started with the view that there were good reasons—including many failures—to be skeptical about government credit, but they had tried to find at least one case study in which things seemed to have gone well to see if an argument could be made about potential benefits. Their paper was not a blanket endorsement of directed credit, said Calomiris, and if much of the Bank's assistance took that form, it was probably misdirected, just as most government assistance to U.S. farmers is misdirected. The comments by Millard Long (discussant), Calomiris thought, were not germane to their paper, since it was not their intention to present the World Bank's objectives or the results of its credit policies in the postwar period.

Long responded that he was not suggesting that the Bank's agricultural credit programs had been unjustified. Indeed, he had praised the OED report, which makes the opposite point. What he had said was that the paper provided no theory to help us understand whether the programs were justified. There must be other arguments for the programs in addition to those that were presented.

A World Bank participant said he was disturbed to hear that the default position in doing this study was skepticism. In reply, Himmelberg said he had simply meant that if he had been asked in advance whether he thought directed credit was a good idea, he would have said no, because he tended to believe that markets work and government intervention does not.

Calomiris referred to the interesting evidence presented by Benno Ndulu (discussant) and said he was glad he and Himmelberg had not invoked the integration model as a way to solve incentive problems. They had not given it serious attention partly because they were aware of some of the failures.

Koichi Hamada (discussant) had requested that the authors be more specific about their review of the literature. In response, Calomiris observed that the

The session was chaired by Magdi R. Iskander, director of the World Bank's Private Sector Development Department.

empirical literature on banking is beginning to suggest that, practically speaking, moral hazard problems are much more important than adverse selection problems. The banks' most important role in the economy does not seem to be discriminating among firms that apply for credit but establishing relationships that discipline borrowers' behavior. It was necessary, he said, to clarify the term "asymmetric information," which, he emphasized, involved sorting and monitoring (to control firms' behavior). Research suggests that investing in monitoring, which is a form of information, is more important than sorting.

Addressing a point not stressed in the paper, Himmelberg said that directed credit programs can be aimed not only at asymmetric information problems but also at imperfections in the capital market. The government can use directed credit as a means of remedying externalities. If, for example, subsidizing the machine tool industry offers positive growth externalities, policymakers will look at exactly how to subsidize that industry. The default response of the classical economist might be to rely on price incentives, but in an environment in which the credit market is constrained for certain types of firms, the instrument with the most leverage might well be directed credit.

Another participant disagreed with Long's statement that asymmetric information was not a major problem. To have a viable banking operation, he said, a reasonable recovery rate was needed, and throughout the developing world recovery rates are less than 30–40 percent. Asymmetric information plays a part in that loss. It is argued, for example, that one reason for the Great Depression following the collapse of U.S. banks in the 1930s was the loss of information about borrowers. He agreed, however, that although imperfect information may be a significant problem, it may not be a good reason for having directed credit programs. Maybe the solution is to design programs that specifically address information asymmetries by, say, imposing a screening mechanism for borrowers or offering only short-term loans so that lenders have a better idea of the likely direction of the investment. Someone who needs another loan is less likely to default. By analogy, people pay their phone bills not because the telephone company will take them to court but because the opportunity cost of not having phone service is high.

Long responded that in his view the primary reason for directed credit in most countries was to bail out troubled state enterprises. Those loans that have gone bad were loans that the banks had no choice but to make. And that, he noted, is not a problem of asymmetric information. He had no idea whether short-term loans would result in higher repayment rates. The Bank's concern is that short-term loans won't do the job; the problem is finding a way to encourage long-term investment.

Concerning such group lending schemes as the Grameen Bank in Bangladesh, Hamada reminded the group that the loans involved are extremely small, typically less than \$100. Other banks lend \$500–\$600 to individuals under schemes that work very well and do not necessarily require subsidies. Incidentally, he continued, little of the Grameen Bank's lending is for agricultural production,

except for purchases of small animals such as goats and chickens. He pointed out that a loan with a weekly payback schedule is not appropriate for agriculture, where harvests come in once or twice a year. Another participant responded that although the loans were agriculture-related, they were neither agricultural nor industrial; they were loans to provide working capital in the agricultural sector.

A participant noted that in the instance of Honda Motors, which Hamada had mentioned, directed credit was used to encourage investment. But in many cases—especially in the steel and petrochemical industries, and especially during slowdowns—it was used to discourage new commerce. Another participant said it is necessary to consider the environment in which things happen in Japan. The Japanese believe that their government acts in their best interests, and if the government is channeling investments in a certain direction, the people accept and support that decision.