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Abstract

The development of the financial system is shown, both historically and in contemporary data, to be adversely affected by inequality in the distribution of land. To accommodate these empirical findings, a theory is developed that highlights the incentives of landowners to oppose competition in the financial sector. The theory provides an explanation for the co-incident development of the financial sector and overall economy.

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1 Introduction

The development of the financial system has typically gone hand-in-hand with sustained economic growth (McKinnon, 1973; Shaw, 1973). Their close correlation in contemporary country-level data is clear, even if the directions of causality are not completely understood.[1]

The primary explanation for fundamental differences in financial system development is differences in legal origins, as documented extensively by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998). The role of legal origins for finance complements the institutional hypothesis regarding the origin of long-run sustained growth and the divergence in income per capita across countries. North (1981), Parente and Prescott (2000), Acemoglu, Johnson, and Robinson (2001), and Acemoglu and Robinson (2006), among others, emphasize the importance of property rights and the rule of law in enabling the European and North American take-off in the 19th century and the global divergence in incomes since then.

This paper proposes that, in addition to the traditional institutional explanations, inequality in the distribution of land was instrumental in the development of the financial sector. Through this effect on finance, inequality affected the transition from agriculture to industry and ultimately the divergence in income per capita across countries. The theory emphasizes the role that efficiency in the financial sector plays in mediating the savings/investment process. Efficiency is determined by the level of competition, and this is subject to the political process. Landowners, at least at low levels of development, use the political system to oppose financial competition in order to keep wages low and rents high.

This explanation emphasizes the dynamic nature of the financial system and its endogenous evolution rather than relying on exogenous differences in legal structures. It shares this dynamic approach to institutions with work by Galor, Moav, and Vollrath (2009) that studies the emergence of human-capital promoting public policies and the influence of land inequality on this process. This approach also complements the work of Rajan and Zingales (2003) and Musacchio (2008) who emphasize that financial systems are more fluid over time than suggested by the legal origins literature.

Economic history shows that financial development was closely entwined with political considerations. As reviewed more thoroughly below, banks were required to obtain charters to operate, and these charters were often only available by royal decree or acts of national legislative bodies. Thus the ability to enter the financial industry was tightly controlled by the political system, and history shows that land owners used this to stymie financial competition. Evidence from Rajan and Ramcharan (2008) corroborates this idea with evidence from the early 20th-century United States. They found that states with higher land concentrations

[1] See King and Levine (1993) for the relationship of growth and bank credit, or Levine and Zervos (1998) for similar results regarding growth and stock markets. Levine, Beck, and Loayza (2000) use legal origins as instruments for financial development and find a causal role of finance for growth. Beck, Levine, and Loayza (2000) use dynamic panel methods to reach a similar conclusion. See Levine (2005) for a full review of this literature.

had more restrictive banking legislation and counties with unequal land distributions have fewer banks per capita.

Land inequality was not only important historically, but it's effects can still be seen in contemporary cross-country data. The depth of the financial system over 1980-1995, measured by bank credit relative to GDP, is shown to be significantly and inversely related to inequality in land-holdings. To identify the relationship, instrumental variables on the production of sugar and wheat are used to provide exogenous variation in land inequality, following the work of Engerman and Sokoloff (1997) on the origins of inequality in the Western Hemisphere. Further, this relationship of financial depth and land inequality is shown to operate primarily through the efficiency of the financial system, measured by net interest margin and overhead costs.

The model presented accommodates these empirical regularities by building a banking sector oligopsony into an overlapping generations model of capital accumulation. Banks are competitive, but do take into account how the rate they pay on deposits affects the supply of savings. The greater the number of banks, the smaller the net interest margin they can charge, and the greater the supply of savings they attract. The choice of the number of banks thus determines the size of the capital stock available to the economy in the next period. Following the historical evidence, the number of banks is determined through a political process that must accommodate the interests of land owners, bank owners, and workers.

While landowners always support fewer banks than individuals without land holdings, their preferences evolve over time with the economy. As capital is accumulated and the workforce becomes more industrial, landowners may eventually find it to their benefit to support financial competition. Whether the economy reaches the point where landowners support financial development depends upon the concentration of land and the size of the land endowment. As such, there is the possibility of a poverty trap in which high inequality economies stagnate at low levels of income per capita with under-developed financial sectors.

Links between inequality and the financial sector have been drawn before. These papers, though, focus on the effects of inequality on the supply and/or demand for financial assets, taking the structure of the financial sector as a given. Greenwood and Jovanovic (1990) note in their model of finance, inequality, and growth that the nature of financial intermediation is not a crucial aspect of their analysis. Works by Aghion and Bolton (1997), Banerjee and Newman (1993), Galor and Zeira (1993), and Charkaborty and Ray (2005) all rely on financial sector frictions to generate a relationship from inequality to growth, but the frictions are exogenously determined. This paper looks at the question in a different manner, focusing on how inequality influences the frictions themselves rather than the supply or demand for funds. It also provides an explanation for how financial sector frictions evolve dynamically instead of assuming they are exogenously fixed.

