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Bank Ownership Type and Banking Relationships

Allen N. Berger
Board of Governors of the Federal Reserve System, Washington, DC 20551 U.S.A.
Wharton Financial Institutions Center, Philadelphia, PA 19104 U.S.A.
aberger@frb.gov
Leora F. Klapper
Development Research Group, World Bank, Washington, DC 20433 U.S.A.
lklapper@worldbank.org
Maria Soledad Martinez Peria
Development Research Group, World Bank, Washington, DC 20433 U.S.A.
mmartinezperia@worldbank.org
Rida Zaidi
Wolfson College, University of Cambridge, Cambridge CB2 1TN, UK.
rz213@hermes.cam.ac.uk

Abstract

We formulate and test hypotheses about the role of bank ownership types – foreign, state-owned, and private domestic banks – in banking relationships, using data from India. The empirical results are consistent with all of our hypotheses with regard to foreign banks. These banks tend to serve as the main bank for transparent firms, and firms with foreign main banks are most likely to have multiple banking relationships, have the most relationships, and diversify relationships across bank ownership types. The data are also consistent with the hypothesis that firms with state-owned main banks are relatively unlikely to diversify across bank ownership types. However, state-owned banks often do not provide the main relationship for firms they are mandated to serve (e.g., small, opaque firms), and the predictions of negative effects on multiple banking and number of relationships hold for only one type of state-owned bank.

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Please address correspondence to Allen N. Berger, Mail Stop 153, Federal Reserve Board, 20th and C Streets. NW, Washington, DC 20551, call 202-452-2903, fax 202-452-5295, or email aberger@frb.gov.

1. Introduction

A number of important policy and research issues concern the relationships of banks with nonfinancial firms. Theory suggests that such relationships may play key roles in resolving information problems and mitigating financial market imperfections more generally, and empirical analysis has shown important benefits from strong banking relationships.

Much of the research focus is on the nature of relationships formed by different types of banks and on the rationale for multiple banking relationships. To our knowledge, however, existing studies of relationship forms and multiple relationships have not directly addressed the potentially important role of bank ownership types – foreign, state-owned, and private domestic banks. In addition, very few of the empirical relationship studies are applied to data on developing nations, where relationships may be particularly important because of financial system inadequacies.

This paper directly addresses these under-researched issues by formulating hypotheses about the effects of bank ownership type on relationships and testing these hypotheses using data from India, one of the largest and most important developing nations. In particular, we test for patterns in firms' main banking relationships across ownership types, and investigate the impact of bank ownership type on the number of banking relationships and the likelihood that firms diversify across ownership types.

The hypotheses are based on the extant theory and knowledge about the effects of bank ownership type on bank-firm relationships. Theory suggests a number of reasons why ownership type might affect relationships. Information-based theories of banking relationships (e.g., Stein 2002) suggest that foreign banks – by virtue of their inability to process "soft" information about opaque local firms and market conditions – may be more likely to use their advantages in "hard" information and serve as the main relationship bank for transparent firms. In contrast, state-owned banks often have direct mandates to serve certain types of businesses, such as small firms with limited access to private-sector credit, state-owned firms, firms in rural areas, or those in "priority sectors."

Other research emphasizes that multiple banking relationships might be a consequence of firms' need to protect themselves from premature withdrawal of services from financially fragile relationship banks (e.g., Detragiache, Garella, and Guiso 2000). We argue that the concept of fragility may be broadened to describe the banking relationship itself. In particular, there are reasons to expect that the

fragility of a banking relationship may vary with a bank's ownership type, independent of the bank's financial condition. We hypothesize that relationships with foreign banks may be particularly fragile – even if these institutions are not themselves financially fragile – because foreign banks have weaker ties to the nation, more alternative business opportunities overseas, and can exit the market more easily. Thus, a firm with its main relationship at a foreign bank may be more likely to maintain multiple relationships or more relationships to protect itself against withdrawal of services, all else equal. Similarly, firms with foreign institutions as their main bank may be more likely to diversify across ownership types by having at least one other banking relationship with a state-owned or private domestic institution that is less likely to withdraw from the country.

In contrast, relationships with state-owned banks may be particularly sturdy. Fear of withdrawal of services is expected to be least for state-owned banks – even if they are in poor financial condition – because these institutions generally have the most government backing/subsidies to protect them from failing or having to withdraw credits because of poor financial condition. In addition, for some firms that state-owned banks have direct mandates to serve, state-owned banks may be the only institutions willing to provide credit for projects that may have negative net present values, making additional relationships less likely. State-owned banks may also provide subsidies such as below-market interest rates on credit, reducing the probability that the recipients of these subsidies would seek other relationships. Thus, firms with their main relationship at a state-owned bank may be less likely have additional relationships or to diversify into another bank ownership type.

Another potential effect of bank ownership on multiple relationships and diversification is based on differences in monitoring. Prior research illustrates how decisions on multiple relationships may also depend on the costs and benefits of bank monitoring by multiple banks (e.g., Carletti 2004). State-owned banks often tolerate poor loan repayment performance and have very high proportions of nonperforming loans as a result. This tolerance or relatively low level of monitoring may be interpreted as a net monitoring benefit to a firm from a single relationship with a state-owned bank. Again, this suggests that firms with state-owned bank main banks may be relatively unlikely to have multiple relationships or diversify across bank ownership types. Based on both sets of arguments, we test the hypotheses that firms with state-owned banks for their main relationship are the least likely to maintain multiple

relationships, to have many relationships, or to diversify relationships across bank ownership types.

Our Indian data set provides an excellent opportunity to test the hypotheses, with information on firms, banks, and their relationships, as well as data on local market conditions. The data set includes information for 3,423 nonfinancial firms for the year 2001 from the Centre for Monitoring Indian Economy (CMIE). The firms are either listed on a national exchange or have sales or assets exceeding the equivalent of about US $4 million. In addition to firm characteristics, the data include the identities of the banks with which these firms have relationships. Firms with multiple relationships assign priorities to them, and we designate the bank with the highest priority as the firm's main relationship bank. For firms with only one relationship, we treat their only bank as their main bank.

These data are matched to information from the central bank on the size, financial condition, and ownership type of the commercial banks in the country. We identify four bank ownership types – foreign banks, two types of state-owned banks, and private domestic banks. The state-owned banks include the State Bank of India (SBI) and its associates, established in the 1950s with a substantial rural footprint. These are treated separately from the other type of state-owned bank: more recently nationalized large banks that are managed more as corporate entities and retained some prior management, staff, and relationships with large firms. For convenience, we refer to the four ownership types as foreign, SBI, nationalized, and private, respectively.[1]

We estimate three models of bank ownership types and firm-bank relationships. These are reduced forms that embody the preferences and needs of the firms, the abilities of the different types of banks to meeting these needs/preferences, and local market characteristics. Our first empirical model examines the determinants of the ownership type of the firm's main bank. The results are generally consistent with the hypothesis that foreign banks tend to serve as the main bank for transparent firms. However, the findings often do not support the hypothesis that state-owned banks provide the main relationship for types of firms they are mandated to serve.

Our second empirical model analyzes the effects of main bank ownership type and other variables on whether the firm has multiple banking relationships and on the number of relationships. The results

[1] Our sample excludes regional rural development banks (RRBs) – state-owned development finance vehicles that make microloans to the rural poor – that do not have relationships with the firms in our sample.

are consistent with the hypothesis that firms with foreign main banks are more likely than other firms to have multiple banking relationships and more relationships, and those with the stated-owned SBI as their main bank are relatively unlikely to have more than one relationship and fewer relationships. However, the findings for firms with the other type of state-owned bank, a nationalized bank, as their main bank are not consistent with the hypothesis.

Our third empirical model investigates the effects of main bank ownership type and other variables on whether firms diversify the ownership type of their banking relationships. The empirical findings are consistent with the hypotheses that firms with foreign main banks are the most likely to diversify across ownership types, while firms with state-owned main banks are least likely to do so.

The remainder of the paper is organized as follows. Section 2 reviews the literature on banking relationships, multiple relationships, and bank ownership types. Section 3 provides an overview of the Indian banking sector. Section 4 discusses the data set and provides summary statistics. Section 5 presents the empirical methodology. Section 6 presents the empirical results, and Section 7 concludes.

