

Tests of Financial Intermediation and Banking Reform in China

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Abstract

We develop tests of financial intermediation by national banking systems that exploit regional financial and economic data. Derived from a model of bank profit maximization, the tests are based on the expectation that in efficient systems, financial intermediation should not be overly influenced by policy variables; should be greater where projects are more profitable and require greater financing—typically in faster growing, richer, industrial areas; and should direct funds to the best projects regardless of where deposits originate. We apply these tests to Chinese provincial data from 1991-97 for all state banks, the Agricultural Bank of China, rural credit cooperatives, and other financial institutions. China implemented a series of widely publicized financial reforms in the mid-1990s designed to improve bank performance. However, descriptive and estimation results suggest that the importance of state bank policy lending (to support SOEs and finance agricultural procurement) has increased, not fallen, during the recent period, and lending does not respond to economic fundamentals. Only the group of smaller, less-regulated financial institutions appear commercially oriented. Despite reforms, significant barriers to efficient inter-regional financial intermediation remain.

Keywords: financial intermediation, banking, reform, China

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1. Introduction

As economies grow, financial institutions play an increasingly important role in directing financial resources to their most productive use. Through their greater size and scope, they are better able than informal institutions to safeguard deposits, diversify portfolio risk, provide liquidity to borrowers and depositors, and achieve economies of scale in evaluating projects and providing financial services. The depth of financial intermediation (loans as a share of GDP) has been shown to be positively associated with both the level of development (GDP per capita) and the rate of economic growth.¹

The literature's emphasis on the size of the financial sector overlooks differences in how well available resources are allocated. The recent Asian financial crisis and the experience of banks in transition economies (Bonin and Szekely, 1994), as well as historically poor bank performance in Latin America and Africa (Haggard and Lee, 1995; Nissanke, 1998), highlight the difficulty of establishing successful commercial banking systems that allocate financial resources efficiently. Policy lending, barriers to inter-regional lending, distorted pricing, poor managerial incentives, and lack of prudential financial regulation all can undermine financial performance.

This paper proposes a new approach to assess the effectiveness of financial intermediation by national banking systems. The tests, derived from a model of bank profit maximization, exploit regional financial and economic data and are based on the expectation that in efficient systems, financial intermediation should not be overly influenced by policy variables; should be greater where projects are more profitable and

¹ See Gertler and Rose (1996), Goldsmith (1969), King and Levine (1993), Levine and Zervos (1998), and Rajan and Zingales (1998). Financial intermediation can also occur through equity markets, but in China the stock market is small and tightly regulated.

require greater financing—typically in faster growing, richer, and more industrial areas; and should direct funds to the best projects regardless of where deposits originate.

We then apply these tests to the case of China. The Asian financial crisis has heightened scrutiny of China's state banking system, whose fragility stems from the continued use of the financial system to support urban-based state-owned enterprises (Brandt and Zhu, forthcoming). Recent estimates suggest that more than one quarter of the loans of China's four major state-owned banks are non-performing, and that technically these banks are insolvent (Lardy, 1998). 1997 provincial data reveals a striking inverse relationship between financial intermediation and GDP per capita that is at odds with the empirical regularity of positive correlation found in cross-country studies (Figure 1). This pattern suggests that the allocation of financial resources across provinces may be highly inefficient, with richer provinces being taxed relative to poor provinces (Sehrt, 1999; Lardy, 1998).

In recent years, the Chinese leadership has recognized the importance of improving financial intermediation and has made financial reforms a top policy priority. The most sweeping changes were implemented in the mid-1990s—relaxation of binding credit plans following the 1993 anti-inflation campaign, centralization of PBC relending to reduce excessive local influence on central bank financing of loans, a shift to ratio management of loans that gave more autonomy to state banks to reallocate funds among provincial branch offices, adoption of a new Commercial Bank Law to improve managerial incentives and prudential financial regulation, establishment of policy banks to separate policy from commercial lending, and the establishment of a national, unified interbank market. This paper provides initial empirical evidence on the effect of these reforms on loan allocation decisions. We examine the performance of different Chinese

financial institutions before and after the reforms: all state banks (including specialized and policy banks); the Agricultural Bank of China (ABC), a specialized bank which later spun off China's largest policy bank, the Agricultural Development Bank of China (ADBC); rural credit cooperatives (RCCs), the largest financial institution other than state banks, with a branch structure reaching to villages; and other financial institutions (OFIs), including urban cooperatives and Urban Cooperative Banks, national and regional commercial banks, and national trust and investment companies--a small but dynamic part of the financial sector.

We find that the effect of policy concerns on lending by state specialized and policy banks, such as to support state-owned enterprises and grain procurement, has been significant and, if anything, has increased since the financial reforms in the mid-1990s. Economic fundamentals have had little effect on total lending by state banks, but there is evidence that separation of policy and commercial lending through the establishment of the ADBC has enabled the ABC to become more commercially oriented. Among other financial institutions, RCCs seem poorly integrated into financial markets, but the small but rapidly growing group of other financial institutions (OFIs) has been most responsive to economic fundamentals. While recent reforms of state banks, including reforms after 1997, and the growth of OFIs hold promise for future performance, remaining restrictions on interbank lending, interest rates, and entry remain serious obstacles to efficient financial intermediation.

The paper is organized as follows. In Section 2, we present a model of financial intermediation, leading to formal tests of efficient financial intermediation. In Section 3, we introduce China's financial system and describe the main financial reforms. The empirical specification and tests are presented in Section 4, followed by discussion of

data and estimation in sections 5 and 6. Section 7 presents the results, Section 8 raises several caveats, and section 9 concludes.

2. Modeling Financial Intermediation

Consider the problem of a bank or bank branch (b) located in region r lending to different sectors of the economy (indexed by i). The bank's one-period maximization problem can be expressed as follows:

$$\underset{L_{rbi}, T_{rb}}{\text{Max}} \pi_{rb} = \sum_i (1+r) \int_0^{L_{rbi}} R_{rbi}(L) dL + L_{rbg} (1+r) R_{rbg} - (1+d) D_{rb} - (1+r_t) T_{rb} \quad (1)$$

s.t.

$$\sum_i L_{rbi} + L_{rbg} - D_{rb} - T_{rb} = 0 \quad (2)$$

Income from each sector depends on the loan interest rate (r) and the expected repayment rate on loans to that sector (R_{rbi}), which decreases as lending (L_{rbi}) increases. The bank also is required by the government to make policy loans (L_{rbg}), which have an expected repayment rate R_{rbg} . The bank has two sources of funds--deposits (D_{rb}), which earn interest d, and net borrowing from the interbank market (T_{rb}) at interest rate r_t . The bank can demand or supply funds from or to the interbank market, so that T_{rb} can be positive or negative. The bank takes all interest rates, the amount of deposits, and the amount and expected repayment rate of policy loans as exogenous. It chooses the amount of lending to each sector and the amount of net borrowing from the interbank market. A balance condition equates the sources and uses of funds (2).

For commercial lending, the main difference between regions and banks is the quality of loan projects, or the expected repayment rate on loans. We posit that the repayment rate is a linear function of economic fundamentals, including the sector's size (measured by share of output, q_{ri}), the sector's rate of growth (g_{ri}) interacted with its size, the overall level of development (output per capita— y_r/pop_r), and the extent of financial intermediation, or the amount of lending by the bank (L_{rbi}) and other banks in the sector (L_{rbi}), normalized by sectoral output ($q_{ri}y_r$):

$$R_{rbi} = -\alpha_i^1 \frac{L_{rbi}}{q_{ri}y_r} - \alpha_i^2 \frac{L_{rbi}}{q_{ri}y_r} + \alpha_i^3 q_{ri} + \alpha_i^4 q_{ri}g_{ri} + \alpha_i^5 \ln\left(\frac{y_r}{pop_r}\right) \quad (3)$$

Here, all α_i^n are defined to have positive expectation. Lending by other banks is taken as exogenous. As lending to the sector increases, good projects become harder to find and the expected repayment rate falls. The larger the sector and the faster it is growing, the easier it is to find good projects for a given lending volume. As described in the introduction, regions with higher levels of development tend to have greater financing requirements because of more input- and capital-intensive production activities. If different banks serve different client pools within the sector, the effect of loans from other banks on repayment may be less than that of the bank's own lending ($\alpha_i^1 > \alpha_i^2$).

Efficient Intermediation

With a free interbank market, each bank can borrow or lend as much as it wants at the interbank interest rate. Lending to each sector in each province equates the marginal expected return to the cost of interbank funds, which, if set to clear the market, leads to

efficient allocation across sectors and provinces. Substituting (3) into (1), dividing through by y_r , defining l_{rbi} as the sectoral intermediation rate ($L_{rbi}/q_{ri}y_r$), and solving the integral and the first order conditions of the bank's maximization problem yields the following:

$$l_{rbi} = -\frac{\alpha_i^2}{\alpha_i^1} l_{rbi} + \frac{\alpha_i^3}{\alpha_i^1} q_{ri} + \frac{\alpha_i^4}{\alpha_i^1} q_{ri} g_{ri} + \frac{\alpha_i^5}{\alpha_i^1} \ln\left(\frac{y_r}{pop_r}\right) - \frac{(1+r_i)}{\alpha_i^1(1+r)} \quad (4)$$

The maximization problem of other banks can be solved analogously (to simplify we assume there is only one other bank). Optimal lending by each bank is a function of lending by the other. The two response functions determine a Nash equilibrium, yielding a reduced form relationship between l_{rbi} and the economic fundamentals. The responsiveness of lending will depend on the extent to which lending from the two banks substitute for each other (formally, the α_i^1 s and α_i^2 s in each bank's repayment function).² Assuming that the repayment functions of the two banks have identical coefficients, the reduced form coefficients on fundamentals will equal those in (4) multiplied by κ_i , where

$$\kappa_i = \frac{1 - \frac{\alpha_i^2}{\alpha_i^1}}{1 - \left(\frac{\alpha_i^2}{\alpha_i^1}\right)^2}. \quad (5)$$

² Adding bank subscripts 1 and 2, the reduced form coefficients for bank 1's lending are

$\frac{\alpha_{1i}^n \alpha_{2i}^1 - \alpha_{1i}^2 \alpha_{2i}^n}{\alpha_{1i}^1 \alpha_{2i}^1 - \alpha_{1i}^2 \alpha_{2i}^2}$, where n is the n'th argument of the repayment function (3).