In highlighting the connection of agricultural structure and finance, the current work follows the work of

Tomich, Kilby, and Johnston (1995) and Binswanger, Deininger, and Feder (1995), but provides a much more rigorous consideration of the incentives involved. The mechanisms discussed in this paper also complement the literature on the endogenous development of the institutions of economic growth. The historical work of Engerman and Sokoloff (1997) suggested that the agrarian structure dictated by the geographical conditions in Central and South America led the political elites of these areas to create institutions that perpetuated their own political and economic power. Unified growth models such as those reviewed comprehensively by Galor (2005) have shown how crucial elements such as the demographic structure (Galor and Weil, 2000) and class structure (Galor and Moav, 2006) evolve endogenously. This work adds to this broad literature by showing that financial institutions also arise endogenously through the process of economic development, and are not fixed by historical events.

The paper proceeds in section 2 by examining the historical record to establish that agrarian interests have been identified with opposition to financial development. These examples show that landowners often opposed the reforms necessary for financial development, and were loathe to participate in the financial sector even when those reforms had passed. The historical evidence, in particular from Latin America, also shows that landowners opposed financial reform specifically because they felt it eroded their control of the labor market. Section 3 presents cross-country empirical evidence on the effect of land inequality on financial development. The basic model is presented in section 4, the dynamics of financial development are considered in section 5 and then the paper concludes in section 6.

2 Historical Evidence

The proposition that agrarian interests are opposed to the development of the financial system can be seen in several different historical contexts. In the United Kingdom, the United States, Brazil, and Mexico, the creation of functioning financial systems is fought by landowners. The main differences across these countries lies in the success that the agrarian interests have in stalling financial reform.

2.1 The United Kingdom

The financial system of England at the time of the Glorious Revolution (1688) was defective and lagged far behind the Dutch (Dickson, 1967; Neal, 1990). As England entered back into war with France in 1688, the English government was desperate to obtain funding for its armies. With constitutional monarchy now established, it was necessary for this funding to be obtained with the approval of Parliament, who were disinclined to allow land taxes to rise any further.

Several innovations allowed the government to pay for the war with France. The first was the issuance

of long-term debt to the public in 1690 that were garuanteed as "debts of the nation" by Parliament, as opposed to personal debts of the sitting monarch. The second was the establishment of the Bank of England in 1694, which was set up to provide a steady source of lending to the government. Support for the Bank came primarily from the mercantile and legal circles, who felt the Bank would foster a broader financial market in London by providing a ready market for government bonds.

The evidence from Dickson (1967) shows clearly that the landed interests in England wanted very little to do with establishing the Bank of England. Of the original subscribers to the Bank, only 10% came from outside of the greater London area. In fact, only nine peers subscribed at all to the Bank. According to Dickson, "The majority of subscribers.....belonged to the mercantile middle class of London". In further issuances of government debt and bank stock, landed peers accounted for between 0.5 and 4.3% of the total capital raised.

On the eve of the South Sea Bubble in 1720, the holdings of the peerage in the Bank of England, the East India Company, and the large issuance of government bonds in 1717 were not significant. Following the bursting of the Bubble, Robert Walpole undertook to pay down the national debt and restructure the remainder to be on more favorable terms for the government. Walpole acted explicitly to create an environment conducive to financial activity and the expansion of commerce, which required him to navigate past the landed and farming interests of England who opposed the expansion of credit (Dickson, 1967).

In the period following the South Sea Bubble, the evidence again shows the almost complete absence of landed interests in the financial system. Of the greater than 10,000 subscribers to the 3% government loan of 1742, all were merchants and none were landed gentlemen. By the middle of the 18th century the proportion of MP's holding bank stock or government debt increased, due almost solely to the increasing number of merchants, lawyers, and military professionals in Parliament. Dickson states, "It seems fair to generalize that the landed classes as a whole were not significant contributors of new capital for public loans." Throughout this whole period of financial development, the landed class of England was wary of the establishment of broader credit facilities and showed their opposition by withholding their capital from inclusion in the financial system.