2. Literature review on banking relationships, multiple banking, and bank ownership type

Banking relationships

Although banking relationships is a general topic, much of the literature focuses on relationship lending to informationally opaque firms. Both theory and empirical evidence point to an advantage for large banks in transactions lending technologies, while small banks tend to excel in lending based on "soft" information. These differences may stem from economies (diseconomies) of scale in the processing and transmission of hard (soft) information (e.g., Stein 2002), managerial agency problems caused by some of the soft information being proprietary to the loan officer that require a closely-held organizational structure (e.g., Berger and Udell 2002), and Williamson-type (Williamson 1988) organizational diseconomies in large banks with using transactions technologies for large businesses along with relationship lending to SMEs. Empirical research supporting these differences includes findings that large banks base lending decisions more on financial ratios than on prior relationships (e.g., Cole, Goldberg, and White 2004) and that large banks tend to have shorter, less exclusive, less personal,

and longer-distance associations with SMEs (e.g., Berger, Miller, Petersen, Rajan, and Stein 2005).[2]

Because soft information is generally proprietary to the relationship bank, an exclusive banking relationship for a firm may give rise to a "hold up" problem and the extraction of rents from the firm (e.g., Sharpe 1990, Rajan 1992). Several key issues arise concerning the extent to which borrowers gain from relationships in terms of improved credit availability or contract terms and the actions that firms take to offset some of the potential extraction of rents. Some theories suggest that marginally creditworthy borrowers may have improved credit availability from this exploitation of market power, since it allows the bank to enforce long-term implicit contracts in which the borrower receives a subsidized interest rate in the short term, and then compensates the bank by paying a higher-than-competitive rate in a later period (Sharpe 1990). As the market power of the bank increases, firms with progressively lower credit quality may be able to obtain funding (Petersen and Rajan 1995). A number of empirical papers test this theory by measuring the association between credit availability and measures of market power, such as banking market concentration or other restrictions on bank competition (e.g., barriers to entry). The empirical results are mixed, with some finding more credit availability (e.g., Petersen and Rajan 1995, Cetorelli and Gambera 2001) and some finding less availability (e.g., Black and Strahan 2002, Berger, Hasan, and Klapper 2004) when measured market power is relatively high.

Some have also examined the issue of whether firms with stronger banking relationships generally have more credit availability or more favorable credit contract terms. Relationship strength is usually measured by its length, breadth, or whether the lending bank is the firm's main relationship bank (e.g., its "hausbank" in Germany). Some of the theories predict that contract terms such as interest rate and collateral requirements become easier for firms as a relationship matures (e.g., Boot and Thakor 1994, Petersen and Rajan 1995), whereas others predict that terms become tougher over the course of the relationship (e.g., Greenbaum, Kanatas, and Venezia 1989, Sharpe 1990).

The empirical literature has fairly consistently found more favorable treatment of firms with stronger banking relationships. Studies of measures of credit availability, such as higher loan application acceptance or less dependence on expensive trade credit are consistent with the notion that banking

[2] A significant caveat to this literature is that the lending technology is usually not observed, but is inferred from the loan contract terms or the characteristics of the SME receiving the credit (Berger and Udell forthcoming).

relationships facilitate access to financing (e.g., Petersen and Rajan 1994,1995, Cole 1998, Elsas and Krahnen 1998, Harhoff and Körting 1998, Machauer and Weber 2000). The empirical research is also consistent with improved loan contract terms, such as lower interest rates and collateral requirements when relationships are stronger (e.g., Berger and Udell 1995, Harhoff and Körting 1998, Degryse and van Cayseele 2000).[3]

Multiple banking relationships

The existing research refers to at least four major motives for multiple banking relationships. First, multiple relationships may arise when one bank cannot provide all the needs of a firm. This may be expected to occur when the firm is large, complex, and geographically dispersed, requiring more types of services in more locations.[4] Multiple relationships may arise, for example, when the firm's main bank is too small to provide enough credit, when the firm needs domestic and international services and the main bank has sufficient expertise in only one of these categories; or when the main bank does not have offices in all the localities where the firm needs services.

Second, firms may seek multiple banking relationships to mitigate the hold up problem of a single relationship bank discussed above (e.g., Von Thadden 1995, Boot 2000). This incentive may be greater when banking markets are less competitive, offering fewer potential alternatives in the future event that their main bank tightens contract terms dramatically.[5]

Third, firms may engage in multiple relationships to insure themselves against a premature withdrawal of credit or other services due to the distress of their main bank, rather than any deterioration in their own creditworthiness (e.g., Detragiache, Garella, and Guiso 2000). This incentive is greater, the more financially fragile is the firm's main bank. By maintaining additional relationships, the firm can increase the likelihood that at least one informed bank would be able to continue providing services, reducing the costs of bankruptcy or financial distress for the firm.

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[3] Studies of large, traded firms also find that banking relationships add value by showing that the announcement of bank loan agreements have a positive effect on firm stock prices (e.g., James 1987, Billet, Flannery, and Garfinkel 1995). A related literature also finds that announcements on the health of the main bank have a significant effect on firm stock prices (e.g., Slovin, Sushka, and Polonchek 1993, Djankov, Jindra, and Klapper 2005).

[4] Prior research finds that multiple-bank firms tend to be larger than single-bank firms (e.g., Houston and James 1996, Ongena and Smith 2000).

[5] A related theoretical model finds that it might be optimal for firms to have one main relationship lender plus a multitude of small bank lenders to reduce the hold up problem. This mix may be particularly advantageous for firms with high asset sensitivity or low expected cash flow (Elsas, Heinemann, and Tyrell 2004).

Fourth, multiple banking relationships may be driven by the costs and benefits to the firm from bank monitoring. In one model, the choice between single and multiple banking relationships depends on optimization by firms weighing the costs and benefits in terms of expected profitability and private benefits of the additional monitoring, including the effects on project success and duplication of monitoring costs (Carletti 2004).[6]

All four motives may create strong incentives for multiple relationships in developing economies where there may be significant market power because bank competition is frequently restricted, and where the costs of monitoring tend to be high due to poor disclosure/accounting standards and other factors. Banks in these nations also often have limited abilities to provide services; the banks are commonly financially fragile and the firms may often be in poor condition and cannot bear the costs of losing access to their main source of external finance. All of the motives may also be blunted for small, opaque firms because these firms often require the informational benefits of an exclusive relationship and because these firms may not be able to bear the duplicative costs of multiple relationships.

There is a growing empirical literature on the determinants of multiple banking (e.g., Houston and James 1996, Detragiache, Garella, and Guiso 2000, Machauer and Weber 2000, Ongena and Smith 2000, Berger, Klapper, and Udell 2001, Farinha and Santos 2002, Berger, Miller, Petersen, Rajan, and Stein 2005). Most of these studies focus on developed nations, such as the U.S., Italy, and Germany. These studies generally find that the likelihood of multiple banking relationships or the number of these relationships increases with firm size.[7] This is consistent with the first motive discussed above that their main bank cannot fulfill all their needs, given that large firms more often are in many localities, require domestic and international services, are complex, and may require more credit than their main bank is able to provide.[8] This result is also consistent with possibility noted above that small firms more

[6] A related study analyzes multiple bank lending from the perspective of banks in a setting where monitoring is essential (Carletti, Cerasi, and Daltung 2004). The model predicts greater use of multiple bank lending when banks are small relative to investment projects, firms are less profitable, and monitoring costs are high due to poor financial integration, strict regulation, and inefficient judicial systems.

[7] In some cases, these studies measure the number of lending relationships, rather than the more inclusive concept of banking relationships employed here.

[8] Also consistent with the first cause, one study finds that firms that are foreign affiliates of multinational corporations often choose a private domestic bank for their cash management services (Berger, Dai, Ongena, and Smith 2003). Presumably, these firms are often using their home nation bank for some other services, although that study did not have data on the firm's use of other banks.

frequently have exclusive relationships to resolve information problems and/or avoid duplicative costs of multiple relationships.