At the extreme of no substitution, $\alpha_i^2=0$, $\kappa_i=1$ and l_{rbi} is the same as equation (4), excluding the first term on the right hand side. As substitutability increases, α_i^2 approaches α_i^1 and κ_i approaches 0.5.³ The responsiveness of lending to economic fundamentals is reduced as the bank anticipates the lending behavior of the other bank, and its effect on repayment rates. Thus, measurable responsiveness to fundamentals presumes market power. However, the number of lenders will not affect the aggregate responsiveness of lending to fundamentals, since total lending must equalize expected return across regions in equilibrium.⁴

An equation for region-bank-sector specific lending is estimable given sector-specific data and under the assumption of efficient interbank markets. Unfortunately, we often only have data on total lending by the bank, with an unclear mapping between loan categories and economic sectors. Total loans of the bank are the sum of commercial sectoral loans and policy loans, an identity which can be expressed in terms of intermediation rates:

$$l_{rb} = \sum_i q_{ri} l_{rbi} + l_{rbg} \quad (6)$$

Here, l_{rbg} is policy loans divided by provincial output (L_{rbg}/y_r). Substituting yields the following:

$$l_{rb} = \sum_i \left(\frac{\kappa_i \alpha_i^3}{\alpha_i^1} q_{ri} + \frac{\kappa_i \alpha_i^4}{\alpha_i^1} q_{ri} g_{ri} \right) + \sum_i \frac{\kappa_i \alpha_i^5}{\alpha_i^1} \ln \left(\frac{y_r}{pop_r} \right) - \sum_i \frac{\kappa_i (1+r_i)}{\alpha_i^1 (1+r)} + \frac{L_{rbg}}{y_r}. \quad (7)$$

³ The solution is indeterminate if there is perfect substitutability ($\alpha_i^1=\alpha_i^2$). More generally, for $n>2$, κ_i will converge to $1/n$.

⁴ Market power does not reduce total lending because lending volume affects expected repayment for the marginal loan only. If the endogeneity of repayment rates to lending volume is treated analogously to

Intermediation with Fund Constraints

If the volume of interbank lending is restricted ($TL_{rb} < T_{rb} < TU_{rb}$), where TL_{rb} and TU_{rb} are lower and upper bounds, and the constraint binds (i.e., the bank would like to borrow or lend more at the going interest rate), then the following identity must hold:

$$l_{rb} = \frac{D_{rb}}{y_r} + \frac{TL(TU)_{rb}}{y_r} \quad (8)$$

If interbank constraints were identical for all banks in all provinces, then the quality of loan projects would still affect lending amounts within the range of the bounds. If, on the other hand, interbank transfers were fully dictated by policy (i.e., $TL_{rb} = TU_{rb}$), then the bank has no role in affecting the amount of lending and economic fundamentals become irrelevant.

Of course, it is possible that the bounds themselves are responsive to economic fundamentals if officials internalize the goal of efficient intermediation. In the case of efficient planning, planned transfers would be set equal to the market-determined amounts and the outcome would be indistinguishable from the decentralized case. However, officials may have other policy objectives. Intermediation could even be inversely related to economic fundamentals if prosperous areas are taxed to finance policy lending elsewhere. Absent a free interbank market, intermediation outcomes depend on the specific alternative mechanisms enabling funds to move across regions.

price endogeneity, the monopolist can perfectly discriminate. Thus, market power will not affect lending decisions in aggregate, nor undermine efficiency of resource allocation, assuming correct price signals.

We can model the transfer bounds as a function of economic fundamentals, policy variables, and deposits:

$$TL(TU)_{rb} = t_0 + \sum_i (t_{rbi}^1 q_{ri} + t_{rbi}^2 q_{ri} g_{ri}) + t_{rb}^3 \ln\left(\frac{y_r}{pop_r}\right) + t_{rb}^4 \frac{L_{rbg}}{y_r} + t_{rb}^5 \frac{L_{rg}}{y_r} + t_{rb}^6 \frac{D_{rb}}{y_r} \quad (9)$$

Inclusion of deposits captures the idea that the government may tax banks with high deposit levels by adjusting transfer bounds. In such cases, more deposits do not necessarily translate into an ability to make more loans. Substituting (9) into (8) yields the following expression for lending when transfer bounds are binding:

$$l_{rb} = t_0 + \sum_i (t_{rbi}^1 q_{ri} + t_{rbi}^2 q_{ri} g_{ri}) + t_{rb}^3 \ln\left(\frac{y_r}{pop_r}\right) + t_{rb}^4 \frac{L_{rbg}}{y_r} + t_{rb}^5 \frac{L_{rg}}{y_r} + (1 + t_{rb}^6) \frac{D_{rb}}{y_r} \quad (10)$$

This equation contains two variables that do not appear in the lending equation assuming efficient intermediation (7)—provincial policy loans (L_{rg}/y_r), which include policy loans not lent by the bank itself (L_{rbg}/y_r), and the amount of deposits in the bank (D_{rb}/y_r).

Measuring the effect of these variables on lending thus is a natural test for efficient intermediation. For example, lending by a rural bank could be influenced by the size of the state-owned sector even if the rural bank does not lend directly to that sector. Also, with free interbank lending, lending amounts should depend on economic fundamentals and not be influenced by the amount of own deposits. A strong effect of deposits on lending is thus indicative of inefficient intermediation, but the lack of an effect is not evidence of efficient intermediation because it may reflect a government policy of fully

taxing surplus deposits ($t_{rb}^6 = -1$). To the extent that the effect of economic fundamentals on lending may be of opposite sign in (7) and (10), the sign of the coefficients on economic variables become an additional test.

These tests examine financial intermediation across provinces. Even if inter-provincial intermediation is inefficient, we also may be interested in assessing intermediation within provinces. If there were no financial flows among provinces but unrestricted flows within provinces, provincial policy loans should affect lending volume by all institutions. This also may be true if intra-provincial flows are restricted, so the effect of provincial policy loans on lending cannot be used to test for the efficiency of intra-provincial intermediation. A more promising approach is to test the effect of savings in other provincial banks on bank lending. If the interbank market within the province is free, lending by any one bank should be affected by total deposits in the province rather than the bank's own deposits.

3. Financial Intermediation in China

China's financial system is dominated by four state "specialized" banks and three policy banks. In 1997 these accounted for two thirds of total deposits and three fourths of lending (Table 1). Established in the early 1980s, the specialized banks took over the lending responsibilities of the socialist monobank, each focusing on a specific sector-- industry and commerce, agriculture, construction, and foreign currency transactions. Despite reform efforts to commercialize these banks and promote greater competition, policy lending, mainly to state-owned enterprises, without doubt has accounted for a significant proportion of specialized bank lending in China. Lardy (1998), citing Chinese sources, estimates that 42 percent of specialized bank loans in 1991 were policy loans.

The three policy banks were established in 1994 to separate policy from commercial lending. However, their share of total loans extended by the banking system was only 16 percent in 1997, suggesting that substantial policy lending, especially to state-owned enterprises, continues through the specialized banks.⁵

Financial institutions other than state banks include rural credit cooperatives, or RCCs (13 percent of deposits, 10 percent of loans), national and regional commercial banks (10 percent of deposits, 5 percent of loans), urban credit cooperatives and urban cooperative banks (7 and 5 percent respectively), and national trust-and investment companies.⁶ The RCCs, the only financial institutions with a branch network extending to villages, are under the administrative supervision of the state banking system (currently the People's Bank of China (PBC) and before 1996, the Agricultural Bank of China), lend mainly to farmers and rural enterprises, and have no national headquarters to directly intermediate funds across provinces. Other financial institutions (OFIs) in general are more recently established (dating from the late 1980s), are located in richer regions, tend to lend more funds to the non-state sector and have grown rapidly in recent years. OFIs are subject to central bank reserve requirements but do not have access to central bank refinancing.

The efficiency of financial intermediation depends on the specific mechanisms that facilitate financial flows across regions. In China, there are three main channels: central bank fund allocation, mainly through relending by the People's Bank of China;

⁵ The State Development Bank of China (SDB) finances large infrastructure projects, the Agricultural Development Bank of China (ADBC) provides working capital for the procurement of agricultural commodities, and the Export-Import Bank of China provides export credit particularly for enterprises in the shipbuilding, machinery and electronics industries. The policy banks do not take deposits but finance their loans via central bank re-lending or by issuing bonds.

⁶ Our data does not include other financial institutions such as regional trust and investment companies, finance companies, rural cooperative funds (RCFs), rotating savings and credit associations (ROSCAs, or *hui*), inter-enterprise finance, and other informal financial organizations.

reallocation of funds among provincial branches of national banks (within-bank transfers), and the interbank market. Financial reforms in the 1990s affected all three of these channels.⁷ We discuss briefly six policy changes and their anticipated effects on inter-regional financial flows. The changes are summarized in Table 2.

1. Guidance versus binding enforcement of credit plans

Although production and distribution plans gradually lost their importance in the mid-1980's, annual national credit plans have continued to be a key determinant of inter-regional fund allocation. Based on consultation with provincial government leaders and managers of national banks, the State Planning Commission determined credit targets for each bank branch in each province. The plans gave primacy to policy lending goals (often linked to specific projects), but also internalized distributional and efficiency considerations. When strictly enforced, the plans left little room for bank managers to adjust total lending amounts, either through within-bank transfers or interbank lending.

During different periods, credit plan targets either have been enforced as “binding” (*zhilixing*) or have been understood to provide only “guidance” (*zhidaoxing*). Binding enforcement has occurred during policy retrenchment periods to combat inflation and reduce excessive total lending. These periods also have been associated with sharply reduced lending to the non-state sector (Brandt and Zhu, forthcoming) and strong efforts to reduce unlawful diversion of funds from policy to

⁷ The financial reforms of the mid-1990s were designed to improve the quality of loan portfolios and improve monetary control. They began with what became known as Zhu Rongji's “16 point program” in July 1993 which contained emergency measures aimed at reducing inflation. The December 1993 State Council “Decision on Reform of the Financial System” was the blueprint for the financial reforms instituted the following year, including the establishment of policy banks. This was followed by the promulgation of a new Central Bank Law (March 18, 1995) and a new Commercial Bank Law (May 5, 1995).

commercial lending. In the 1990s, binding enforcement occurred during the high inflation period beginning in late 1993 and extending through 1994.⁸

2. Centralization of PBC relending

In order to help finance shortfalls between loans and deposits the central bank has maintained a system of re-lending (*zaidaikuan*). Officially these funds are earmarked for specific purposes, such as procurement of agricultural goods, support for large and medium-size SOEs, disaster relief etc. (Luo, 1991; Xie, 1996). Relending supports credit plan targets by providing low-interest loans to bank branches that have “quota but no funds.” Throughout the late 1980s and early 1990s, PBC relending refinanced about 30 percent of the specialized banks’ loans, reaching almost 40 percent in 1993 (calculated from PBC, various years).

Until 1994 the vast majority of PBC relending--up to 70 percent according to some estimates--was channeled through the PBC’s local branches at the provincial level and below (Xie, 1996).⁹ Decisions by managers of these branches were often influenced by local government officials who controlled their promotion and other benefits (Sehrt, 1999). This led to excessive lending that contributed to inflationary pressures. To combat this problem, in May 1994 local PBC branches were prohibited from re-lending to specialized bank branches in their locale (PBC, 1994c). The PBC instead directed refinancing to the national headquarters of specialized or policy banks, which distributed them to local branches based on approved plans. Local branches thus had to appeal to

⁸China experienced three austerity periods between the mid-1980’s and mid-90’s corresponding with inflation peaks in 1985, 1988 and 1993/4. The boom-bust cycles of China’s reform experience are widely recognized (Compare Fan and Woo, 1993; Yusuf, 1994; Naughton, 1995; World Bank, 1995; Huang, 1996).