2.2 The United States

The success of the English financial system in stimulating commerce had a profound influence on many in the newly declared United States of America. One such person was Robert Morris, who too over the Office of Finance during the Revolutionary War in 1781. Not only was he impressed with the power of the British financial system, but he felt that "the Revolution meant a break with the agrarian past and the growth of

commercial and industrial enterprise in the United States" (Ferguson, 1961). Morris undertook to restore the public credit first by having more accurate accounts and better information on income and debts. His second major effort was to create a Bank of North America, modeled directly on the Bank of England, with the expressed purpose of holding government debt and providing a stable source of funds for the government. Morris saw the presence of sound government debt as crucial to the establishment of wider securities markets. In addition, he wanted the Bank to form the basis for all paper money in the U.S., retiring the individual state currencies already in existence.

In his fight to establish the Bank of North America, Morris was opposed by agrarian interests. For these agrarians, "Money in this sense is not meant to stimulate economic activity; its amount is to be limited to the needs of trade and legal payments," (Hammond, 1957). The agrarian interests in the U.S. acted to limit the establishment of the Bank, and in fact in 1785 these interests in Pennsylvania were able to cancel its charter (the Bank operated out of Philadelphia). Not only did agrarian interests attempt to sabotage the Bank of North America, but across all states as the United States grew "these agrarians restricted banks and bank currency to the point of prohibiting them, without supplying a substitute," (Hammond, 1957).

With the end of the war and the creation of the Constitution, the most visible argument within the U.S. over financial development was over the establishment of the Bank of the United States in 1791. Alexander Hamilton pushed for the national bank explicitly to promote industry and development, while Thomas Jefferson opposed the bank as something that would defile the agrarian core of America and lead to centralization of government.[2] Ultimately, 33 of the 39 "Yes" votes for the Bank came from New England, New York, New Jersey and Pennsylvania, the commercial and industrial heart of America, while 15 of the 20 "No" votes were from the plantation dominated states of Georgia, North Carolina, South Carolina, and Virginia (Hammond, 1957).

The growth of the financial sector following the establishment of the Bank was dramatic. In 1790 there were 3 chartered commercial banks in the U.S., but by 1815 there were 212 and by 1835 there were 584 (Bodenhorn, 2000). Interestingly, even though Jefferson's Republicans were in power from 1800 to 1811, they did not act to remove the banking legislation. Hammond speculates that this is due to the fact that even the small farmers who formed the basis of Jefferson's support were experiencing dramatic economic gains due to the increase in commerce.

Over the first part of the 19th century, agrarian interests continued to put barriers in the way of financial development as new states were settled and admitted to the Union. Hammond finds that only after the Western states developed industrially did they remove laws limiting the amount of banking allowed. This

[2]Incidentally, Jeffereson was not ignorant of the role of banks in expanding the money supply. His understood this quite well, but felt that it was an evil to be avoided by an agrarian economy (Hammond, 1957).

situation of state-level restrictions ended in 1864 with the National Bank Act, which taxed state currencies out of existence, required reserves, and allowed for private national banks to be created. Following the Act, interest rate differentials declined across the United States, indicating further financial integration and development (James, 1978).

2.3 Latin America

The histories of the U.K. and U.S. show the successful introduction of financial reform despite the opposition of agrarian interests. The general history of Latin America, however, is one in which the agrarian interests were more successful in restricting the growth of the financial system. Most Latin American countries became independent in the 1820's, but this independence did not alter the highly concentrated nature of land-holdings across the region. The landholding class was also the ruling political class and "there were few occasions when political hegemony was not exercised by landowners who - not surprisingly - used the power of the state whenever possible to reinforce their privileged status," (Bulmer-Thomas, 2003).

Across the region this political hegemony led to a manipulation of factor markets in the interest of keeping labor costs low, favoring the owners of land and mines who hired in labor extensively. In addition, the financial sector remained underdeveloped, with informal lending and the Church acting as the main sources of funds for commerce. This led to a situation in which industry failed to advance. Bulmer-Thomas cites two main reasons that the small handicraft sector was not able to convert itself to higher-productivity activities. First, there were few funds available for working or fixed capital. Second, the potential entrepreneurs were not part of the landed, political elite and were not able to push for favorable financial reforms.

These conditions led to a financial sector much smaller than in colonies favored with more equitable concentrations of land and political power. By 1913, the amount of bank deposits per person (in U.S. dollars) was 3.3 in Bolivia, 9.4 in Brazil, 26.0 in Chile, 2.3 in El Salvador and 1.2 in Venezuela. Argentina was far more developed, with 75.7 in deposits per head, but even this trailed far behind Australia (150.3), Canada (142.9) and New Zealand (108.5) (Bulmer-Thomas, 2003).