Regarding the second motive, there is evidence that large U.S. firms not only engage in multiple banking relationships in order to offset the hold up problem, but they also reduce the control of their main banks and lending costs by issuing public debt at higher costs (Houston and James 1996 and Santos and Winton 2005, respectively).[9] A cross-country study finds that firms maintain a higher number of banking relationships in countries with unconcentrated banking sectors, contrary to the theoretical predictions (Ongena and Smith 2000).[10]

Regarding the third motive, there is information on the effects of bank fragility and the costs to firms of losing their main banking relationship, but some of the evidence is also conflicting. One study using German data finds that borrower quality – which should be a proxy for the ability of the firm to recover in the event of the cutoff of bank funds – has no impact on the number of banking relationships (Machauer and Weber 2000).[11] However, a study using Italian data finds that the number of banking relationships is higher for firms with more leverage, suggesting lower quality, consistent with the third motive (Detragiache, Garella, and Guiso 2000). This study also finds that those borrowing from banks that are prone to financial distress – measured in terms of the bank's size, volatility of liquidity, and nonperforming loans – are likely to maintain a larger number of banking relationships, consistent with the motive for multiple banking as insurance against the premature termination of services. A study of Argentine banks similarly finds that bank fragility has a positive impact on the likelihood that a firm will borrow from multiple banks (Berger, Klapper, and Udell 2001). However, Ongena and Smith (2000) find mixed support in this regard. They find that firms maintain a higher number of banking relationships in countries with inefficient judicial systems and poor enforcement of property rights, consistent with the theory, but also find more banking relationships in nations with more stable banking systems (i.e., with better bank credit ratings), contrary to the predictions.

[9] A related empirical study finds that banks charge higher rates to customers with limited financing options during economic recessions (Santos and Winton 2005).

[10] One potential explanation for this result is that banks in unconcentrated sectors are smaller and firms might need many relationships to satisfy their needs.

[11] A second study using German survey data finds that multiple lending relationships increase collateral requirements (Harhoff and Korting 1998).

We are unaware of prior empirical evidence on the fourth motive –costs and benefits to the firm from monitoring. This theory is relatively new and the available data on monitoring costs may be limited.

Finally, we note that the hypotheses about the effects of bank ownership type on multiple relationships and diversification across ownership types are based primarily on extensions of the third and fourth motives for multiple banking relationships in the literature. We broaden the concept of bank fragility in the third motive to describe the banking relationship itself. We hypothesize that relationships with foreign banks may be particularly fragile primarily because these banks are the most likely to leave the country. We also postulate that relationships with state-owned banks may be particularly sturdy primarily because these banks generally are not subject to distress because of government backing. We also broaden the interpretation of monitoring costs and benefits in the fourth motive to include the tolerance of poor loan repayment performance by state-owned banks, giving a net monitoring benefit to firms that borrow from a single state-owned bank in the form of less pressure to repay their loans. These extensions of the third and fourth motives yield the hypotheses that firms with their main relationship at a foreign bank may be most likely to maintain multiple relationships and to diversify their banking relationships across ownership types, and vice versa for state-owned banks.

The performance effects of bank ownership type

We are not aware of any studies that directly examine the effects of bank ownership type on our relationship questions and hypotheses. However, there are a number of studies on the relative performance of foreign and state-owned banks. The extant research generally suggests that the foreign banks perform more poorly on average than private domestic institutions in developed nations (e.g., DeYoung and Nolle 1996, Berger, DeYoung, Genay, and Udell 2000). However, more relevant here is the common finding that the advantages of foreign banks often outweigh the disadvantages in developing nations in terms of bank performance. Foreign ownership is often associated with greater efficiency (e.g., Claessens, Demirguc-Kunt, and Huizinga 2001, Bonin, Hasan, and Wachtel 2004); more competitive national banking systems (e.g., Claessens and Laeven 2004, Martinez Peria and Mody 2004); and more business credit availability (e.g., Clarke, Cull, and Martinez Peria 2002, Berger, Hasan, and Klapper 2004, Bhaumik and Piesse 2005). Other literature shows that foreign banks provide a greater share of total funds in countries with stronger creditor rights and legal enforcement and less government

ownership of banking assets (Esty 2004) and in countries with smaller cultural and geographical "distances" between the foreign bank headquarters and local branches (Mian 2006).

The empirical literature on state-owned banks in developing nations generally finds unfavorable performance. Individual state-owned institutions have relatively low efficiency and high nonperforming loans, and large market shares for state-owned banks are associated with reduced access to credit, diminished financial system development, and slow economic growth (e.g., La Porta, Lopez-de-Silanes, and Shleifer 2002, Barth, Caprio, and Levine 2004, Beck, Demirguc-Kunt, and Maksimovic 2004, Berger, Hasan, and Klapper 2004, Berger, Clarke, Cull, Klapper, and Udell 2005). In some cases, they have also been found to subsidize or direct credit for political purposes (e.g., Cole 2004, Sapienza 2004) or lend mostly to large firms (e.g., Francisco and Kumar 2004). The low efficiency and high nonperforming loans are not necessarily contrary to the objectives of state-owned banks that are mandated to subsidize some negative net present value projects. However, the generally reduced access to credit, diminished development, slow economic growth, and focus on large firms do not appear to be consistent with their mandates.

3. The Indian banking sector

We distinguish among four categories of banking institutions identified by the Reserve Bank of India (RBI): *Foreign banks* that mostly entered after 1990 and operate local branches, the state-owned *State Bank of India* (*SBI*) formed in 1955 and its associates; *nationalized banks* that were formerly private large banks and became state-owned in two waves, 1969 and 1980, and *private Indian banks* that were mostly created after 1990.

Following independence in 1945, the RBI was formed as the central bank and high priority was given to increasing credit to rural areas and small businesses. In 1955, the government took over the largest bank, the Imperial Bank of India, to form SBI. The State Bank of India Act in 1959 directed SBI to take over regional banks that were associated with local governments and make them subsidiaries of SBI, which were later named "associates." SBI is now the largest commercial banking organization in the country – and one of the largest in the world. SBI and its seven regional associates have a substantial rural branching footprint – of about 14,000 branches of these banks, 74% are located in rural and semi-urban areas (India Banking Yearbook 2003).

Given continued pressure to extend bank credit to the agricultural and small business sectors, the Indian government nationalized 14 large banks in 1969 and another 6 banks in 1980 to redirect credit to "underserved" sectors and populations. Unlike SBI, nationalized banks remained corporate entities and retained most of their management and staff. Although their boards of directors were replaced by the state, appointees included representatives from both the government and private industry (Banerjee, Cole, and Dufflo 2005). RBI continued to fix interest rates on loans, and a significant portion of nationalized banks' deposit bases were redirected to support government expenditures through statutory measures that required banks to maintain specified fractions of their total deposits as cash balances with RBI and additional fractions in government and quasi-government securities.[12] However, the nationalized banks continue to the present day to maintain relationships with large firms that begun prior to nationalization. Thus, in our empirical analysis, we distinguish between the two state-owned bank categories to allow for the effects of their differences in governance and history on their relationship behavior.[13]

Banking sector liberalization and deregulation in India started in the early 1990s as part of a comprehensive reform agenda. This included permission to establish de novo banks and the entry of foreign banks, the deregulation of branch expansion, and the privatization of some state-owned banks. Interest rates were also liberalized and banks were permitted to invest in equity. However, as of 2004, all commercial banks are still required to make loans to "priority sectors" at below-market rates. These sectors consist largely of agriculture, exporters, and small businesses.

Most foreign banks began operating in the 1990s under a license to open branches and are permitted to take deposits and provide credit in accordance with local banking laws and RBI regulations.[14] Between 1994 and 2000, 21 foreign banks were established. Foreign banks have generally not purchased shares of local Indian banks, since foreign banks were restricted to a ceiling of 10% of voting rights, even though foreign banks could legally own up to 74% of equity. Planned revised

[12] Previous literature finds that the extension of credit by Indian banks is affected by lending restrictions and other RBI regulations (Bhaumik and Piesse 2005).

[13] Both SBI and nationalized banks are subject to Central Vigilance Commission (CVC) oversight. The CVC, which was designed to prevent cronyism, can hold loan officers at these banks criminally liable for lost loans (Banerjee, Cole, and Duflo 2005). As a result, loan officers in SBI and nationalized banks might focus more on relatively safe loans and hard information lending technologies, since officers may be less likely to be prosecuted when the ex ante probability of loss was low and when hard information is available to document the decisions.

[14] A few foreign banks, such as Standard Charter, have had limited operations in India for decades.

regulations will allow foreign banks to open 100% capitalized wholly-owned subsidiaries in India. Foreign banks have typically focused their operations in the top 25 cities in the country, likely due in part to restrictions on branch expansion.[15] The foreign banks generally use more modern equipment, pay higher salaries, and attract better-trained employees (IndiaMart 2004).