⁹ Officially, PBC refinancing at the local level was only intended to help banks cover temporary shortages in funds. However, the balance sheets of local PBC branches reflect that throughout the late 1980’s and early 1990’s at least 50 percent of PBC re-lending extended at the provincial level and below were loans with a duration of one year or above (Compare HJPBC, 1996; ZPBC, 1997).

their headquarters for additional funds, rather than, with the help of local government officials, pressuring local PBC branches to extend more funds. If previous excessive lending primarily supported politically desired projects of local officials, then centralized relending should have strengthened the commercial basis of lending. If lending was based on economic criteria, the opposite could be true.

3. Shift to ratio loan management

Reforms in 1994 changed the method for determining approved credit volume of specialized banks. Instead of the previous system of administrative targets (*guimo guanli*) approved credit volume was based on a maximum ratio between loans and deposits (*bili guanli*) (PBC, 1994b).¹⁰ The ratios applied to total national lending by individual banks, but allowed the headquarters to alter the credit allocation for specific provinces. This change should have provided specialized banks with greater flexibility to use within-bank transfers to adjust interregional fund allocation, presumably to pursue commercial lending goals.

4. Improved managerial incentives and prudent financial regulation

The new Commercial Bank Law that came into effect in 1995 contained measures to improve managerial profit incentives and the quality of bank loan portfolios.¹¹ These

¹⁰ In line with Basel international banking standards, the average of total loans at the end of each ten day period cannot exceed 75 percent of the average of total deposits during that time period. The ratio management applies to all domestic commercial banks as well as foreign joint venture banks. The four specialized banks which had much higher loan-deposit ratios were given two years to conform to these standards. For the four specialized banks the average total of *new* loans at the end of ten day period cannot exceed 75 percent of the average total *new* deposits during that time period (PBC, 1994b). It is questionable whether the specialized banks are actually conforming to these ratios. Although there is evidence that since 1994 the ratio of new loans to new deposits of the specialized banks has been below the 75 percent limit (Xie, 1997), the ratios of outstanding loans to total deposits, remain well above the Basle standards.

¹¹ The 1994 legislation established capital adequacy ratios in line with international standards. Overdue loans cannot exceed eight percent of total loans, non-performing loans cannot exceed five percent and bad loans cannot exceed two percent of total loans measured as average balance at the end of each month. Additional provisions limit the exposure to large customers. Loans to any one customer cannot exceed 15 percent of the banks total capital. Loans to the banks largest ten customers cannot exceed 50 percent of the

changes should have improved the responsiveness of lending to economic fundamentals by constraining the ability of banks to make unprofitable policy-driven loans.

5. Establishment of policy banks

The establishment of policy banks, a process completed by the end of 1994, was intended to reduce incentive conflicts associated with mixing policy and commercial objectives. By far the largest policy bank, and the only one established in all provinces (and in many counties), was the Agricultural Development Bank of China. Over 90 percent of ADBC loans were for procurement of agricultural commodities, mostly grain. It was hoped that separation would prevent diversion of policy loans to more profitable lending activity, on the one hand, and free specialized banks to focus on commercial lending without being burdened by policy responsibilities (diversion in the opposite direction), on the other. Whether lending becomes more or less policy (versus commercially) oriented depends on the direction of previous diversion. It is also possible that separation could increase overall responsiveness to both policy variables and fundamentals.

6. Reopening of the interbank market

In order to increase capital mobility between banks and across regions, and to help decrease the banks' reliance on PBC re-financing, in 1986 the PBC permitted all banking institutions to lend and borrow funds on local interbank markets. By the end of 1987 there were 360 interbank markets operating nationwide (PBC, 1988). There is evidence that these markets were quite active in the early 1990s. Many bank branches, even at the county and township levels, lent funds directly to branches in other provinces.

banks total capital. Loans to stockholders cannot exceed 100 percent of the total amount of the stockholder's paid in capital (PBC, 1994b).

In 1993 at least RMB 100 billion were lent by the specialized banks to non-bank financial institutions, mainly trust and investment companies, or TICs (PBC, 1994a).¹²

The possibility that large but unmonitored inter-regional transactions were leading to substantial outflows from the formal banking system, thus undermining the effectiveness of the credit plan, prompted policy-makers in the second half of 1993 to suspend most interbank market activities. With the exception of trading centers run by PBC branches in 35 cities for short-term borrowing and lending, all interbank market centers were shut down.

A new, national unified interbank market was opened in Shanghai in January 1996. The new market is much more tightly controlled than the one which had existed in 1993. Access to the market is reserved for the national headquarters of specialized banks and PBC branches in 35 cities. Interbank lending is limited to short-term transactions (maximum of four months). Thus, bank branches are no longer able to trade independently but must depend on their headquarters to adjust their supply of funds (PBC, 1994b; Wang and Yang, 1996; PBC Department for Monetary Policy, 1997). Other financial institutions such as the headquarters of national and regional commercial banks as well as Urban Cooperative Banks in principle also have access to the national interbank market.

Reform and Performance of Chinese Financial Institutions

Most of the financial reforms were implemented from mid-1994 to mid-1995, and all had the potential to increase the commercial orientation of the banking system. We roughly divide the 1991-1997 period into pre-reform (1991-94) and post-reform (1995-

¹² Compare TIC balance sheets in (PBC, various years).

97) periods despite the fact that the timing of a few reforms do not fit well with this division. First, two retrenchment policies began in 1993—binding enforcement of credit plans and suspension of interbank trading—that hurt commercialization in the middle of the pre-reform period. Second, the re-establishment of the interbank market did not occur until January 1996, well into the post-reform period. The timing of these reforms may qualify our interpretation of the empirical analysis, but broadly speaking the post-reform period should have been much more commercialized if the intended reforms were implemented successfully. Evidence on the effect of “oddly” timed reforms also may appear in annual regression results.

The effect of reforms on financial performance may have differed by financial institution. The strongest effects should be seen in the performance of state specialized and policy banks, which were directly affected by all six policy changes. The effect of policy bank establishment should be especially pronounced for the Agricultural Bank of China (ABC), China’s second largest specialized bank in 1993, which spun off the country’s largest policy bank, the ADBC. The ADBC’s loan portfolio was nearly the same size as that of the ABC by 1997 (Table 1). The ABC is also unique in being the only specialized bank to negotiate a fixed rent profit-sharing contract with the center as early as 1988, which could have made managerial profit incentives stronger than in other banks.

The rural credit cooperatives (RCCs) and other financial institutions (OFIs) were not affected by all of the financial reforms. For instance, PBC relending and policy banks had no relevance for the decisions of RCCs and OFIs. RCCs, because of their organizational structure and local lending orientation, are likely to lend in regionally segmented markets and so may not be strongly affected by the shift to ratio planning or

restrictions on the interbank market. On the other hand, they may have been affected by the shift in oversight from the ABC to the PBC in 1996, which resulted in lower reserve requirements and more hands-off regulatory oversight. This may have reduced the effect of policy lending on fund availability. For OFIs, on the other hand, the interbank market (legal or illegal) may have been an important source or outlet for funds. OFIs, because of their focus on the non-state sector, also may have suffered particularly from binding enforcement of credit plans.

4. Empirical Specification and Tests

The main estimating equation is the following:

$$l_{rht} = \beta_1 ISH_{rt} + \beta_2 IG_{rt} * ISH_{rt} + \beta_3 AG_{rt} * (1 - ISH_{rt}) + \beta_4 LY_{rt} + \beta_5 GRAIN_{rt} + \beta_6 SOEY_{rt} + \beta_7 SOEP_{rt} * SOEY_{rt} + \beta_8 BD_{rt} + \beta_9 TD_{rt} + \lambda_r + \delta_t \quad (11)$$

The economy is divided into two sectors--industrial (or non-agricultural) and agricultural (or non-industrial), denoted by I and A. Four variables describe the economic fundamentals: ISH is the industrial/non-agricultural share of output, IG and AG are sectoral growth rates, which are interacted with sector shares, and LY is the log of output per capita. The three policy variables are GRAIN (grain production normalized by total output), SOEY (output of state-owned industry normalized by total output), and SOEP (SOE profits as a share of assets), which is interacted with the size of the SOE sector. BD is the bank's deposits normalized by total output (BDEP for state banks, ADEP for the ABC/ADBC, RDEP for RCCs, and ODEP for OFIs), and TD is total provincial

deposits from all financial institutions. The last two terms are provincial and year unobservables.

Before discussing the data and estimation, we review briefly the interpretation of the coefficients on different variable groups.

Policy Lending

The effect of policy variables (GRAIN, SOEY, or SOEP) on bank lending has two possible implications for efficient financial intermediation. First, if the bank itself is responsible for the policy lending, policy lending can crowd out commercial lending.¹³ However, net of policy lending, intermediation may still be efficient if policy loans act like a fixed tax and lending responds to economic fundamentals. Second, if the bank is not responsible for the policy lending (for example, RCCs do not generally lend to SOEs), the effect of a policy variable on lending is *prima facie* evidence that transfer bounds are affected by policy variables.

Economic Fundamentals

In a commercial system, financial intermediation should increase with the level of industrialization, the rate of economic growth (in all sectors), and the overall level of development.¹⁴ The extent to which lending by individual banks responds to fundamentals increases with market power. Lending by aggregations of banks should respond to fundamentals even in competitive markets. Even with significant policy lending, if at the margin funds are allowed to flow to their most productive use, lending

¹³ At the national level, central financing still must crowd out commercial lending or become unsustainable.

¹⁴ Firms in rapidly growing areas also may be more able to finance activities from retained earnings, but China's low official interest rates make loan financing highly desirable.

should respond positively to fundamentals after controlling for policy factors. However, if the government taxes richer, faster growing areas and controls the allocation of resources across regions, intermediation may be inversely related to economic fundamentals.

Deposits and Lending

With a free interbank market, loans should be made based on economic fundamentals without regard to the source of deposits. Thus, greater influence of own deposits on lending implies market segmentation and less efficient intermediation. If the interbank market is free within a province but not across provinces, lending should be affected by total deposits in the province, but not own deposits.

5. Data

Data are from published sources, including various issues of the *Statistical Yearbook of China*, the *China Rural Economics Statistical Yearbook*, the *China Rural Financial Statistics Yearbook*, the *Agricultural Yearbook of China*, *China Almanac of Banking and Finance*, and *China Provincial Statistics During 20 Years of Economic Reform*. For state banks and OFIs, complete data is available for 1991-97, and for the ABC/ADBC and RCCs, data is available for 1991-96.

For intermediation by state banks and OFIs, output (Y) is measured by GDP, I refers to industrial GDP, and A refers to non-industrial GDP. For intermediation by the ABC/ADBC and the RCC, output is measured by rural social output value, I refers to nonagricultural rural social output value, and A refers to agricultural output value. State-owned enterprise output is measured by SOE industrial output value. Data on rural social

output value in 1995 is not available and is interpolated to be the mean of the previous and subsequent years for each province. All values are adjusted to 1996 yuan using provincial consumer price indices.