The barriers to financial development are apparent in the specific histories of Brazil and Mexico. In Brazil, the financial system was almost non-existent until the end of the 19th century. By 1888, Brazil had only 26 banks and seven of Brazil's twenty states had no banks at all (Haber, 1997). This limited financial situation was due largely to policies that discouraged the creation of banks and corporate entities. The imperial government had the sole right to charter banks and was far more interested in creating a few large banks that could act as a source of government finance. In addition, constant changes in regulation hindered these large banks ability to create a smooth financial system (Haber, 1997). The incorporation law of 1860

required any joint-stock company to obtain an imperial charter and did not permit limited liability, and an investor could be held liable for a firm's debt even after the stock had been sold (Haber, 1997; Haber 1998).

In 1888 the imperial government, in part to appease the republican opposition, abolished slavery and opened up the capital markets by allowing twelve banks to issue currency and granting seventeen banks interest-free loans (Haber, 1997; Hanley, 1998). Imperial rule in Brazil ended in 1889, replaced by a federal republic. The republicans had overthrown the traditional oligarchy, reducing (but not eliminating) the influence of the large landowners. The republican government, though, had changed the political center of the country to Rio de Janeiro and Sao Paulo, and "left behind the guarded policies of the monarchy and actively favored the expansion of domestic enterprise," (Hanley, 1998). In 1890 the government deregulated the financial industry, allowed for limited liability, and authorized margin purchases of securities. In the six months following the passage of these reforms over 200 new joint-stock companies were formed in Sao Paulo alone, leading to the formation of the Sao Paulo Bourse. By 1905 the volume and value of the shares listed in Sao Paulo had tripled (Hanley, 1998). Haber (1998) presents evidence that the productivity levels of textile firms in Brazil were much higher for those firms that obtained finance through the markets, as opposed to those who relied on the informal channels that had dominated previously.

The increase in Brazilian productivity due to financial reforms stands in contrast to the experience of Mexico, which was not able to bring forward as deep a financial reform in this period. Mexico headed into the late 19th century with a financial sector as limited as Brazil's prior to the revolution. In 1884 only 8 banks were operating in Mexico, and even by 1911 there were only 47 banks, of which only 10 could lend for longer than a year (Haber, 1998). The lack of financial sophistication was tied in many ways to the interests of the ruling oligarchy. Marichal (1997) documents that the government routinely defaulted on debts to its public bondholders, undermining trust in financial instruments in general. The laws governing the financial sector were backwards and applied haphazardly; Mexico did not have a general incorporation law at all until 1889. Ties to the ruling regime were by far the most important factor in contract enforcement and in obtaining financing during this period.

Haber (1998) suggests that the motivation for the restrictive nature of the banking sector in Mexico was because is served the purposes of the ruling elite, who wished to have financing available to the government and to maintain the near monopoly on banking services that the Banco National de Mexico held. The result was a tiny source of financing available to entrepreneurs, and that political connections rather than skill determined access to that small pool of financing. While the ruling regime of Profirio Diaz was interested in industrialization, it strongly supported and remained politically tied to the hacienda owners, who opposed the modernization program and encroachments on the labor peonage system (Garner, 2001).

3 Finance and Inequality across Countries

Along with the historical evidence, the inverse relationship of land inequality and financial development can be seen in cross-country data from the more recent past. In addition, the cross-country data also suggest that the effect of land inequality on financial development operates primarily through efficiency. In other words, places with high land inequality have less efficient financial sectors that makes the financial sector small relative to GDP.

3.1 Data Sources

3.1.1 Land Inequality

To establish these cross-country results, a Gini coefficient for land-holdings within countries is calculated using data from rounds of the Agricultural Census overseen by the Food and Agriculture Organization (FAO) of the U.N. A census of land-holdings was done at roughly ten year intervals in most countries, and the size distribution of the land-holdings is reported in the FAO summary reports. Deininger and Squire (1998) (DS hereafter) used this data to construct the Gini coefficients for land inequality included in their growth regressions.

One issue with this DS Gini coefficient is that is overlooks an important component of land inequality: landlessness. The FAO data indicate if there is a concentrated distribution of land among the existing land-holdings, but does not provide information on what percentage of the agricultural population actually has a land-holding. To address this, Vollrath and Erickson (2007) use information on the size of the economically active agricultural population (estimated by the FAO) and the total number of holdings to construct a modified "overall" Gini coefficient for land inequality. It is this Gini coefficient that is used in the analysis of this section.

Because there are agricultural census reports from different decades for each country, a choice must be made regarding which observation to use.[3] Following DS, the earliest observed value of the Gini coefficient from before 1980 is used. There is little time-series movement in the land Gini, but this method ensures that the specifications are using data on inequality that is temporally prior to the data used on financial development.

Summary statistics for the land Gini are found in table 1. The average value is nearly 0.85, ranging from a low of 0.617 in Greece to a high of 0.975 in Kenya. In general, the countries of Latin America have higher values of the land Gini, while Europe and Asia have relatively low levels. Table 2 shows the values of the

[3]Agricultural censuses rounds were centered around 1960, 1970, 1980, 1990, and 2000. In any given census round a country may have actually done their enumeration before or after the given year (e.g. Honduras produced its 1960 round census in 1962). Countries do not necessarily have an agricultural census in each round.