Private banks are primarily de novo entrants that were granted banking licenses during the financial liberalization in the early 1990s. A total of 25 de novo private banks began operations between 1994 and 2000. There are also a small number of incumbent private banks that existed before 1990 and some state-owned institutions that have been successfully privatized. An example of the latter is ICICI, which was formed in 1955 as a state-owned institution at the initiative of the Government of India and the World Bank to create a development financial institution for providing medium- and long-term project financing to Indian businesses. During the 1990s, ICICI was privatized and evolved into a private, full-service bank and is now India's second largest bank offering a wide range of services to retail and corporate customers.

As shown in Table 1, the foreign banks are most numerous, but they have relatively few branches and accounts and also have fewer deposits and assets than the other types. Nationalized banks are the largest type as measured by number of branches, accounts, deposits, and assets. The state-owned banks combined – SBI plus the nationalized banks – dominate the banking sector with about 80% of deposits and assets.

4. Data and Summary Statistics

We match data from nonfinancial firms, the banks with which they have relationships, and information on their local market. The firm data are from *Prowess*, an electronic database produced by the Centre for Monitoring Indian Economy (CMIE). This database includes firms that are required to file annual accounting reports and have submitted reports for at least three years. This comprises: (i) firms that are listed on a national exchange (National Stock Exchange or Bombay Stock Exchange), and (ii) all unlisted public limited companies that have sales or assets more than Rs. 200,000,000 or about U.S. $4.23 million. Prowess includes balance sheet, income statement, and other financial information for over

[15] Foreign banks currently operate only on a branch license basis under which they are required to keep locally $25 million in capital for the first three branches. Further expansion does not require additional capital, but requires RBI approval, which is often difficult to receive.

7,000 firms over time. Prowess also includes information on the ownership type of the firm and the names of the banks with which the firm maintains relationships. The data set lists up to 26 banks with which the firm has relationships of all types – including lending, deposit, or other types of relationships – listed in order of priority according to each firm's own assessment.[16]

We exclude a number of firms from the sample. First, we drop financial firms and firms with missing key financial information, reducing the sample to 4,382 firms. We also exclude 628 firms that do not list a main bank and 313 firms that list a main bank with financial institutions that are not regulated by the RBI and hence do not submit audited financial statements to RBI.[17] Finally, we exclude 18 firms for which the ownership of the firm is either cooperative or undisclosed. These exclusions reduce our sample of firms to 3,423. However, missing information on some indicators of main bank fragility – liquidity and nonperforming loans – reduces the sample of firms to 3,357 in some specifications.

Table 2, Panel A shows definitions and summary statistics of all firm characteristics based on the final sample of 3,357 nonfinancial firms with all of the data needed for the regression analyses. We use the firm size classification of the Indian Ministry of Industry (2003): Small and medium sized firms (*SME*) are identified as firms with gross fixed assets less than Rs. 100 million (about US $2.2 million). The SMEs in our sample generally do not include the smallest firms in India due to the requirements for firms to be included in Prowess. Thus, the sample is significantly skewed towards large Indian firms (excluded from the regression equations as the base case), which comprise 64% of the sample. We also include the natural log of the number of years since incorporation (*Log Age*), but we report the actual average firm age in Table 2. The ages of firms in our sample range from 2 to 178 years, with an average age of 26.62 years. We use *SME* and *Log Age* to proxy for small, opaque firms with limited access to private-sector credit.

We also include two direct measures of access to nonbank external finance. We use a dummy for firms that are listed on one of the two national exchanges (*Listed*), 25% of the sample. These firms have access to public equity financing, which may reduce their dependence on banks. Listed firms may also

[16] Others use Prowess to study the privatization of state-owned firms (Gupta 2005) and the effect of firm ownership and industry concentration on changes to entry regulations (Chari and Gupta 2005).

[17] Thus, we drop firms with relationships with development banks, co-operative banks, and offshore foreign banks, since we do not have comparable bank data (we use only domestic assets and capital of foreign bank branches).

have greater transparency because of exchange disclosure requirements. We also include a dummy for firms that belong to Indian business groups (*Business Groups*), 36% of the sample. These firms may have access to inter-company loans or be able to use other firms in their group as guarantors.[18]

Our third set of firm variables includes dummies that classify firm ownership, as identified by CMIE. In particular, we distinguish between foreign, state-owned, and private domestic firms (the omitted category). A firm's ownership may affect its access to and need for bank finance. Foreign firms may have cheaper financing overseas or via their parent firm and state-owned firms may secure financing from government agencies (including banks) directly or gain access indirectly by virtue of an implicit government guarantee. In our sample, approximately 90% of firms are privately-owned, 6% are foreign-owned, and 4% are state-owned.

The fourth group of variables measure firm performance. We include return on assets (*ROA*) and the ratio of total debt to total assets (*Leverage*) to control for profitability and indebtedness, respectively. Average ROA is 0.04 and the average leverage ratio is 0.39.[19]

We also include controls for the firm's location and sector in all regressions, but do not display these in the tables. We use dummies for 4 Indian regions (North, East, South, and West) and 7 industry sectors (food, textile, chemicals, electronics, machinery and tools and others).[20]

Panel B shows our variables for banking relationships, and the characteristics of the main bank – the bank with the highest priority relationship with the firm. As noted, this highest priority is based on the perception of the firm, and does correspond to any mechanical rule, such as the largest lender. We argue that this criterion is a very useful indicator of the strongest relationship, since it is assigned the highest value by the firm. We include a dummy that equals one if the firm has multiple (i.e., more than

[18] Prior research finds that firms belonging to diversified Indian business groups outperform unaffiliated firms (Khanna and Palepu 2001) and are less likely to become bankrupt during financial distress (Gopalan, Nanda, and Seru 2005).

[19] In some estimations, we also included sales growth but since this variable was never significant and reduced the sample of firms, these estimations are not shown.

[20] Approximately 40% of firms in the sample are located in Western India, 30% are in the South, 19% are located in the North and 14% are in Eastern India. In terms of sectors, 22% of firms are in the chemicals and pharmaceutical sectors, 30% are in the electronics and machinery sectors, 15% are in the service industry, 10% are in textiles, and 9% are in the foods sector. The remaining 14% are in the "others" category, which includes glass and ceramics, paper and printing, construction, mining and quarrying; extraction of crude petroleum and natural gas; manufacture of coke; refined petroleum products and nuclear fuel; electricity, gas, stream and hot water supply; manufacture of furniture and manufacturing N.E.C.; hotels and restaurants; diversified; etc.

one) banking relationship (*Multiple Banks Dummy*) and a separate variable that records the actual number of banking relationships up to 26 (*Number of Banking Relationships*). About 60% of firms have multiple banking relationships, and the average firm has 2.74 relationships. Finally, we also include a dummy (*Diversification*) for firms that diversify their relationships across banks of different ownership types, i.e., have relationships with at least two different ownership types. Almost half of the firms, 49%, diversify across bank ownership types.

Balance sheet information on the main banks is from the Accounts of Scheduled Commercial Banks, published by the RBI. We include main bank size (*Log Assets*) and three measures of main bank fragility: the ratio of equity capital to total assets (*Capital Asset Ratio*), the ratio of nonperforming loans to total net loans (*Nonperforming Loans*), and the ratio of liquid assets (cash, balance with other banks, and money market instruments) to total assets (*Liquidity*).[21] The average size of main banks is Rs. 351,512.3 **(**US$ 7 billion) in assets.[22] The average main bank fragility indicators are 0.05 for the capital ratio, 0.06 for the nonperforming loans ratio, and 0.19 for the ratio of liquid to total assets.

When we measure main bank fragility in the regressions, we always include the bank's capital ratio, the most standard measure of bank financial condition. However, we report the regressions both with and without the nonperforming loans and liquidity ratios, since we find these to be more questionable indicators of fragility. Nonperforming loan numbers can be manipulated by banks through "evergreening," the practice of rolling over overdue loans and/or providing additional credit to cover the required repayments on existing loans. Liquidity ratios may in some circumstances not adequately reflect the lending capacity of banks. For example, apparently illiquid but solvent banks might be able to borrow (from banks or the government) to continue to extend loans to clients with whom they have a relationship. Banks that appear to be highly liquid – for example because they have high balances with other banks – might find those resources to be unavailable if the other banks run into trouble.