6. Estimation

It is straightforward to estimate the intermediation equation for individual banks or aggregations of banks. We estimate (11) for 4 definitions of b : state banks, the ABC/ADBC, RCCs, and OFIs. For each definition we include the bank's own deposits as well as total deposits in all financial institutions. Regions (r) are provinces in China, excluding the municipalities (Beijing, Tianjin, and Shanghai), Tibet, and Guangxi.¹⁵

The main estimation results are from seemingly unrelated regression (SUR) models of intermediation rates for the four bank definitions. We estimate within and between estimates, allowing the within estimates to differ by period through the inclusion of period interaction terms, and controlling for national changes by including year dummies. The 1991-97 period is divided into two periods—1991-94 and 1995-97. We also run annual regressions, which are reported in Appendix Tables 4-7. The SUR model increases the precision of estimates by exploiting possible error correlation across the equations for different banks. Hausman tests reject random effects in all cases.

7. Results

¹⁵ Municipalities are excluded because they are extreme outliers for variables such as output per capita, rural social output value per capita, deposits, and intermediation rates. For example, including municipal provinces in the intermediation-GDP per capita regressions yields destroys the clear negative trend in the data seen in Figure 1. Tibet and Guangxi are excluded because of missing data.

Descriptive

The striking inverse relationship between the rate of financial intermediation and the level of economic development among Chinese provinces suggests that factors other than economic fundamentals play an important role in lending decisions. China's richest and fastest growing coastal provinces (Zhejiang, Jiangsu, Fujian, and Shandong) had the lowest state bank intermediation rates during 1991-97 while provinces with higher intermediation rates tended to be those with greater SOE output relative to GDP, and with less profitable SOEs (Appendix Tables 1 and 2). For state banks, the negative intermediation trend became statistically significant beginning in 1994 and worsened to a low elasticity of intermediation with respect to GDP per capita of -0.42 in 1997 (Table 3). For the ABC/ADBC the elasticities were even more negative, perhaps reflecting their rural focus, but for RCCs they have been only slightly negative and not statistically significant (Table 3). In contrast, intermediation by OFIs is strongly positively related to the level of development. This suggests that OFIs are helping to meet credit demand in areas where official state banks are underproviding credit.

Estimation

Table 5 reports the main estimation results. We discuss separately the results for all state banks, ABC/ADBC, RCCs, and OFIs, in each case assessing the different tests of efficient intermediation associated with different variables--policy lending, economic fundamentals, and deposits.

State Banks

Policy objectives clearly play an important role in financial lending decisions in China. Reforms attempted to reduce policy influence on lending. However, the within

estimates suggest that a one yuan increase in SOE output value increased lending by 0.28 yuan in period 1 (1991-94) and 0.30 yuan in period 2 (1995-1997). The between estimate is similar (but statistically insignificant), and also reveals that a one yuan decrease in profits per 100 yuan assets increases the responsiveness of lending to SOE output by 0.01. In annual regressions, the effects of SOE output and profits increase steadily over time, reaching their highest values in 1997 (Appendix Table 3). This suggests that China's SOE policy lending problem did not abate despite announced reforms and may even have increased. Part of this may be due to the steady erosion of SOE profitability despite declines in SOE output per capita since 1993 (Table 4).¹⁶

The coefficients on the economic fundamentals are mostly insignificant and frequently of the wrong sign, suggesting that the regional allocation of resources through the state banking system does not respond to economic signals, *even after controlling for factors affecting policy lending*. The within estimates show that higher output is strongly associated with lower levels of intermediation, and that this inverse relationship is stronger in the post-reform period, a change that is statistically significant. However, the between estimate reveals a slightly positive (but statistically insignificant) relationship, so that after controlling for covariates, the 1997 negative cross-sectional relationship of Figure 1 is not evidenced for provincial means. The only other statistically significant result is a negative coefficient on industrial growth for the between estimate. Within estimates for industrial growth are negative, more negative in the post-reform period (not significant), but much smaller than the between estimates. In annual regressions, the negative coefficient on industrial growth only becomes statistically significant (and much larger) in 1997. Similarly, industrial share of income becomes significantly negative only

¹⁶ We defer discussion of policy lending for grain to the section on ABC/ADBCs.

in the last 2 years (it is slightly positive but not significant in the main estimation results, both for within and between estimates) The coefficient on agricultural growth is of mixed signs but not statistically significant. Overall, there appears to be a worsening, if anything, of performance in the post-reform period.

The effect of state bank deposits on lending is near zero and insignificant pre-reform and 0.34 and significant post-reform (within estimates) and very large and significant in cross-section (between estimate greater than 1). Annual regressions show that very high coefficients on deposits obtain from 1992 to 1995, but that there is a substantial reduction (less than half) in 1996 and 1997, corresponding to the period when interbank market mechanisms were reintroduced. The coefficient on total provincial deposits is significantly negative in the years when deposit coefficients are large and positive (they are also negative in the between and post-reform within estimates). This suggests poor intermediation across institutions within provinces. Deposits in other institutions appear to result in more loans from competing institutions which crowd out own lending.

ABC/ADBC

The main policy lending responsibility for the ABC/ADBC is grain procurement loans. For the ABC/ADBC, the coefficients on GRAIN have similar relative magnitudes but are much larger than for all banks. The between estimate (634) is much larger than the within estimates (251 and 148). There is a reduction in the coefficient size in the post-reform period (and it is no longer significant), but in annual regressions, the coefficient on grain grows steadily over time, reaching a peak of 1834 in 1997. The grain coefficient can be interpreted as the amount of lending associated with one additional ton of grain production. The size of the coefficients are extremely high when one considers that in

1996, a ton of grain cost about 1200 yuan¹⁷ and China's grain bureaus only procure about 20 percent of production on average. Two possible explanations for the large grain coefficients are that procurement as a share of output increases with output and that much of the value is unrecoverable debt, which reportedly accounts for 40 percent of ADBC outstanding loans (Liu, 1998).¹⁸ In recent years, ADBC outstanding loans have increased rapidly (33 and 38 percent in 1996 and 1997) despite modest increases in grain output, low grain prices, and reduced procurement quotas (ADBC, 1998). This is consistent with the poor within-province correlation between lending and grain output in the post-reform period. Separation of policy and commercially may have weakened the enforcement of policy loan repayment. The estimates also provide evidence that ABCs lend more where SOE output is high, although the magnitudes are much smaller than for all state banks.

The responsiveness of ABC/ADBC lending to economic fundamentals is similar to that for all banks, but with more mixed results. Log output per capita is significantly positive in the between estimation and for all years in annual regressions. Agricultural growth also has a significant positive coefficient in the between estimation and in some years of the annual regression. Also, as for all banks, deposits have a larger effect on lending in the post-reform within estimate (0.839) and an even greater effect in the between estimate (1.084). In annual regressions, there is a sharp drop in the deposit coefficient in 1994, the year when the ADBC was established. This may reflect a formal break in deposit financing of policy lending (ADBC loans are financed almost entirely by PBC relending). The negative coefficient on total provincial deposits might be explained by the same argument used above.

¹⁷ Procurement prices in 1996 were 1.06 yuan/kg for maize, 1.31 yuan/kg for wheat, and 1.33 yuan/kg for paddy rice.

Beginning in 1994, it is possible to look separately at lending by ABC and ADBC branches (Table 6). Within estimates for the 1994-96 period reveal that ABC branches responded positively to industrial share and industrial growth, consistent with the increasing proportion of loans going to township and village enterprises (almost 20 percent in 1996). However, all three policy variables are significant, suggesting that ABCs continue to support grain procurement and SOEs (these effects are much more significant than in the pooled result). In 1995, procurement loans by the ABC were about 25 percent that of the ADBC. ADBC intermediation rates show a negative response to industrial share and agricultural growth, revealing no responsiveness to fundamentals. However, the grain coefficient is not significant, consistent with the interpretation that the surge in outstanding loans may be due less to grain procurement needs than problems of loan diversion and failed repayment of earlier loans. SOE variables are also insignificant. In annual regressions, ADBC lending appears positively associated with industrial growth and economic output, suggesting that repayment problems may be greater in richer areas where the incentive to divert funds is greater. The annual regressions also show grain becoming more significant for ADBCs and less significant for ABC branches over time, as would be expected.

RCCs

The RCCs appear to be isolated institutions not well-integrated into national financial markets nor overly influenced by policy lending goals. Between estimates and annual regressions produce statistically significant coefficients only for own deposits (0.813 between estimate). Turning to the within estimates, RCCs tend to intermediate more when areas become more industrial (positive and increasing within estimates). The

¹⁸ Such lending is plausible since the ABC has branch offices in major cities, and is the primarily lender to

RCCs also appear to loan more in provinces with greater SOE output, perhaps because loans diverted to SOEs by other banks no longer compete with the RCCs own portfolio.

Other Financial Institutions

The other financial institutions appear to be more commercially oriented, but just as for other institutions, lending is increasingly affected by own deposits over time. Both the level of output and the rate of industrial growth have positive coefficients in the between and within estimates, and in almost all years. The elasticity of intermediation with respect to GDP per capita is relatively small (0.034-0.078) but precisely estimated. Industrial growth has an especially pronounced effect in the post-reform period. There are, however, significant negative coefficients for industrial income share in the post-reform period, and agricultural growth in the pre-reform period. There are also some unanticipated effects of policy variables (grain and SOE profitability in the first period) which might reflect government influence in lending decisions by OFIs. In annual regressions, none of the policy variables is consistently significant across time. Deposits affect lending more in the second period, with the within and between estimates very high (0.55 and 0.89, and 0.70). The annual regressions show that high deposit coefficients begin after closure of the interbank market in 1993 but do not return to lower levels after 1995 as in other banks. This suggests that OFIs have not had full access to the new national interbank market. In addition, they may have been scrutinized more closely by central bank officials on adherence of the newly established minimum loan-to-deposit ratios.

8. Caveats

Overdue Loans

Our measure of financial intermediation is based on outstanding loans, which can overestimate the extent of true financial intermediation if a large share of loans are overdue and non-performing.¹⁹ Bad loans have been estimated to account for 20 percent of outstanding loans of state banks (Lardy, 1998), and could be higher if loans are rolled over and not categorized as overdue. Overdue loans should decrease with better economic fundamentals, possibly leading us to underestimate the response of *new* lending to fundamentals. However, much of the possible bias from non-repayment should be picked up by the policy variables, especially SOE profitability. Agricultural policy loan repayment problems are less due to cyclical factors than structural incentive problems (Park and Rozelle, 1998). Overdue loans may also reflect the past history of economic fundamentals and policy lending, but our data is insufficient to identify such a rich lagged structure.²⁰ Some of this history may be picked up by the provincial fixed effects. To the extent that new policy loans are highly serially correlated because they are linked to past policy lending commitments, the coefficient on policy variables will overestimate their effect on new lending. But this bias is of independent interest and has similar implications for performance. In this case, the policy variables will also better absorb the bias from omitted past economic and policy variables. Even if bias from overdue loans remains, the test results at the very least provide evidence on the extent to which the overdue problem overwhelms (possibly efficient) new loan allocation in affecting overall lending portfolios.