Gini for each of the 54 countries included in the empirical work.

3.1.2 Financial Development

I measure financial development using standard indices of broad financial depth. The data is obtained from Beck, Demirgüç-Kunt and Levine (2001), who build it from individual bank-level data and aggregate up to the country level. The first index is the extent of bank credit, measured as the size of claims on the private sector by deposit money banks relative to GDP. This measure specifically excludes credit issued to government entities, and also excludes credit issued by the central bank in order to concentrate on the extent of financial intermediation. The claims are taken from the asset side of bank balance sheets, and are indicative of the extent to which banks are channeling savings to investors.

The second broad measure of financial development focuses on the liability side of bank balance sheets. Liquid liabilities relative to GDP equals the value of currency plus demand and interest-bearing liabilities of banks and other financial companies relative to GDP. It is a very broad indicator of financial activity, as it incorporates not just deposit money banks, but also other financial intermediaries as well as the central bank.

In addition to these measures of financial depth, two measures of the efficiency of the financial sector are included in the analysis, also taken from the Beck, Demirgüç-Kunt and Levine (2001) data-set. The first is the net interest margin, calculated as the value of bank's net interest revenue divided by bank assets. The greater the spread between lending and deposit rates, the larger this ratio will be. As competition increases, this should fall. The second measure of efficiency is overhead costs, measured as banks reported overhead costs as a share of assets.

Summary statistics can be found in table 1, which shows that financial depth varies widely in this sample. From bank credit relative to GDP of under 10% in Sierra Leone and Peru (see table 2) to over 80% in much of Europe and over 100% in Japan. Liquid liabilities have a similar range. The efficiency of the financial system, as measured by net interest margin, ranges from under 2% in much of Europe as well as Bangladesh to around 10% in Argentina, Turkey, and Brazil.

3.2 Identifying the Role of Land Inequality

A simple cross-sectional plot of bank credit versus the land Gini is presented in figure 1. This shows the negative relationship of financial development and inequality. Fitted values from OLS regressions are shown for the whole sample, as well as the fitted values using only the non-OECD countries included in the sample.

This correlation, though informative, does not necessarily show the true effect of land inequality on

financial development. Not only are there likely to be relevant omitted variables, but there is a distinct likelihood that financial development determines the degree of land inequality. To address this a method of identifying the relationship is necessary.

To do this, I turn to an instrumental variable strategy similar to that employed by Easterly (2001, 2007), Easterly and Levine (2003), Ramcharan (2007), and Vollrath (2008). This builds on the work of Engerman and Sokoloff (1997), who suggest that a fundamental cause of inequality within countries was their geographic endowments, specifically their suitability for growing certain cash crops. The idea is that geographic determinants of crop type can be used as instruments for inequality.

To utilize this strategy here, I adopt the simple crop variables used by Easterly and Levine (2003), specifically their dummy variables for whether a country can produce sugar or whether they can produce wheat. Using these two instruments has several advantages. First, they are highly correlated with other crop dummies and crop production variables, meaning that they capture a good deal of the variation in geographic endowments across countries. Second, with two instruments one can look at tests to confirm that the instruments are indeed properly excluded from the second stage regressions.

3.3 Regression Results

With the availability of the sugar and wheat dummies as instruments for the land Gini, I estimate the relationship of inequality and financial development. The first dependent variable of interest is bank credit relative to GDP, and the results are found in table 3.

Column (1) shows the OLS relationship for the 54 countries in the sample, mimicking the fitted line from figure 1. As can be seen, there is a strongly significant correlation of land inequality and bank credit. In column (2), the sugar and wheat dummies are used in the first stage to provide exogenous variation in the land Gini, and the second stage shows not only a highly significant relationship of inequality and financial depth, but the absolute size of the estimated coefficient has more than doubled. The effect of land inequality is quite strong. A one standard deviation increase in land inequality (about 0.09) lowers bank credit relative to GDP by nearly 22%, or almost exactly one standard deviation.

Specification test results are found at the foot of table 3. The Sargan test has a null hypothesis that the excluded instruments (sugar and wheat) have no correlation with the residual of the second stage. As can be seen, we cannot reject this hypothesis. There is statistical support for using this specification. In addition, the joint F-statistic of the two instruments is reported, and as can be seen this is quite large. The size of the first stage F-statistic implies that the specification is neither weak nor under-identified.[4]

[4]The next draft of the paper will include explicit test statistics and p-values for the standard weak and under-identification tests.