We also create dummies for the ownership type of the main bank – foreign, SBI, nationalized, or private. Most firms, 62%, have a nationalized bank as its main bank, 16% have an SBI bank, 12% have a

[21] Nonperforming loans in the sample have interest or principal past due more than 180 days. This was changed to 90 days past due in 2004.

[22] These averages are for all firm-bank observations in our sample and reflect the frequency with which the banks are reported as the main bank by firms in the sample. The average size of all the commercial banks in our sample (independent of how often they serve as a main bank) is considerably lower, approximately US$2 billion.

private bank, and 10% a foreign bank.

Panel C shows the local market characteristics used to account for differences in the local economy and supply of banking services, using the Indian state as the local market. CMIE provides information on each firm's "headquarters district," the main location of firm operations. Sample firms are located in 25 different states. We also use information on the total number of banks in the market from the RBI Branch Banking Statistics (2002). We find that the average local market has 61 banks, ranging from a minimum of 6 for one very small state to a maximum of 68 (*Number of Banks*). In the model for main bank ownership type below, we include a dummy for the presence of at least one foreign bank in the state to control for whether the firm has a convenient choice of a foreign main bank**.** At least one foreign bank operates in 16 out of the 25 states of India represented in our sample. However, because most firms are in those 16 states, the mean for this variable (*At least 1 foreign bank present*) is 0.97. In the regressions where we estimate the likelihood that firms will diversify across bank ownership types, we control for the degree of concentration in the bank ownership types operating in the local market. *Bank ownership concentration* is defined as the sum of squared shares of the number of banks of our four ownership types. The mean for this variable is 0.3. We use Census India 2001 to collect population density to proxy for rural versus urban areas (*Population Density*). The average population density per square kilometer is 1,441 people, with a wide range from 109 to 9,294 people. All data are for 2001.

5. Empirical Methodology

Determinants of main bank ownership type

Our first model tests the effects of firm and local market characteristics in determining the ownership type of the firm's main bank:

$$\textit{Main bank ownership type} = f\{\textit{Firm characteristics, Local market characteristics}\} \qquad (1)$$

The dependent variables are dummies which equal 1 if the main bank is the given ownership type (foreign, SBI, nationalized, or private) and 0 otherwise. The firm characteristics include measures of firm opacity, access to external finance, ownership type, financial performance, location, and industry type. Local market characteristics include a dummy for the presence of at least one foreign bank (so the firm

has the choice of a foreign main bank) in the state where the firm's headquarters is located. Also, we control for the population density of the state where the firm is located.

We estimate equation (1) using a multinomial logit model to determine the likelihood that the main bank is foreign, SBI, or nationalized, relative to the omitted private bank category. This model allows us to test the hypotheses that foreign banks tend to serve as the main bank for transparent firms (i.e., large, listed, and foreign firms) and state-owned banks tend to establish relationships with firms for which they may have mandates to serve, such as small, opaque firms with limited access to private-sector credit, state-owned firms, and firms in rural areas. We also compare the two types of state-owned banks (SBI and nationalized) to see if they tend to serve as the main bank for similar or different kinds of firms.

Determinants of multiple banking relationships and number of relationships

Our second model investigates the determinants of multiple relationships and the number of relationships in two ways. First, we estimate a two-step Heckman selection model. In the first stage we estimate the likelihood that a firm has multiple banking relationships and in the second stage we estimate the number of relationships. We pursue this approach in light of the findings by Detragiache, Garella, and Guiso (2000), which suggest a nonmonotonic relationship between bank fragility and the number of banking relationships.[23] We also use their same exclusion restriction to identify the two-step model. In particular, we assume that firms' R&D expense ratio helps explain whether the firm has more than one banking relationship, because high-intensity research firms may be subject to more rent extraction by single relationship bank, but beyond that will have no effect on the actual number of relationships. Second, we study the actual number of banking relationships (*Number of Banking Relationships*) by estimating a Poisson model that is frequently used with count data. In both cases, we assume that multiple banking relationships is a function of firm, local market, and main bank characteristics as illustrated in equation (2):

Multiple Relationships (Dummy or Number) = g{Firm characteristics, Main bank characteristics, Local market characteristics} (2)

[23] An important difference between our approach and theirs is that we define fragility exclusively in terms of the main bank and not all relationship banks as they do.

The firm characteristics in equation (2) are identical to those in equation (1). We expect transparent firms (large, listed, foreign) to be more likely to have multiple relationships because of needs that cannot be fulfilled by a single bank and because they less often require exclusive relationships to address opacity problems or minimize duplicative costs. In contrast, we expect small, young firms with limited access to credit to be more likely to have single relationships because of requirements for fewer services, greater need to exclusivity to resolve information problems, and inability to bear the costs of multiple relationships. We also expect state-owned nonfinancial firms to be more likely to have multiple relationships because they are typically very large and operate in many states.

The main bank characteristics include measures of main bank size, main bank fragility, and dummies for main bank ownership type. As discussed above, we always include the capital asset ratio as an indicator of main bank fragility, but run the models with and without the nonperforming loans and liquidity ratios, which are more questionable. While the literature has included firm and market characteristics and measures of bank fragility, no prior study of multiple banking has, to our knowledge, included variables to distinguish between main bank ownership types.

We use equation (2) to test the key hypotheses that relationships with foreign banks may be particularly fragile (most likely to leave the country) and relationships with state-owned banks may be particularly sturdy (least subject to distress, least likely to withdraw due to deterioration of firm condition). We also test the more conventional hypothesis that the number of banking relationships should increase with main bank fragility.

Finally, the local market characteristics differ in two ways from those in equation (1). First, we exclude the dummy for the presence of at least one foreign bank, which is not necessary for multiple banking. Second, we add the log of the number of banks in the market – the state where the firm's headquarters is located. More local banks may indicate less bank market power, reducing the incentive for multiple banking to avoid bank hold up problems. Alternatively, more nearby banks may encourage multiple banking because additional banks are more conveniently located.

Determinants of the likelihood of diversification of bank ownership type

Our third model investigates whether firms diversify across bank ownership types. In particular, we conduct probit estimations of the likelihood that firms will diversify, where the dependent variable,

Diversification, is a dummy that equals one if the firm has relationships with at least two different bank ownership types and zero otherwise. To be clear, a diversified firm has multiple banking relationships and not all are with banks of the same ownership type (e.g., a foreign bank and a nationalized bank), and an undiversified firm either has a single relationship or has multiple relationships with the same ownership type (e.g., all foreign banks). As in equation (2) for the number of banking relationships, we assume that diversification is a function of firm, local market, and main bank characteristics:

$$Diversification = h\{Firm\ characteristics,\ Main\ bank\ characteristics,\ Local\ market\ characteristics\}, \quad (3)$$

In equation (3), the firm and main bank characteristics are the same as those in model (2) for the number of banking relationships. However, in the market characteristics, we replace the log of the number of local banks in the state with an index of bank ownership concentration in the state. This is defined as the sum of the squared shares of the numbers of banks of each type relative to the total number of banks in the state. Presumably, there will be less diversification of bank ownership type among firms when there is more concentration of bank ownership in the market.

The key hypotheses tested using model (3) are consonant with those for model (2). We test whether firms with their main relationship at a foreign bank are more likely to diversify across bank ownership types, and vice versa for those with state-owned main banks.

6. Empirical results

Tables 3, 4, and 5 show our regressions results for the determinants of the main bank ownership type (Table 3), multiple banking relationships and number of relationships (Table 4), and diversification across bank ownership types (Table 5). The estimations are all nonlinear forms with limited dependent variables, so we report marginal effects instead of coefficients for the exogenous variables to facilitate evaluation of whether their magnitudes are of economic importance. In most cases, our key exogenous variables of interest are dummy variables such as a bank ownership type (e.g., Main bank foreign) or firm characteristic (e.g., SME) that take on the values 0 or 1. For each of these variables, the reported marginal effect is the difference in predicted value for the dependent variable (e.g., probability of multiple relationships) for a dummy value of 1 versus 0, with all other exogenous variables at their means. For the

continuous exogenous variables, the reported marginal effects are the derivatives of the predicted dependent variable for small changes in the exogenous variables.