¹⁹ Outstanding loans also may reflect loans in previous years rather than the most recent year if loans have a duration that exceeds one year. In China, the vast majority of loans are short-term (70 percent of new loans in 1997 had a duration of one year or less).

²⁰ The high R-squared values also suggest that most of the variation is explained by current-period covariates.

Endogeneity of Intermediation and Growth

The difficulty of identifying causal direction in the positive association between financial development and economic growth is a well-known problem (Levine and Zervos, 1998; Rajan and Zingales, 1998). A positive effect of financial intermediation on growth may lead to an upward bias in our estimates of the effect of economic fundamentals on lending. This possible bias, however, only strengthens our findings that many economic fundamentals do not appear to influence the level of financial intermediation. As a robustness check, we re-estimate the within estimates by instrumenting the economic fundamentals by their lagged values and also by regressing directly on the lagged values instead of contemporaneous values. The former assumes that lagged values do not belong in the intermediation equation, the latter that loans are based on past rather than expected future performance or capture an arguably exogenous part of expected outcomes. These alternative estimates for the most part do not alter the main results in terms of the signs of coefficients or changes between the two periods (Appendix Table 4).²¹

Omission of Other Intermediaries

Our dataset excludes some financial intermediaries, such as regional trust and investment companies, finance companies, rural cooperative funds (RCFs), rotating savings and credit associations (ROSCAs), inter-enterprise finance, and other informal

²¹ Estimates as expected reveal an upward bias on coefficients of many economic fundamentals. Coefficients changing from positive to negative include industrial share of income (state banks, both periods, lagged and 3SLS estimates) and log output per capita (OFI, both periods, 3SLS estimate); those changing from negative to positive include agricultural growth (state banks, period 1, lagged and 3SLS estimates).

lending institutions. We do not expect these unmeasured activities to be very large. Nonetheless, it is possible that other financial intermediaries assume larger roles in more developed areas, or that various informal or even illegal mechanisms channel funds to their most valued use. Our results strictly speaking assess only performance by the institutions for which we have data rather than the overall financial system. Nonetheless, in a country where formal financial institutions control such a vast amount of resources, we expect their performance to have large aggregate effects on economic growth.

9. Conclusion

In this paper, we have developed empirical tests of financial intermediation based on a model of profit maximization by banks and restrictions on interbank lending. The tests focus on the effect of policy variables, economic fundamentals, and deposits on rates of financial intermediation. We have applied these tests to Chinese data, but they have much wider potential application.

The results suggest that financial intermediation in China is far from efficient and that financial reforms in the mid-1990s have not reversed a worsening trend. The responsiveness of lending to policy concerns such as SOE output and profitability and grain production is significant and has increased, if anything, in the recent period. Economic fundamentals have had little effect on total lending, but there is evidence that for the specific case of the ABC and ADBC, separation of policy and commercial lending has allowed the ABC to become more commercially oriented, even though it still responds to policy variables as well. Such separation does not improve overall performance, with the ADBC incurring increasing losses from policy lending. Among other financial institutions, RCCs seem poorly integrated into financial markets,

suggesting potentially large gains from integrating RCCs into the national banking system. The small but rapidly growing group of other financial institutions (Urban Cooperatives and Cooperative Banks, national and regional commercial banks, and national TICs), are most commercial in their orientation and likely have filled important credit demand niches.

Despite greater rhetoric about the need for financial reform, the performance of banks appears to have worsened, if anything in recent years. This does not necessarily mean that reforms have been ineffective or unnecessary. They may reflect continued difficulty in dealing with the huge portfolio problems facing Chinese banks, so that despite stronger incentives to improve allocation of new loans, the sharply deteriorating performance of SOEs and the portfolio of older loans is overwhelming these efforts. After 1997, reforms continued. In 1998, provincial PBC branches were abolished in favor of multi-province regional branches and the government announced that the national credit plan would be eliminated in 1999. Banks have been allowed to adjust their branch structures based on commercial considerations rather than having a branch at each administrative level. Each specialized bank has established an asset management company to salvage as much value as possible from non-performing loans. All of these changes will continue to move China toward a more commercial banking system. However, while growth of OFIs and continued reform of specialized banks holds promise for future performance, the limited and highly regulated interbank market, government-set interest rates, centralization of financial management, and continued difficulty resolving the SOE problem continue to be major impediments to efficient inter-regional resource flows.

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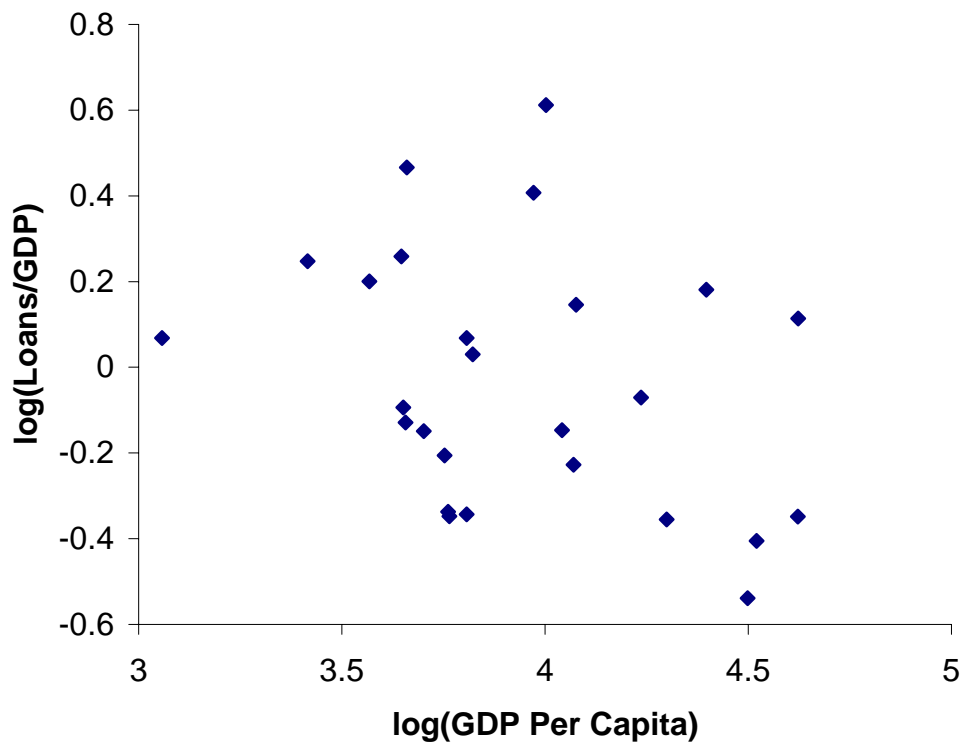
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Figure 1

**Log(All Bank Financial Intermediation Rate) and Log(GDP per Capita),
Chinese Provinces 1997**



Note: excludes municipal provinces (Beijing, Tianjin, Shanghai), and Tibet.

Table 1
Deposits and Loan Shares of China's Financial Institutions, 1997

	Deposits	Loans
State Banks		
Specialized Banks	65%	62%
Industrial and Commercial Bank of China	28%	26%
Agricultural Bank of China	14%	13%
Bank of China	7%	7%
China Construction Bank	16%	15%
Policy Banks	0%	16%
Agricultural Development Bank of China	0%	11%
State Development Bank of China	0%	5%
Export-Import Bank	0%	0%
Other Financial Institutions*	35%	22%
Rural Credit Cooperatives	13%	10%
National Commercial Banks**	8%	4%
Regional Commercial Banks***	2%	1%
Urban Credit Cooperatives/Urban Coop. Banks	7%	5%
Postal Savings	3%	
National Trust-and Investment Companies	1%	1%

Source: Calculated from (PBC, 1998) and the banks' annual reports.

* Excluded institutions include regional trust-and investment companies and finance companies which are estimated to account for three percent of the national total for both loans and deposits. Also excluded are rural cooperative funds (RCFs), rotating savings and credit associations (ROSCAS), interenterprise finance, and other informal lending institutions.

** National commercial banks include the Bank of Communications, CITIC Industrial Bank, Everbright Bank, Huaxia Bank, the China Investment Bank, Zhaoshang Bank and Minsheng Bank.

*** Regional commercial banks include Guangdong Development Bank, Shenzhen Development Bank, Fujian Xingye Bank, Shanghai Pudong Development Bank and Hainan Development Bank.

Table 2
Financial Reform Summary, 1991-97

Policy reform	1991	1992	1993	1994	1995	1996	1997
1. Guidance (not binding) credit plans	yes	yes	no (July)	no	yes	yes	yes
2. Centralized PBC relending	no	no	no	yes (June)	yes	yes	yes
3. Ratio loan management	no	no	no	yes (Feb)	yes	yes	yes
4. Commercial Bank Law Improved managerial incentives	no	no	no	No	yes (May)	yes	yes
5. Policy banks established	no	no	no	yes (Dec.)	yes	yes	yes
6. Open interbank market	yes	yes	no (July)	no	no	yes	yes

*Policy banks established gradually throughout the year. ADBC's established mostly in late 1994.

Notes and sources for reform dates:

1. Zhu Rongji's 16 point program.
2. Announced May 9th, implemented June 21st. PBC (1994). "Zhongguo renmin yinhang, Zhongguo gongshang yinhang, Zhongguo nongye yinhang, Zhongguo yinhang, Zhongguo renmin jianshe yinhang guanyu zuo hao Zhongguo renmin yinhang fen zhe hang yuanfafang de zaidaikuan huazhuan gongzuo de tongzhi; Yinfa (1994) no. 43." in 1994 nian xindai zijin guanli wenjian huibian (ed.) Beijing: Zhongguo jinrong chubanshe (1995): pg. 92 - 98.
3. Announced February 15th, implemented later in the year. PBC (1994). "Zhongguo renmin yinhang guanyu dui shangye yinhang fuzhai bili guanli de tongzhi; Yinfa (1994) no. 38." in 1994 nian jinrong guizhang zhidu xuanbian. PBC (ed.) Beijing: Zhongguo jinrong chubanshe. Vol. 1: pg. 25-31.
4. Zhongguo renmin gongheguo shangye yinhangfa." In in PBC (1996). 1995 nian jinrong guizhang zhidu xuanbian. Vol. 1. Beijing: Zhongguo jinrong chubanshe, pg. 8 ff.
5. Policy banks established gradually beginning mid-year. SDB established April 14th, Import-Export Bank established on July 1st, and ADBC branches established mostly in late 1994. PBC (1995). Zhongguo jinrong nianjian 1995. Beijing: Zhongguo jinrong chubanshe, pg.145.
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Table 3

**Financial Intermediation and Economic Development Elasticities,
Chinese Provinces 1991-97**

Year	All	State Banks	ABC/ADBC	RCCs	OFIs
1991	0.019	0.021	-0.418	0.169	1.187
1992	-0.032	-0.109	-0.566	0.132	0.499
1993	-0.063	-0.196	-0.701	0.013	0.478
1994	-0.179	-0.326	-0.739	-0.104	0.396
1995	-0.177	-0.353	-0.733	-0.108	0.559
1996	-0.219	-0.419	-0.685	-0.114	0.735
1997	-0.242	-0.411			0.508

Notes: Estimates in bold are different from zero at the 10 percent significance level. Elasticities are coefficient estimates from annual bivariate regressions of the log of financial intermediation rate (loans/output) on the log of output per capita. State banks include commercial and policy banks and exclude cooperatives or non-bank financial institutions. ABC=Agricultural Bank of China, ADBC=Agricultural Development Bank of China, RCC=Rural Credit Cooperatives, OFI=other financial institutions, including Urban Credit Cooperatives, national and regional commercial banks, and national trust and investment companies. For all, state banks, and OFIs, output is GDP and population is total population. For ABCs and RCCs, output is rural social output value and population is rural population. Excluded provinces are municipalities (Beijing, Tianjin, and Shanghai) and Tibet. State bank estimates also exclude Guangxi due to missing data.