Column (2) yields the reduced form effect of land inequality on financial development, acting through any number of channels. To more clearly understand how land inequality influences financial development, the following specifications control for various other fundamentals to see how they affect the estimated relationship. Column (3) incorporates the legal origin dummies (with an excluded reference country of Britain) from La Porta et al (1997,1998). These legal origins are typically cited as a valid source of exogenous variation in financial development. As can be seen, even when those legal dummies are included, the size and significance of land inequality are essentially unchanged. While legal origins might be important for financial development (although these results question that conclusion), land inequality appears equally so.

The next specification in column (4) incorporates information on institutional quality from the index of Kaufman, Kraay, and Zoido (1999) as well as measures of ethnic and religious fractionalization obtained from Alesina et al (2003). Here we see a distinct decline in the absolute size of the effect of land inequality. What this indicates is that, to some degree, land inequality is a proxy for institutional quality. Even so, the effect of land inequality remains independently significant, if smaller, when institutions are controlled for.

Column (5) presents the most interesting results from the perspective of this paper. In this specification, measures of financial efficiency are included, both overhead costs and net interest margin. As can be seen, once these factors are accounted for, there is no separate significant effect of land inequality on financial depth. What this indicates is that the effect of land inequality is operating through the efficiency of the financial system to reduce bank credit. That is, high land inequality implies large interest margins and high overhead costs, both indicative of un-competitive financial sectors, and this inefficiency reduces the scope of the banking sector.

The importance of this result in column (5) is that it indicates what shape a theory of land inequality and financial depth should take. Rather than focusing on the effects of inequality on people's ability or incentive to save, theory should explore the role that inequality has in determining how efficiently the banking sector transforms savings into investment. This empirical regularity will inform the model I develop in subsequent sections of this paper.

The final specification in table 3 adds in a control for *income* inequality from Deininger and Squire (1998) to confirm that the measure of *land* inequality is not simply proxying for income inequality. Fewer observations are available, (47 rather than 54), but as can be seen there is still a significant negative effect of land inequality on bank credit. The size of the point estimate is similar to that found in column (4), which includes similar control variables.

Table 3 shows that land inequality is an important determinant of bank credit, and importantly that this operates through bank efficiency. Table 4 repeats the specifications, but uses liquid liabilities relative to GDP as the dependent variable. As can be seen, land inequality remains highly significant, and negative,

as a determinant of financial depth. Again, the size of the effect is reduced when institutions are controlled for (see column 4), and reduced further when efficiency is introduced (see column 5). While land inequality remains significant when the efficiency measures are used, the point estimate is smaller, indicating that some of the effect of inequality operates through efficiency. Recall that liquid liabilities involves not just liabilities of banks, but also central banks and other financial intermediaries. So while there is an overall effect of land inequality on financial depth, it appears to work most strongly through bank credit, as seen in table 3.

Ultimately, the regression results provide several interesting clues towards the development of a theory of financial development. First, land inequality plays a significant and relevant role in the determination of the size of the financial sector. Second, this effect operates through not only institutional quality, but importantly through the efficiency with which the financial sector is organized. Incorporating this into a coherent theory of long run financial development is undertaken in the next section.

4 A Model of Financial Development

The basic structure of the model revolves around the savings decisions of individuals in an overlapping generations setting, with the additional feature that the younger generation has the ability to influence this decision through their choices regarding the structure of the financial sector.

The timing of the model is as follows. In their first period of life, a generation works, earns rents on their land-holdings, and earns profits on their share of the banking sector. They produce a new generation of children, and this child generation chooses the number of banks authorized to compete in the financial sector. The parent generation takes this decision as given, and choose savings based on the rate of return available from the financial sector. These savings become the capital stock used by their child generation. In the second period of life, the parent generation consumes their savings.

The important decision is thus the choice of the number of banks. The child generation, knowing how their parents will respond to rates of return, chooses the number of banks to authorize. The more banks, the greater the competition and the greater the return on savings. As savings will increase with the return, the child generation, in essence, chooses how big of a capital stock they would like available for their use in their first period of their life.

Land is passed directly from parent to child, and there is no market for land. The influence of land-holdings on the financial sector arises from the role of rents in the income of the young generation. As financial competition rises with the number of banks, the capital stock increases and the rental rate on land declines. Thus individuals with large land-holdings will be less inclined to support financial competition. The strength of this effect will depend crucially on the land-holders own stake in the banking sector, and

the profits that she can accrue from this activity. As will be shown, holding constant the share of bank profits, an increase in the size of land-holdings of an individual will always make their support for financial competition decrease.

4.1 Production

There are two sectors in the economy: agriculture and manufacturing. They differ only in the non-labor input to production used. Output is presumed to be homogenous (or alternately, there is assumed to be free trade so that the relative price of their output is constant). The population of each generation is assumed to be equal to N, there is no population growth, and so the total population at any given time is $2N$.