Results for determinants of main bank ownership type

Table 3 shows the marginal effects for the determinants of the main bank ownership type (equation 3). The estimation is a multinomial logit model in which private banks are the excluded benchmark category. We report estimations including: (a) all firms, (b) firms older than 10 years, (c) private firms, (d) private firms with one banking relationship. We include the different subsamples to show the robustness of our results. The subsample of older firms (b) help us examine whether our findings are driven by relationships that existed prior to the liberalization in India that occurred approximately a decade prior to our sample period of 2001 versus determined primarily by small, young firms that established relationships subsequent to the liberalization. Subsample (c) excludes state-owned firms that may be bound to preexisting relationships with state-owned banks. Further limiting the data to only firms with one relationship in subsample (d) checks if our results are driven by which banking relationship firms list as the highest-priority or main relationship, since firms with one relationship have an unambiguous main bank identity.

The results for all firms in column (a) of Table 3 are generally consistent with the hypothesis that foreign banks tend to serve as the main relationship bank for transparent firms. Foreign banks serve mostly large, well-connected, well-performing, listed, foreign, and urban firms. However, the results do not generally support the hypothesis that state-owned banks act as the main bank for the types of firms they are mandated to serve. SBI is not found to be more likely to serve SMEs, young firms, or state-owned firms than private banks (the excluded category in Table 3), although SBI is more likely to serve rural firms (negative effect of population density). The other type of state-owned bank, nationalized banks, is significantly less likely to serve as the main bank for SMEs and young firms than private banks, and is no more likely to serve state-owned or rural firms. However, an important caveat to these findings is that our data set does not have information on the smallest firms in India.

In some cases, the differences in the predicted effects of firm characteristics on main bank ownership type are large in magnitude, and in other cases, the quantitative effects are relatively small. For example, the predicted probability of having a foreign main bank rather than a private main bank (the

excluded category) is 5.7, 3.8, and 26.4 percentage points higher for a firm that is listed, belongs to a business group, and is foreign-owned, respectively. However, the predicted effect of a firm being small (SME) on the likelihood of having a foreign main bank is only 2.2 percentage points lower. Regarding the probability of having a state-owned main bank, most of the key firm characteristics describing the types of firms that these institutions are mandated to serve are not statistically significant or large in magnitude, although SMEs are predicted to be 4.6 percentage points less likely to have nationalized banks than private banks.

The results for subsample (b) of firms older than 10 years yield very similar results for foreign main banks, and some minor differences for the firms served by state-owned banks. The finding that neither type of state-owned bank tends to serve as main bank for SMEs remains intact, suggesting that our finding in this regard was not simply driven by young, small firms that established relationships after liberalization. Within the subsample of older firms, SBI does more often act as main bank for state-owned firms than private firms. The results for subsamples (c) and (d) of all private firms and those with a single relationship again confirm that state-owned banks do not specialize in relationships with small, young firms.

Results for determinants of multiple banking relationships and number of relationships

Table 4 shows the results of our tests for the determinants of whether firms have multiple banking relationships and the number of these relationships (equation 4). The table shows both stages of the two-stage selection model – multiple versus single relationship for the firm (1^{st} stage), and the number of relationships for those with multiple relationships (2^{nd} stage). This table also shows results from a Poisson model for the number of relationships (i.e., 1,2,3,…). The findings for the two methods are generally consistent.

We run the models both with and without the main bank ownership variables. The findings of strong statistical significance and substantial magnitudes support our innovation of including these variables. The positive, significant coefficients on the foreign main bank dummy are consistent with the hypothesis that firms with foreign main banks are more likely than other firms to have multiple relationships and more total relationships. The consistently negative, significant coefficients on SBI are also consistent with the hypothesis that firms with state-owned main banks are likely to have fewer

relationships. However, the findings for nationalized banks are not consistent with this hypothesis – these banks are found to be no less likely than private banks to have multiple relationships, and to have more relationships when they have more than one.

The measured effects of foreign and SBI main banks are also substantial in magnitude. According to the marginal effects of the two-stage model, firms with foreign main banks are predicted to be over 20 percentage points more likely than those with private main banks to have multiple banking relationships, and to have more than 2 additional relationships when they do have multiple relationships. The model also predicts those with SBI as their main bank are about 40 percentage points less likely than those with private main banks to have multiple relationships, with more than 2 fewer relationships conditioned on multiple relationships. The marginal effects from the Poisson model are similarly substantial.

We also find some support for the hypothesis that firms with financially fragile main banks are more likely to have multiple banking relationships. The coefficients on the capital asset ratio are negative and significant in the full specifications with the bank ownership type variables included. However, main bank liquidity and nonperforming loans are not consistently significant.

The coefficients on the firm characteristics are mostly consistent with expectations. Large firms, listed firms, firms in business groups and state-owned firms tend to have more banking relationships. However, perhaps surprisingly, the findings for firm age and foreign firms are not significant.

Results for the determinants of the likelihood of bank ownership type diversification

Table 5 presents the empirical results for the likelihood that firms diversify across bank ownership types. The findings are consistent with the hypotheses that firms with foreign main banks are the most likely to diversify across ownership types and firms with either type of state-owned bank for their main relationship are least likely to diversify.

These findings are also large in magnitude, particularly for foreign banks and SBI. The marginal effects of about 0.25 and -0.50 for foreign banks and SBI, respectively, imply very large predicted effects on the predicted probabilities of diversification from differences in bank ownership type.

The measured effects of main bank fragility are not consistent, but most of the effects of the firm characteristics are qualitatively similar to the findings for the number of banks above.

7. Conclusions

We formulate and test hypotheses about the links between bank ownership type and relationships using data from an important developing nation. Specifically, we directly address hypotheses about 1) the kinds of firms that have their main banking relationship with foreign, state-owned, and private domestic banks, 2) the effects of these bank ownership types on whether firms have multiple banking relationships and the number of these relationships, and 3) whether firms diversify across these ownership types. Our analysis uses data from India, one of the largest and fastest growing developing nations, which also has a mix of all the major different bank ownership types. The Indian economy is representative as well of financial market imperfections that are prevalent in many developing countries.

Our data set is particularly informative on these issues because it has information on a large number of nonfinancial firms; their banking relationships and markets; and the banks themselves. The data set also distinguishes between two types of state-owned banks – SBI and nationalized banks – with different governance structures and history. The data set is for 2001, allowing a period of about 10 years for most of the effects of the liberalization of India's banking sector to have taken effect.

We test the hypothesis that foreign banks may be most likely to serve as the main relationship bank for transparent firms (e.g., large, listed, foreign firms) and state-owned banks tend to provide relationships for firms they are mandated to serve (e.g., small firms with limited credit access, state-owned firms, rural firms). We also test hypotheses that firms with main relationships at foreign banks may be more likely to maintain multiple relationships, more relationships, and to diversify across ownership types by having at least one other banking relationship with another ownership type. We test the converse for firms with state-owned banks for their main relationship – that they are least likely to maintain multiple relationships, have many relationships, or diversify across bank ownership types.

These hypotheses are based primarily on extensions of current theories about banking relationships and multiple relationships. For instance, we build on the theory that firms may have multiple relationships to insure themselves against a premature withdrawal of services due to the financial fragility of their main bank. We broaden this concept to describe the fragility of the banking relationship itself. This is linked to bank ownership type based on arguments that relationships with foreign banks may be particularly fragile (most likely to leave the country) and relationships with state-owned banks

may be most sturdy (least subject to distress, least likely to withdraw services due to firm deterioration).

Our empirical results are consistent with all of the hypotheses with regard to foreign banks. We find that foreign banks tend to serve as the main bank for transparent firms, that firms with foreign main banks are most likely to have multiple banking relationships and the most relationships, and are most likely to diversify their relationships across ownership types.

However, our results are not always consistent with the hypotheses with regard to state-owned banks. We find that state-owned banks often do not tend to provide the main relationship for types of firms they are mandated to serve – for example, private banks more often serve as the main bank for small, young firms that likely have difficulty obtaining credit. The predictions of negative effects on multiple banking and number of relationships do hold for one type of state-owned bank, SBI, but not for the other type, nationalized banks that are governed more like private banks. Finally, the empirical findings are consistent with the hypothesis that firms with state-owned main banks of either type are relatively unlikely to diversify their relationships across bank ownership types.

Our findings suggest some policy concerns about whether state-owned banks fulfill their mandates. The data suggest they may possibly crowd out private banks that might be better at relationships with relatively small, young firms, although with the significant caveat that our data do not include the smallest firms in India. As well, the differences between the two types of state-owned banks suggest that the governance structure and history of these institutions may have important effects on their relationship behavior. Importantly, all of our results may be affected by the history and regulatory environment in India. Additional research on the links between bank ownership type and bank-firm relationships in other nations is needed to confirm or contradict our findings.