Table 4

Summary Statistics by Year, 1991-97

	1991	1992	1993	1994	1995	1996	1997
<u>Intermediation Rates</u>							
All Financial Inst.*	0.90	0.90	0.87	0.81	0.79	0.80	0.87
State Banks**	0.80	0.77	0.70	0.64	0.61	0.63	0.69
ABCs/ADBCs	0.24	0.21	0.16	0.14	0.14	0.16	
RCCs	0.096	0.097	0.082	0.067	0.068	0.070	
<u>OFIs*</u>	0.053	0.066	0.074	0.086	0.090	0.088	0.97
<u>Loan-deposit Ratios</u>							
All Financial Inst.*	1.21	1.16	1.11	1.03	0.96	0.91	0.93
State Banks**	1.27	1.17	1.19	1.12	1.04	0.97	1.01
ABCs/ADBCs	1.42	1.36	1.31	1.34	1.62	1.62	1.61
RCCs	0.67	0.71	0.77	0.74	0.73	0.72	0.70
<i>OFIs*</i>	1.24	1.34	1.13	0.85	0.80	0.79	0.81
<i>Econ. Performance</i>							
GDP Per Capita	3.38	3.81	4.30	4.55	4.77	5.35	5.78
GDP Growth	0.105	0.143	0.142	0.071	0.095	0.099	0.090
Ind. Share of GDP	0.36	0.38	0.41	0.41	0.40	0.40	0.41
Industrial Growth	0.118	0.197	0.230	0.086	0.078	0.103	0.104
RSOV Per Capita	3.74	4.72	6.47	8.07	8.47	9.29	
RSOV Growth	0.113	0.280	0.388	0.257	0.066	0.106	
Nonag. Share of RSOV	0.55	0.63	0.71	0.73	0.72	0.73	
Nonag Rural Growth	0.180	0.450	0.583	0.295	0.061	0.125	
<u>Policy Variables</u>							
SOE Output Value P.C.	2.23	2.46	2.70	2.50	2.44	2.15	2.11
SOE Profits (Per 1000 Yuan Assets)	11.9	12.4	12.9	12.6	9.3	7.6	7.3
Grain Output P.C.	0.48	0.49	0.50	0.49	0.51	0.55	0.54

Value unit: 1996 thousand yuan.

* OFI loans and deposits calculated by subtracting state bank and RCC values from all loans and deposits. All loans and deposits have missing data—3 provinces in 1991 and 1992, 2 provinces in 1993, one province in 1994. Means for NBFIs loan/deposit rates exclude observations when deposits equal zero (6 in 1991, 1 in 1992, 3 in 1993, and 1 in 1994).

** Means for state banks intermediation rates and loan-deposit ratios exclude Guangxi due to missing data.

Notes: All means are weighted and exclude municipal provinces (Beijing, Tianjin, Shanghai) and Tibet. RSOV=rural social output value, SOE=state-owned enterprise, ABC=Agricultural Bank of China, ADBC=Agricultural Development Bank of China, RCC=Rural Credit Cooperatives, OFI=other financial institutions (excluding RCCs). State banks include commercial and policy banks and exclude cooperatives and non-bank financial institutions.

Table 5
Determinants of Financial Intermediation Rates

	1991-94		Within 1995-96/97		Diff. p-value	Between 1991-96/97	
	Coef.	S.E.	Coef.	S.E.		Coef	S.E.
State Banks							
NSH	0.076	0.225	0.050	0.232	0.861	0.223	0.550
NG*NSH	-0.065	0.194	-0.319	0.238	0.381	-5.563	2.212
<i>AG*(1-NSH)</i>	-0.094	0.101	0.033	0.097	0.361	1.425	1.496
LY	-0.192	0.057	-0.253	0.053	0.017	0.090	0.075
GRAIN	17.42	3.79	6.66	4.08	0.000	15.53	8.36
SOEY	0.277	0.087	0.299	0.097	0.755	0.257	0.271
SOEP*SOEY	-0.00001	0.00157	0.00049	0.00197	0.702	-0.01145	0.00362
BDEP	-0.054	0.155	0.344	0.114	0.001	1.161	0.316
TDEP	0.124	0.126	-0.171	0.093	0.000	-0.381	0.206
N			166			25	
R-squared			0.984			0.898	
ABC/ADBCs							
NSH	-0.078	0.080	-0.009	0.094	0.245	-0.076	0.143
NG*NSH	0.006	0.030	0.097	0.035	0.033	-0.624	0.233
<i>AG*(1-NSH)</i>	-0.072	0.062	-0.093	0.118	0.871	2.659	0.795
LY	-0.095	0.022	-0.106	0.021	0.261	0.076	0.025
GRAIN	250.89	77.21	147.607	180.271	0.465	633.58	225.72
SOEY	0.029	0.023	0.087	0.029	0.003	0.078	0.044
SOEP*SOEY	0.00005	0.00060	-0.00022	0.00087	0.620	-0.00108	0.00109
<i>ADEP</i>	0.600	0.162	0.839	0.222	0.066	1.084	0.242
TDEP	-0.041	0.025	-0.032	0.029	0.611	-0.124	0.043
N			141			25	
R-squared			0.990			0.942	

Notes: Bold denotes different than zero at the 10 percent significance. Within estimates for state banks and OFIs are from 2-equation SUR fixed effects model with time dummies and period interaction terms for 1991-97. Within estimates for ABC/ADBCs and RCCs are from 4-equation SUR fixed effects model with time dummies and period interaction terms for 1991-96. Between estimates are from 4-equation SUR model of provincial means from 1991-96 or 1991-97. Within estimates include time dummies. Excluded provinces are municipalities (Beijing, Tianjin, and Shanghai) and those with missing data (Tibet and Guangxi). For state banks and OFIs, intermediation rate is loans/GDP. For ABC/ADBCs and RCCs, intermediation rate is loans/RSOV (rural social output value). [continued on next page]

Table 5
Determinants of Financial Intermediation Rates, cont.

	1991-94		Within 1995-96/97		Diff. p-value	Between 1991-96/97	
	Coef.	S.E.	Coef.	S.E.		Coef	S.E.
RCCs							
NSH	0.049	0.024	0.074	0.026	0.163	0.044	0.043
NG*NSH	-0.006	0.009	-0.009	0.010	0.775	-0.112	0.071
AG*(1-NSH)	0.024	0.018	-0.036	0.034	0.105	0.093	0.242
LY	-0.023	0.007	-0.023	0.007	0.853	0.001	0.008
GRAIN	-23.61	22.35	16.17	50.58	0.310	-79.53	70.87
SOEY	0.012	0.007	0.019	0.008	0.219	0.007	0.015
SOEP*SOEY	0.00000	0.00017	-0.00013	0.00024	0.362	-0.00001	0.00034
RDEP	0.464	0.048	0.392	0.067	0.077	0.813	0.084
TDEP	-0.015	0.004	-0.004	0.008	0.068	-0.019	0.016
N			141			25	
R-squared			0.980			0.907	
OIs							
NSH	-0.178	0.127	-0.583	0.126	0.000	-0.017	0.096
NG*NSH	0.116	0.109	0.273	0.135	0.336	0.047	0.441
AG*(1-NSH)	-0.160	0.057	-0.027	0.054	0.089	-0.344	0.289
LY	0.078	0.033	0.070	0.030	0.571	0.034	0.015
GRAIN	-1.51	2.09	-4.13	2.25	0.095	4.19	1.59
SOEY	-0.021	0.049	0.002	0.054	0.531	-0.042	0.050
SOEP*SOEY	-0.00222	0.00088	-0.00141	0.00110	0.255	-0.00049	0.00068
ODEP	0.548	0.100	0.891	0.064	0.000	0.701	0.081
TDEP	0.201	0.035	0.083	0.034	0.000	0.018	0.025
N			166			25	
R-squared			0.932			0.938	

Notes (continued): For state banks and OIs independent variables are as follows: NSH=industrial share of GDP (including construction), NG=growth rate of industrial GDP, AG=growth rate of non-industrial GDP, LY=log(GDP per capita), GRAIN=grain production/GDP, SOEY=SOE output value/GDP, SOEP=SOE profits per 1000 yuan fixed assets, BDEP=bank deposits/GDP, ODEP=OI deposits/GDP, and TDEP=total deposits/GDP. For ABC/ADBCs and RCCs, independent variables are as follows: NSH=nonagricultural share of RSOV, NG=growth rate of nonagricultural RSOV, AG=growth rate of agricultural RSOV, LY=log(RSOV per capita), GRAIN=grain production/RSOV, SOEY=SOE output value/RSOV, SOEP=SOE profits per 1000 yuan fixed assets, ADEP=ABC/ADBC deposits/RSOV, RDEP=RCC deposits/RSOV, TDEP=total bank deposits/RSOV.