The sectors, denoted by the subscripts A and M, have aggregate production functions of

$$Y_{At} = X^{\alpha}(1 - q_t)^{1-\alpha}N^{1-\alpha} \tag{1}$$

$$Y_{Mt} = K_t^{\alpha} q_t^{1-\alpha} N^{1-\alpha} \tag{2}$$

where q_t is the share of labor allocated to the M sector, X is the total quantity of land in the economy, and K_t is the size of the capital stock at time t.

Assuming that there is free movement of labor between sectors, then wages will be equalized across sectors and the share of workers in the manufacturing is

$$q_t = \frac{K_t}{K_t + X} \tag{3}$$

and given this allocation the prevailing factor prices at time t are

$$\text{Wages} \quad w_t = (1 - \alpha)(X + K_t)^{1-\alpha}N^{-\alpha} \tag{4}$$

$$\text{Return on capital} \quad R_t = \alpha(X + K_t)^{\alpha-1}N^{1-\alpha} \tag{5}$$

$$\text{Rent on land} \quad \rho_t = \alpha(X + K_t)^{\alpha-1}N^{1-\alpha}. \tag{6}$$

Finally, total income in the economy at period t is

$$Y_t = Y_{At} + Y_{Mt} = (X + K_t)^{\alpha}N^{1-\alpha} \tag{7}$$

while per-capita income (over the whole $2N$ individuals is)

$$y_t = \frac{1}{2}\left(\frac{X + K_t}{N}\right)^{\alpha}. \tag{8}$$

In this model it will be important to distinguish between the return on capital, R_t, and the return on savings, r_t. Because of inefficiencies in the banking sector discussed below, it will be the case that $r_t < R_t$. For the moment, take the value of r_t as given, and then denoting the total income of the young in period t as Y_{t1} and the total income of the old as Y_{t2}, we have

$$Y_{t1} = Y_t - r_t K_t \tag{9}$$

$$Y_{t2} = r_t K_t \tag{10}$$

What this indicates is that the young generation is earning profits on the savings of the older generation. The value of these profits are $(R_t - r_t)K_t$, and as will be seen in the next section these depend on competition in the banking industry.

4.2 Individuals

Before discussing the banking industry, it will be necessary to be more explicit about how individuals make their savings decision, given the return on savings, r_t. The utility function of individuals is over consumption in both periods of their life, $U(c_1, c_2)$, and a central assumption used in the model is that this utility function yields an optimal savings rate that is iso-elastic with respect to the rate of return on savings. Individuals earn income only in the first period of life, and the optimal savings rate is defined as

$$s_t^* = \hat{s}(1 + r_{t+1})^{1/\upsilon} \tag{11}$$

where $1/\upsilon > 0$ is the elasticity of the savings rate with respect to the rate of return, $\hat{s}$ is a minimum savings rates, and s^* is the optimal savings rate. Note that because the savings rate depends only on the rate of return, this optimal rate is identical for all individuals, regardless of their income. This means that the total savings in the economy at time t are

$$S_t = s_t^* Y_{t1} \tag{12}$$

In addition, it is presumed that the utility function is homogenous of degree one. Given the optimal savings rate in (**??**) this additional assumption means that indirect utility for an individual, V, can be

written as

$$V_i = U\left(1 - s_t^*, (1 + r_{t+1})s_t^*\right) y_{1i} \tag{13}$$

which shows that utility is linear in the individuals income as a young worker, y_{1i}. Therefore, given the rate of return r_{t+1}, an individual will maximize utility by maximizing their income.

4.3 The Banking System and Capital Accumulation

Unlike a typical OLG model in which savings are directly translated into capital, in this model a banking system must intermediate this transaction. As the intermediary, the banking system may earn profits by generating a gap between the return on capital, R_t, and the rate of return payed on savings, r_t. The size of this gap, and hence the size of the profits, depends on competition in the banking sector. The number of banks at time t is equal to B_t. How this number is set will ultimately depend on the preferences of individuals and the distribution of political power. For now, take B_t as given.

Banks, regardless of number, are assumed to be identical. The profits of a given bank i are given by

$$\pi_{i,t+1} = (R_{t+1} - r_{t+1})s_i - z \tag{14}$$

where s_i are deposits in the bank. Across all banks, it must be that $\sum_{i=1}^{B_{t+1}} s_i = S_t$. The value z is a fixed cost of operating a bank, and is included so that a finite number of banks will yield $\pi = 0$.