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Table 1: Banking Statistics

Statistics are from the Reserve Bank of India (RBI) for 2001.

	# Banks	# Branches	# Accounts	Total Deposits (million US $)	Total Assets (million US $)
Foreign	46	251	26,830	12,544	21,579
SBI	8	13,550	989,850	66,146	85,381
Nationalized	20	32,579	2,346,410	115,979	132,856
Private	36	5,524	290,800	28,963	34,625

Table 2: Variable Definitions and Summary Statistics

Variable	Definition	Mean	Min.	Max.	Std. Dev.
Panel A: Firm Characteristics					
Firm Size and Age					
SME	Dummy variable equal to 1 if the firm is small or medium sized – defined as gross fixed assets less than Rs. 100 million (US$ 5.5 million) – and 0 otherwise. Source: CMIE	0.36	0	1	0.48
Age	Age in years. Source: CMIE	26.62	2	178	20.95
Firm Access to External Finance					
Listed	Dummy variable equal to 1 if the firm is listed on the Bombay Stock Exchange (BSE) or National Stock Exchange (NSE) and 0 otherwise. Source: CMIE	0.25	0	1	0.43
Business Groups	Dummy variable equal to 1 if the firm belongs to an Indian business group and 0 otherwise. Source: CMIE	0.36	0	1	0.48
Firm Ownership					
Foreign firm	Dummy variable equal to 1 if the firm is foreign-owned and 0 otherwise. Source: CMIE	0.06	0	1	0.25
State-owned firm	Dummy variable equal to 1 if the firm is state-owned and 0 otherwise. Source: CMIE	0.04	0	1	0.19
Firm Operations					
ROA	The ratio of profit before interest and tax to total assets (with tails cut above 99th and below 1st percentile) Source: CMIE	0.04	-0.50	0.39	0.11
Leverage	The ratio of total debt to equity. Source: CMIE	0.39	0	2.45	0.35
R&D expenses	Ratio of R&D expenses to capital. Source: RBI				

Table 2: Variable Definitions and Summary Statistics (Cont.)

Variable	Definition	Mean	Min.	Max.	Std. Dev.
Panel B: Banking Relationships and Main Bank Characteristics					
Banking Relationships					
Multiple Banks Dummy	Dummy variable equal to 1 if the number of banking relationships is greater than 1 and 0 otherwise. Source: CMIE	0.60	0	1	0.49
Number of Banking Relationships	Numerical variable equal to the number of banking relationships. Source: CMIE	2.73	1	26	2.48
Diversification	Dummy equal to 1 for firms for firms that diversify their relationships across banks of different ownership types, i.e., have relationships with at least two different ownership types.	0.49	0	1	0.50
Main Bank Size and Fragility					
Log Assets	The log of assets (in million Rs.) at the main bank. Source: Reserve Bank of India (RBI) (Mean shown is for Assets, not Log Assets)	351,512	6186	3,140,837	3.25
Capital Asset Ratio	The ratio of the sum of total equity and total reserves to total assets at the main bank. Source: RBI.	0.05	0.03	0.11	0.02
Nonperforming Loans	The ratio of nonperforming loans (interest or principal more than 180 days past due) to net loans. Source: RBI	0.06	0.0004	0.24	0.03
Liquidity	Ratio of cash plus balances with other banks plus money market instruments over total assets. Source: RBI	0.19	0.05	0.41	0.07
Main Bank Ownership					
Foreign	Dummy variable equal to 1 if the main bank is a foreign bank and 0 otherwise. Source: RBI.	0.10	0	1	0.30
SBI	Dummy variable equal to 1 if the main bank is an SBI bank and 0 otherwise. Source: RBI.	0.16	0	1	0.37
Nationalized	Dummy variable equal to 1 if the main bank is a nationalized bank and 0 otherwise. Source: RBI.	0.62	0	1	0.49
Private	Dummy variable equal to 1 if the main bank is a private Indian bank and 0 otherwise. Source: RBI.	0.12	0	1	0.33
Panel C: Local Market Characteristics					
Number of Banks	The total number of banks that operate in each state. Source: RBI.	61.13	6	68	9.09
Bank ownership concentration	Sum of squared shares of number of banks of ownership type i over total number of banks, where i: foreign, SBI, nationalized and private. Source: RBI	0.30	0.27	0.67	0.04
At Least 1 Foreign Bank Present	Dummy variable equal to 1 if there is at least 1 foreign bank in the state. Source: RBI.	0.97	0	1	0.16
Population Density	Density of the population in 1,000 people per square kilometer. Source: Census India 2001.	1.44	1.09	92.94	28.16

Table 3: Marginal Effects for the Determinants of Main Bank Ownership Type - Multinomial Logit Estimations

	(a) All firms			(b) Firms of age>10 years			(c) Private firms only			(d) Private firms with 1 banking relationship		
	Foreign	SBI	Nationalized	Foreign	SBI	Nationalized	Foreign	SBI	Nationalized	Foreign	SBI	Nationalized
Firm Characteristics												
SME	-0.022	0.017	-0.046	-0.014	0.015	-0.041	-0.023	0.010	-0.042	0.000	-0.049	-0.004
	[1.98]**	[1.17]	[2.29]**	[1.15]	[0.95]	[1.84]*	[1.97]**	[0.73]	[2.03]**	[1.18]	[1.70]*	[0.12]
Log of age	-0.003	0.002	0.030	0.013	-0.027	0.044	-0.003	0.002	0.034	-0.000	-0.005	0.036
	[0.40]	[0.27]	[2.52]**	[1.57]	[2.22]**	[2.73]***	[0.38]	[0.21]	[2.72]***	[0.47]	[0.25]	[1.66]*
Listed	0.057	-0.104	0.024	0.060	-0.108	0.022	0.055	-0.111	0.033	0.002	0.019	-0.021
	[4.12]***	[7.95]***	[1.07]	[4.04]***	[7.47]***	[0.93]	[3.91]***	[8.55]***	[1.44]	[2.04]**	[0.35]	[0.37]
Business group	0.038	-0.016	-0.006	0.028	-0.010	-0.003	0.039	-0.015	-0.008	0.001	0.062	-0.062
	[3.23]***	[1.17]	[0.31]	[2.31]**	[0.66]	[0.17]	[3.33]**	[1.10]	[0.43]	[1.28]	[1.90]*	[1.81]*
Foreign firms	0.264	-0.061	-0.177	0.245	-0.046	-0.167	0.268	-0.059	-0.181	0.006	0.054	-0.048
	[6.86]***	[2.83]***	[4.43]***	[5.76]***	[1.73]*	[3.74]***	[6.91]***	[2.79]***	[4.53]***	[1.84]*	[0.71]	[0.61]
State-owned firms	-0.030	0.053	0.054	-0.037	0.072	0.031						
	[1.48]	[1.43]	[1.29]	[2.00]**	[1.75]*	[0.70]						
ROA	0.138	0.101	-0.295	0.165	0.044	-0.238	0.137	0.097	-0.307	-0.000	0.297	-0.409
	[2.83]***	[1.74]*	[3.55]***	[2.94]***	[0.68]	[2.62]***	[2.71]***	[1.63]*	[3.58]***	[0.14]	[2.24]**	[2.86]***
Debt to assets	-0.075	0.035	0.059	-0.062	0.013	0.076	-0.085	0.034	0.066	-0.000	0.049	-0.061
	[3.26]***	[1.98]**	[2.08]**	[2.45]**	[0.65]	[2.43]**	[3.50]***	[1.89]*	[2.21]**	[0.09]	[1.21]	[1.43]
Local Market Characteristics												
At least one bank foreign	0.075	-0.096	-0.038	0.067	-0.078	-0.028	0.076	-0.104	-0.032	0.000	-0.084	0.025
	[6.93]***	[2.07]**	[0.75]	[4.74]***	[1.63]	[0.51]	[6.76]***	[2.15]**	[0.61]	[0.02]	[1.03]	[0.30]
Log of population density	0.013	-0.023	0.010	0.017	-0.027	0.009	0.014	-0.023	0.007	0.001	-0.043	0.031
	[1.88]*	[2.66]***	[0.84]	[2.27]**	[2.78]***	[0.65]	[1.94]*	[2.58]***	[0.57]	[1.92]*	[2.15]**	[1.47]
Observations	3422			2850			3280			1320		