Appendix Table 1

**Provincial Financial Intermediation Rates and Loan-Deposit Ratios, 1991-97 Means
(Sorted by All Bank Intermediation Rate)**

	Financial Intermediation Rates					Loan/Deposit Ratios				
	All	State				All	State			
	Banks*	Bank s	ABC/ADBC	RCCs	OFIs*	Banks*	Banks	ABC/ADBC	RCCs	OFIs*
HAINAN	1.51	1.16	0.48	0.09	0.29	0.93	1.03	1.31	0.55	0.66
JILIN	1.47	1.31	0.57	0.07	0.10	1.59	1.78	3.42	0.66	1.15
QINGHAI	1.35	1.31	0.50	0.04	0.02	1.53	1.61	1.53	0.47	0.55
TIANJIN	1.33	1.14	0.16	0.08	0.09	1.16	1.26	1.16	0.75	0.78
BEIJING	1.32	1.14	0.25	0.11	0.12	0.54	0.54	0.99	0.49	0.73
NINGXIA	1.28	1.14	0.47	0.08	0.08	1.20	1.26	1.54	0.51	1.62
SHANGHAI	1.23	1.05	0.23	0.07	0.13	0.90	0.94	0.89	0.71	0.73
SHAANXI	1.18	0.99	0.27	0.12	0.07	1.11	1.22	1.57	0.69	0.83
GANSU	1.13	0.99	0.28	0.06	0.07	1.09	1.15	1.49	0.59	1.06
LIAONING	1.09	0.88	0.20	0.09	0.13	1.16	1.28	1.54	0.84	0.85
SHANXI	1.08	0.89	0.19	0.15	0.08	0.90	1.05	1.22	0.71	0.77
GUANGDONG	1.05	0.68	0.17	0.20	0.21	0.78	0.78	0.87	0.82	0.80
XINJIANG	1.03	0.95	0.69	0.04	0.05	1.04	1.08	1.58	0.45	1.67
INNER MONGOLIA	1.00	0.93	0.35	0.05	0.03	1.46	1.56	2.49	0.60	3.53
HEILONGJ	0.97	0.90	0.45	0.06	0.03	1.25	1.30	2.40	0.61	37.26
JIANGXI	0.92	0.79	0.25	0.06	0.06	1.20	1.34	1.88	0.62	0.88
GUIZHOU	0.89	0.81	0.31	0.05	0.03	1.20	1.30	1.99	0.73	0.58
HUBEI	0.84	0.80	0.29	0.05	0.05	1.18	1.43	2.06	0.63	0.74
SICHUAN	0.83	0.67	0.18	0.07	0.08	1.16	1.32	1.69	0.75	0.83
HEBEI	0.82	0.61	0.17	0.12	0.07	0.93	0.98	1.22	0.67	2.97
HENAN	0.80	0.64	0.18	0.08	0.05	1.11	1.22	1.86	0.83	0.77
ANHUI	0.74	0.62	0.17	0.04	0.06	1.25	1.37	2.25	0.60	40.28
YUNNAN	0.74	0.65	0.32	0.08	0.03	0.84	0.87	1.21	0.60	1.42
HUNAN	0.72	0.54	0.19	0.07	0.09	1.22	1.22	1.89	0.64	2.94
SHANDONG	0.71	0.54	0.11	0.07	0.07	1.03	1.14	1.33	0.72	1.03
ZHEJIANG	0.66	0.45	0.08	0.06	0.09	0.86	0.86	1.02	0.69	4.81
JIANGSU	0.63	0.51	0.09	0.04	0.04	0.91	0.95	1.16	0.71	1.66
FUJIAN	0.63	0.53	0.11	0.05	0.05	0.86	0.88	1.00	0.68	0.88

*Means for all banks and OFIs have missing data: Shanxi (1991-94), Hubei (1991-93), and Guangdong (1991-92). Mean OFI loan/deposit ratios also exclude years when deposits are zero, which occurs 11 times, and more than once only for Inner Mongolia (1991, 1994) and Hunan (1991-93).

Notes: Tibet and Guangxi excluded due to missing data. ABC/ADBC=Agricultural Bank of China/Agricultural Development Bank of China, RCC=Rural Credit Cooperatives, OFI=Other Financial Institutions (excluding RCCs).

Appendix Table 2

Economic and Policy Variables by Province, 1991-97 Means
(Sorted by All Bank Intermediation Rate)

							SOE	SOE	
						Indust.	Output	Profits	Grain
	GDP	GDP	Indust.	RSOV	RSOV	Share	Value	Per 100	Output
	Per	Growth	Share	Per	Growth	of	Per	Yuan	Per
	Capita	Rate	of GDP	Capita	Rate	RSOV	Capita	Assets	Capita
HAINAN	5.1	0.10	0.12	5.2	0.12	0.22	1.3	6	0.43
JILIN	4.3	0.09	0.40	6.1	0.16	0.51	3.5	7	1.36
QINGHAI	3.7	0.04	0.31	2.2	0.07	0.26	2.5	3	0.37
TIANJIN	9.9	0.08	0.50	26.5	0.15	0.88	8.6	11	0.51
BEIJING	12.7	0.05	0.37	26.2	0.05	0.82	9.6	14	0.70
NINGXIA	3.4	0.06	0.35	2.7	0.11	0.41	2.6	6	0.60
SHANGHAI	18.4	0.09	0.53	43.5	0.17	0.89	16.4	16	0.57
SHAANXI	3.1	0.07	0.36	3.5	0.10	0.57	2.1	6	0.39
GANSU	2.6	0.06	0.37	3.0	0.16	0.51	2.3	7	0.37
LIAONING	7.3	0.07	0.45	13.3	0.24	0.74	5.7	7	0.67
SHANXI	3.8	0.07	0.46	5.5	0.22	0.76	2.6	7	0.40
GUANGDONG	7.8	0.14	0.41	9.0	0.18	0.70	2.8	15	0.32
XINJIANG	5.3	0.08	0.27	5.7	0.09	0.21	3.3	5	0.86
INNER									
MONGOLIA	3.8	0.07	0.31	4.9	0.20	0.44	2.2	7	0.83
HEILONGJ	5.5	0.09	0.47	6.8	0.18	0.50	4.1	16	1.41
JIANGXI	3.1	0.10	0.30	4.4	0.13	0.54	1.7	8	0.52
GUIZHOU	2.0	0.05	0.32	1.9	0.09	0.36	1.2	13	0.31
HUBEI	4.2	0.09	0.39	6.0	0.18	0.58	2.7	11	0.60
SICHUAN	3.2	0.09	0.34	4.4	0.17	0.61	1.7	8	0.47
HEBEI	4.4	0.12	0.42	6.1	0.22	0.70	2.2	13	0.47
HENAN	3.3	0.12	0.40	5.1	0.21	0.67	1.7	11	0.45
ANHUI	3.2	0.10	0.41	5.7	0.24	0.65	1.6	12	0.50
YUNNAN	3.3	0.07	0.37	2.6	0.13	0.40	2.0	42	0.35
HUNAN	3.5	0.09	0.32	5.0	0.22	0.58	1.7	12	0.51
SHANDONG	5.7	0.11	0.42	10.2	0.19	0.74	2.8	10	0.56
ZHEJIANG	7.8	0.13	0.45	15.5	0.24	0.83	2.6	14	0.42
JIANGSU	7.1	0.12	0.47	15.5	0.19	0.81	3.4	11	0.62
FUJIAN	6.3	0.17	0.34	8.6	0.28	0.67	1.3	17	0.35

Notes: Unit is 1996 1000 yuan, 1000 kgs. Means for variables including RSOV are for 1991-96. Tibet and Guangxi excluded due to missing data. GDP=gross domestic product, RSOV=rural social output value, SOE=state-owned enterprises. GDP per capita and SOE output value per capita based on total population, RSOV per capita and grain output per capita based on rural population.

Appendix Table 3A
Determinants of State Bank Intermediation Rates, Annual Regressions 1991-1997

	1991		1992		1993		1994		1995		1996		1997	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
NSH	-0.509	0.420	0.628	0.511	-0.515	0.525	-0.512	0.600	-0.759	0.468	-1.410	0.471	-1.368	0.377
NG*NSH	-1.438	1.075	-1.104	0.704	0.460	0.903	-0.173	1.083	-1.029	0.974	-0.083	0.983	-2.681	1.384
AG*(1-NSH)	-1.220	0.524	-0.486	0.555	0.557	0.530	-1.583	0.677	0.509	0.332	-0.459	0.805	-2.041	1.681
LY	0.181	0.069	0.036	0.074	0.100	0.091	0.134	0.091	-0.007	0.084	0.047	0.087	0.072	0.081
GRAIN	23.79	5.81	22.16	6.68	21.55	8.60	17.02	7.07	6.83	11.80	3.84	9.50	-0.39	10.10
SOEY	0.330	0.175	0.353	0.205	0.588	0.191	0.338	0.272	0.397	0.203	0.887	0.344	0.925	0.256
SOEP*SOEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.0073	0.0048	-	-	0.0080	0.0046	0.0068	0.0023	0.0093	0.0035	0.0116	-	-	-
	9	4	0.02019	0.00451	8	9	8	6	4	8	6	0.00532	0.01438	0.00656
BDEP	0.690	0.303	1.405	0.316	1.305	0.373	1.430	0.458	1.370	0.388	0.881	0.418	0.624	0.310
TDEP	0.445	0.258	-0.430	0.238	-0.401	0.243	-0.581	0.310	-0.422	0.252	-0.263	0.248	-0.166	0.213
C	-0.741	0.270	-0.320	0.270	-0.493	0.364	-0.231	0.347	0.282	0.417	0.370	0.363	0.613	0.426
N	22		22		23		24		25		25		25	
R-squared	0.919		0.918		0.874		0.903		0.873		0.863		0.894	

Notes: Bold denotes different than zero at the 10 percent significance. Within estimates include time dummies. Dependent variable is loans by state banks divided by GDP. Each equation is jointly estimated with those for the determinants of ABC/ADBC and RCC intermediation rates. Independent variables are defined as follows: NSH=industrial share of GDP (including construction), NG=growth rate of industrial GDP interacted with NSH, AG=growth rate of non-industrial GDP interacted with (1-NSH), LY=log(GDP per capita), GRAIN=grain production/GDP, SOEY=SOE output value/GDP, SOEP=SOE profits per 1000 yuan fixed assets, BDEP=bank deposits. State banks include commercial and policy banks and exclude cooperatives or non-bank financial institutions. Excluded provinces are municipalities (Beijing, Tianjin, and Shanghai) and those with missing data (Tibet and Guangxi).

Appendix Table 3B
Determinants of ABC/ADBC Intermediation Rates, Annual Regressions 1991-1996

	1991		1992		1993		1994		1995		1996	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
NSH	-0.218	0.128	0.129	0.172	0.032	0.120	-0.299	0.105	-0.402	0.098	-0.428	0.110
NG*NSH	-0.709	0.352	-0.466	0.226	-0.091	0.078	0.051	0.085	0.033	0.040	0.137	0.069
AG*(1-NSH)	-0.579	0.282	0.496	0.549	0.720	0.391	0.055	0.190	0.214	0.272	-0.802	0.484
LY	0.142	0.027	0.114	0.030	0.080	0.022	0.090	0.019	0.096	0.014	0.094	0.016
GRAIN	670.20	155.69	1067.19	188.96	1315.12	174.68	1356.64	204.16	1534.94	202.88	1833.79	472.78
SOEY	0.023	0.060	-0.014	0.049	-0.010	0.036	0.014	0.030	0.063	0.027	0.012	0.077
SOEP*SOEY	-0.00363	0.00142	-0.00446	0.00146	0.00008	0.00096	-0.00066	0.00054	-0.00096	0.00075	-0.00062	0.00147
ADEP	0.840	0.219	1.210	0.244	1.275	0.179	0.495	0.194	0.346	0.266	0.731	0.279
TDEP	-0.082	0.065	-0.086	0.044	-0.119	0.038	0.031	0.033	0.048	0.030	0.013	0.042
C	-0.302	0.126	-0.468	0.115	-0.415	0.097	-0.234	0.090	-0.190	0.076	-0.151	0.094
N	22		22		23		24		25		25	
R-squared	0.932		0.945		0.969		0.973		0.982		0.975	

Notes: Bold denotes different than zero at the 10 percent significance. Within estimates include time dummies. Dependent variable is loans by ABC/ADBCs divided by rural social output value (RSOV). Each equation is jointly estimated with those for the determinants of state bank and RCC intermediation rates. Independent variables are defined as follows: NSH=nonagricultural share of RSOV, NG=growth rate of nonagricultural RSOV interacted with NSH, AG=growth rate of agricultural RSOV interacted with (1-NSH), LY=log(RSOV per capita), GRAIN=grain production/RSOV, SOEY=SOE output value/RSOV, SOEP=SOE profits per 1000 yuan fixed assets, ADEP=deposits in ABC/ADBC, BDEP=bank deposits. Excluded provinces are municipalities (Beijing, Tianjin, and Shanghai) and those with missing data (Tibet and Guangxi).

Appendix Table 3C
Determinants of RCC Intermediation Rates, Annual Regressions 1991-1996

	1991		1992		1993		1994		1995		1996	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
NSH	-0.003	0.034	0.010	0.053	-0.047	0.042	0.013	0.039	0.017	0.034	0.050	0.040
NG*NSH	-0.161	0.080	-0.025	0.065	0.001	0.030	0.003	0.029	-0.006	0.014	-0.005	0.017
AG*(1-NSH)	0.011	0.068	0.189	0.134	-0.052	0.147	-0.053	0.063	-0.108	0.094	-0.138	0.106
LY	-0.002	0.006	0.004	0.008	0.010	0.008	0.005	0.007	0.003	0.006	0.000	0.005
GRAIN	-72.98	39.95	-32.69	52.08	-79.88	72.86	4.89	64.32	-36.77	71.11	106.14	127.83
SOEY	0.006	0.016	0.004	0.014	0.025	0.016	0.006	0.011	0.006	0.011	-0.018	0.024
SOEP*SOEY	0.00002	0.00035	0.00003	0.00041	-0.00039	0.00040	-0.00016	0.00018	-0.00023	0.00025	0.00005	0.00031
RDEP	0.715	0.056	0.763	0.075	0.987	0.063	0.821	0.078	0.815	0.084	0.753	0.076
TDEP	-0.029	0.014	-0.019	0.010	-0.053	0.014	-0.013	0.013	-0.009	0.013	0.005	0.014
C	0.053	0.031	-0.008	0.031	0.004	0.039	-0.034	0.028	-0.024	0.026	-0.042	0.023
N	22		22		23		24		25		25	
R-squared	0.893		0.837		0.887		0.928		0.932		0.959	

Notes: Bold denotes different than zero at the 10 percent significance. Within estimates include time dummies. Dependent variable is loans by RCCs divided by rural social output value (RSOV). Each equation is jointly estimated with those for the determinants of state bank and ABC intermediation rates. Independent variables are defined as follows: NSH=nonagricultural share of RSOV, NG=growth rate of nonagricultural RSOV interacted with NSH, AG=growth rate of agricultural RSOV interacted with (1-NSH), LY=log(RSOV per capita), GRAIN=grain production/RSOV, SOEY=SOE output value/RSOV, SOEP=SOE profits per 1000 yuan fixed assets, RDEP=deposits in RCCs, BDEP=bank deposits. Excluded provinces are municipalities (Beijing, Tianjin, and Shanghai) and those with missing data (Tibet and Guangxi).

Appendix Table 3D
Determinants of Other Financial Institution Intermediation Rates, Annual Regressions 1991-1997

	1991		1992		1993		1994		1995		1996		1997	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
NSH	0.333	0.144	0.162	0.110	0.135	0.066	-0.063	0.082	-0.147	0.078	-0.146	0.085	-0.247	0.108
NG*NSH	0.107	0.399	-0.134	0.163	0.062	0.129	-0.194	0.176	0.411	0.180	0.184	0.195	0.504	0.407
AG*(1-NSH)	-0.041	0.182	-0.079	0.131	-0.258	0.077	-0.013	0.142	-0.030	0.060	0.119	0.156	0.162	0.485
LY	-0.008	0.025	0.043	0.016	0.002	0.014	0.013	0.016	0.019	0.015	0.020	0.017	0.017	0.023
GRAIN	0.97	2.04	5.18	1.50	0.40	1.32	1.92	1.40	0.71	2.19	0.29	1.90	2.62	2.94
SOEY	0.062	0.062	-0.068	0.045	-0.003	0.025	-0.033	0.041	0.027	0.036	0.036	0.060	0.002	0.064
SOEP*SOEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.0030	0.0016	-	-	0.0015	0.0007	0.0005	0.0004	0.0005	0.0006	0.0003	-	-	-
	2	7	0.00002	0.00102	9	2	0	7	6	4	7	0.00103	0.00118	0.00181
ODEP	0.278	0.147	0.608	0.097	0.566	0.079	0.849	0.122	0.861	0.103	0.963	0.097	0.854	0.096
TDEP	-0.064	0.051	0.068	0.031	0.044	0.024	-0.026	0.035	-0.032	0.035	-0.053	0.037	-0.027	0.038
C	-0.028	0.097	-0.229	0.062	-0.038	0.059	0.009	0.067	-0.023	0.078	-0.024	0.072	-0.001	0.122
N	22		22		23		24		25		25		25	
R-squared	0.607		0.920		0.902		0.919		0.933		0.952		0.933	

Notes: Bold denotes different than zero at the 10 percent significance. Within estimates include time dummies. Dependent variable is loans by state banks divided by GDP. Each equation is jointly estimated with those for the determinants of ABC/ADBC and RCC intermediation rates. Independent variables are defined as follows: NSH=industrial share of GDP (including construction), NG=growth rate of industrial GDP interacted with NSH, AG=growth rate of non-industrial GDP interacted with (1-NSH), LY=log(GDP per capita), GRAIN=grain production/GDP, SOEY=SOE output value/GDP, SOEP=SOE profits per 1000 yuan fixed assets, BDEP=bank deposits. State banks include commercial and policy banks and exclude cooperatives or non-bank financial institutions. Excluded provinces are municipalities (Beijing, Tianjin, and Shanghai) and those with missing data (Tibet and Guangxi).

Appendix Table 4

Determinants of Intermediation Rates using Lagged Variables and 3SLS

	Lagged Variables					3SLS				
	1991-94		1995-96/97		diff.	1991-94		1995-96/97		diff.
	Coef	S.E.	Coef.	S.E.	p-value	Coef	S.E.	Coef.	S.E.	p-value
State Banks										
NSH	-0.143	0.276	-0.121	0.243	0.901	-0.465	0.366	-0.728	0.434	0.227
NG*NSH	-0.182	0.225	-0.312	0.217	0.654	-0.870	0.757	0.623	0.632	0.227
AG*(1-NSH)	0.014	0.099	0.149	0.099	0.307	0.066	0.212	0.244	0.180	0.583
LY	-0.078	0.058	-0.175	0.054	0.001	-0.195	0.130	-0.286	0.134	0.006
GRAIN	24.58	3.72	9.86	4.29	0.000	21.07	5.77	6.10	5.68	0.000
SOEY	0.203	0.106	0.179	0.105	0.764	0.233	0.123	0.339	0.142	0.319
SOEP*SOEY	0.00272	0.00278	0.00137	0.00173	0.435	0.00171	0.00233	0.00313	0.00279	0.420
BDEP	-0.192	0.167	0.293	0.124	0.000	-0.039	0.208	0.344	0.136	0.021
TDEP	0.251	0.136	-0.092	0.102	0.000	0.050	0.154	-0.228	0.115	0.004
OFIs										
NSH	0.018	0.141	-0.478	0.120	0.000	0.209	0.209	-0.159	0.239	0.001
NG*NSH	-0.169	0.116	0.150	0.111	0.032	0.031	0.414	-0.155	0.331	0.774
AG*(1-NSH)	-0.066	0.050	-0.137	0.050	0.291	-0.281	0.114	0.019	0.096	0.078
LY	0.083	0.030	0.083	0.028	0.996	-0.066	0.080	-0.059	0.080	0.693
GRAIN	-3.23	1.86	-4.65	2.16	0.345	-6.56	3.19	-8.06	3.13	0.460
SOEY	-0.055	0.054	0.022	0.052	0.039	-0.118	0.072	-0.134	0.082	0.773
SOEP*SOEY	-0.00384	0.00140	-0.00160	0.00089	0.010	-0.00196	0.00129	-0.00137	0.00157	0.517
ODEP	0.562	0.097	0.912	0.064	0.000	0.696	0.132	0.892	0.075	0.089
TDEP	0.171	0.034	0.060	0.033	0.000	0.180	0.061	0.082	0.047	0.013
ABC/ADBCs										
NSH	-0.110	0.082	-0.141	0.089	0.528	-0.007	0.089	0.049	0.106	0.381
NG*NSH	-0.011	0.036	0.032	0.032	0.279	0.001	0.048	0.060	0.041	0.354
AG*(1-NSH)	-0.084	0.046	-0.173	0.080	0.323	-0.008	0.078	-0.218	0.154	0.220
LY	-0.009	0.030	-0.008	0.028	0.931	-0.093	0.025	-0.102	0.024	0.405
GRAIN	349.63	68.28	315.12	159.38	0.786	265.41	80.39	204.93	191.85	0.689
SOEY	0.099	0.026	0.166	0.031	0.000	0.036	0.025	0.096	0.031	0.003
SOEP*SOEY	-0.00129	0.00086	-0.00109	0.00060	0.680	0.00002	0.00065	-0.00024	0.00092	0.646
ADEP	0.726	0.157	0.842	0.208	0.337	0.585	0.171	0.794	0.231	0.122
TDEP	-0.037	0.024	-0.024	0.029	0.469	-0.042	0.025	-0.030	0.030	0.513
RCCs										
NSH	0.050	0.023	0.069	0.029	0.309	0.073	0.028	0.113	0.031	0.049
NG*NSH	-0.005	0.010	-0.005	0.009	0.992	0.024	0.015	-0.027	0.013	0.010
AG*(1-NSH)	-0.002	0.013	-0.022	0.023	0.432	0.015	0.023	-0.110	0.047	0.018
LY	-0.007	0.009	-0.004	0.009	0.329	-0.022	0.008	-0.021	0.008	0.738
GRAIN	-16.44	18.92	35.77	44.17	0.141	-14.39	24.74	66.74	57.50	0.070
SOEY	0.028	0.007	0.037	0.009	0.090	0.021	0.008	0.027	0.009	0.387
SOEP*SOEY	-0.00033	0.00024	-0.00037	0.00017	0.732	-0.00019	0.00019	-0.00030	0.00027	0.501
RDEP	0.514	0.042	0.452	0.068	0.160	0.482	0.056	0.402	0.074	0.073
TDEP	-0.014	0.004	-0.004	0.008	0.099	-0.015	0.004	-0.003	0.008	0.078

Notes: In lagged variable regression, all variables except GRAIN and the deposit variables (TDEP, BDEP, ADEP, RDEP, and ODEP) are one-year lagged variables. In the 3SLS model, all economic fundamentals are taken as endogenous (NSH, NG*NSH, AG*(1-NSH), LY), and additional instruments are the lagged economic fundamentals and lagged SOE output and profit variables. Results for state banks and OFIs are from 2-equation SUR fixed effects model with time dummies for 1991-97. Results from ABC/ADBC and RCCs are from 4-equation SUR fixed effects model with time dummies for 1991-96.