Private bank is the base category in the multinomial logit. Robust z statistics are in brackets. *,*, *** indicate significance at 10, 5, and 1 percent, respectively

Table 4: Marginal Effects of the Determinants of the Number of Banking Relationships

	1st stage Heckman Likelihood of multiple banking relationship				2nd stage Heckman Number of banking relationships				Poisson Number of banking relationships			
Firm Characteristics												
SME	-0.192	-0.187	-0.195	-0.188	-0.921	-1.374	-0.771	-1.216	-0.753	-0.666	-0.751	-0.667
	[8.93]***	[8.49]***	[9.03]***	[8.50]***	[3.75]***	[5.13]***	[3.34]***	[4.93]***	[10.67]***	[9.97]***	[10.64]***	[9.97]***
Log of Age	0.018	0.017	0.020	0.017	0.156	0.172	0.150	0.165	0.099	0.076	0.101	0.076
	[1.30]	[1.21]	[1.44]	[1.24]	[1.92]*	[1.79]*	[1.89]*	[1.88]*	[1.95]**	[1.59]	[1.98]**	[1.61]
Listed	0.266	0.252	0.259	0.248	1.522	2.014	1.349	1.820	1.214	1.074	1.205	1.072
	[13.16]***	[11.83]***	[12.66]***	[11.57]***	[5.87]***	[7.30]***	[5.78]***	[7.33]***	[11.63]***	[11.26]***	[11.47]***	[11.22]***
Business group	0.121	0.114	0.121	0.116	0.829	1.070	0.748	0.986	0.655	0.602	0.651	0.603
	[6.01]***	[5.54]***	[5.98]***	[5.59]***	[4.88]***	[5.64]***	[4.66]***	[5.65]***	[8.39]***	[8.28]***	[8.34]***	[8.27]***
Foreign firms	0.082	0.029	0.060	0.025	0.391	0.205	0.344	0.180	0.364	0.168	0.344	0.166
	[2.14]**	[0.68]	[1.50]	[0.58]	[1.65]*	[0.74]	[1.52]	[0.71]	[2.82]***	[1.40]	[2.66]***	[1.40]
State-owned firms	0.238	0.265	0.237	0.264	3.023	3.704	2.841	3.472	2.611	2.498	2.610	2.497
	[7.43]***	[8.74]***	[7.41]***	[8.62]***	[8.56]***	[8.66]***	[8.53]***	[8.95]***	[7.02]***	[7.39]***	[7.01]***	[7.36]***
ROA	-0.014	-0.023	-0.035	-0.022	1.801	1.609	1.811	1.654	1.018	0.973	1.000	0.974
	[0.15]	[0.25]	[0.39]	[0.24]	[3.24]***	[2.48]**	[3.31]***	[2.76]***	[3.36]***	[3.47]***	[3.32]***	[3.48]***
Debt to assets	0.035	0.049	0.042	0.053	0.254	0.399	0.222	0.368	0.225	0.224	0.237	0.229
	[1.23]	[1.66]*	[1.47]	[1.80]*	[1.35]	[1.83]*	[1.19]	[1.80]*	[2.49]**	[2.65]***	[2.60]***	[2.67]***
R&D expenses	0.010	0.010	0.010	0.010								
	[1.15]	[1.12]	[1.13]	[1.14]								
Main Bank Characteristics												
Main bank size	-0.133	-0.057	-0.143	-0.079	-0.374	-0.440	-0.288	-0.408	-0.347	-0.210	-0.352	-0.221
	[15.06]***	[4.55]***	[15.35]***	[5.64]***	[2.99]***	[4.05]***	[2.40]**	[3.42]***	[13.44]***	[5.79]***	[14.23]***	[5.80]***
Main bank capital	1.021	-1.548	0.466	-1.415	6.738	-10.738	6.466	-9.500	2.702	-5.657	1.913	-5.637
	[1.53]	[2.12]**	[0.68]	[1.93]*	[1.76]*	[1.94]*	[1.63]	[1.86]*	[1.32]	[2.74]***	[0.91]	[2.66]***
Main bank liquidity			0.441	0.275			-0.415	0.097			0.328	0.099
			[3.25]***	[2.00]**			[0.50]	[0.11]			[0.78]	[0.25]
Main bank nonperforming loans			-1.212	-0.948			-0.310	-1.294			-1.138	-0.556
			[3.91]***	[2.67]***			[0.16]	[0.54]			[1.03]	[0.46]
Main bank foreign		0.237		0.216		2.320		2.150		1.470		1.451
		[6.989]***		[5.85]***		[6.98]***		[7.19]***		[8.12]***		[7.75]***
Main bank SBI		-0.437		-0.367		-2.756		-2.223		-0.878		-0.845
		[9.93]***		[7.19]***		[4.04]***		[3.79]***		[8.92]***		[7.70]***
Main bank nationalized		-0.039		0.024		0.800		0.893		0.540		0.576
		[1.12]		[0.62]		[3.23]***		[3.49]***		[5.72]***		[5.49]***
Local Market Characteristics												
Log number of banks in state	0.084	0.058	0.068	0.049	-0.461	-0.491	-0.541	-0.580	-0.189	-0.257	-0.208	-0.265
	[1.39]	[0.98]	[1.10]	[0.77]	[1.18]	[1.10]	[1.43]	[1.41]	[0.68]	[1.08]	[0.75]	[1.12]
Log population density	-0.005	-0.016	-0.004	-0.009	0.140	0.090	0.144	0.104	0.069	0.040	0.070	0.041
	[0.35]	[0.68]	[0.23]	[0.57]	[1.51]	[0.83]	[1.59]	[1.03]	[1.14]	[0.73]	[1.16]	[0.75]
Observations	3362	3362	3357	3357	3362	3362	3357	3357	3362	3362	3357	3357

Main bank private is the omitted category. Absolute value of z statistics in brackets. *,**,*** denote significance at 10,5, and 1 percent, respectively.

Table 5: Marginal Effects for the Likelihood of Diversification of Bank Ownership Type – Relationships with Two or More Different Ownership Types

Variables				
Firm Characteristics				
SME	-0.173	-0.177	-0.169	-0.17
	[7.74]***	[7.88]***	[7.24]***	[7.26]***
Log of age	0.016	0.018	0.017	0.018
	[1.15]	[1.31]	[1.19]	[1.20]
Listed	0.267	0.26	0.251	0.248
	[10.97]***	[10.54]***	[9.92]***	[9.77]***
Business group	0.102	0.102	0.094	0.095
	[4.80]***	[4.74]***	[4.24]***	[4.28]***
Foreign firms	0.071	0.042	-0.008	-0.011
	[1.74]*	[1.02]	[0.18]	[0.25]
State-owned firms	0.303	0.302	0.346	0.345
	[6.48]***	[6.54]***	[7.58]***	[7.54]***
ROA	0.075	0.052	0.06	0.061
	[0.79]	[0.54]	[0.62]	[0.63]
Debt to assets	-0.017	-0.006	-0.005	0
	[0.54]	[0.18]	[0.15]	[0.00]
Main Bank Characteristics				
Main bank size	-0.121	-0.131	-0.01	-0.03
	[13.68]***	[13.88]***	[0.72]	[1.99]**
Main bank capital	2.38	1.575	-1.095	-0.982
	[3.48]***	[2.25]**	[1.45]	[1.29]
Main bank liquidity		0.472		0.254
		[3.31]***		[1.81]*
Main bank nonperforming loans		-1.53		-0.779
		[4.79]***		[2.18]**
Main bank foreign			0.275	0.257
			[5.87]***	[5.27]***
Main bank SBI			-0.52	-0.484
			[11.64]***	[9.92]***
Main bank nationalized			-0.141	-0.082
			[3.80]***	[2.03]**
Local Market Characteristics				
Bank ownership concentration	-0.322	-0.243	-0.165	-0.137
	[1.12]	[0.85]	[0.54]	[0.45]
Population density	0.006	0.009	0.002	0.004
	[0.38]	[0.52]	[0.14]	[0.22]
Observations	3362	3357	3362	3357

Main bank private is the omitted category. Robust z statistics are in brackets. *,*, *** indicate significance at 10, 5, and 1 percent, respectively.