Banks form an oligopsony, meaning that they internalize the supply of deposits given by (**??**) while taking the actions of the other banks as given. The standard equilibrium in such a situation (see Appendix) yields the following value for the return on savings

$$1 + r_{t+1} = \frac{1 + R_{t+1}}{\frac{v}{B_{t+1}} + 1}. \tag{15}$$

The rate paid on savings is thus below the marginal product of capital, R_t, implying positive profits. These profits are earned by the younger generation, who set the number of banks and operate them. This formulation of the industrial structure of the banking industry will allow the model to mimic the empirical evidence regarding bank development and net interest margin. As will be seen, land inequality will directly influence the number of banks, and thus the net interest margin. The effect of the net interest margin is to lower total savings, reducing the credit that banks can extend. Thus the model captures the empirical regularities of the cross-country evidence.

Given the equilibrium return on savings, the optimal savings rate, as defined in (**??**) is

$$s_t^* = \left(\frac{1 + R_{t+1}}{\frac{\upsilon}{B_{t+1}} + 1} \right)^{1/\upsilon} \tag{16}$$

and as can be seen, the savings rate is increasing in the number of banks. This relationship is at the heart of the tradeoff that land-holders will face. Legislating a larger number of banks will raise the savings rate as banks face stiffer competition for deposits. The increase in savings will generate a larger capital stock, which as seen in (6) will lower land rents as labor shifts towards manufacturing. Thus individuals with a large ownership stake in land will be disinclined to support a large number of banks.

More specifically, the capital stock evolves as follows

$$K_{t+1} = S_t = s_t^* Y_{t1} \tag{17}$$

which given the savings rate from (16) and the definition of the return on capital from (6) yields the dynamics of the capital stock,

$$K_{t+1} = \hat{s} \left(\frac{1 + \alpha(X + K_{t+1})^{\alpha-1} N^{1-\alpha}}{\frac{\upsilon}{B_{t+1}} + 1} \right)^{1/\upsilon} Y_{t1} \tag{18}$$

Using this, we can establish the following lemma.

Lemma 1 *The capital stock K_{t+1} is uniquely determined*

$$K_{t+1} = \phi(B_{t+1}; Y_{t1}) \tag{19}$$

where $\phi_B(B_{t+1}; Y_{t1}) > 0$, $\phi_Y(B_{t+1}; Y_{t1}) > 0$, and $\phi_{YY}(B_{t+1}; Y_{t1}) < 0$.

Proof. Defining $\Omega = K_{t+1} - \hat{s} \left(\frac{1+\alpha(X+K_{t+1})^{\alpha-1} N^{1-\alpha}}{\frac{\upsilon}{B_{t+1}}+1} \right)^{1/\upsilon} Y_{t1}$, then $\partial\Omega/\partial K_{t+1} < 0$ for all values of K_{t+1}. Therefore, by the Implicit Function Theorem there exists a single valued function $K_{t+1} = \phi(B_{t+1}; Y_{t1})$ and the properties of ϕ follow from an examination of (18). ■

Knowing how to determine the value of K_{t+1}, we can establish the following

Corollary 2 *Given land size, X, factor prices in period $t+1$ are uniquely determined by B_{t+1} and Y_{t1},*

$$w_{t+1} = w(B_{t+1}; Y_{t1}) \tag{20}$$

$$R_{t+1} = R(B_{t+1}; Y_{t1}) \tag{21}$$

$$\rho_{t+1} = \rho(B_{t+1}; Y_{t1}). \tag{22}$$

In addition, the factor prices are related to the number of banks and prior period young income as follows,

$$w_B(B_{t+1}; Y_{t1}) > 0 \quad \textit{and} \quad w_Y(B_{t+1}; Y_{t1}) > 0 \tag{23}$$

$$R_B(B_{t+1}; Y_{t1}) < 0 \quad \textit{and} \quad R_Y(B_{t+1}; Y_{t1}) < 0 \tag{24}$$

$$\rho_B(B_{t+1}; Y_{t1}) < 0 \quad \textit{and} \quad \rho_Y(B_{t+1}; Y_{t1}) < 0. \tag{25}$$

Proof. The definition of factor prices follows directly from (6) and the definition of K_{t+1} in (19). Given the characteristics of the ϕ function established in the previous lemma, the derivatives follow directly. ■

Now we are in a position to discuss bank profits in more detail. Using the equilibrium return on savings from (15) and the evolution of the capital stock from (17) in the determination of bank profits from (14) we have

$$\pi_{t+1} = (1 + R_{t+1}) \frac{\upsilon}{\upsilon + B_{t+1}} \frac{K_{t+1}}{B_{t+1}} - z. \tag{26}$$

For simplicity we will not focus on the ownership of any specific bank, but rather on individuals ownership of shares in the total banking sector. Therefore, it will be useful from this point forward to consider the total profits of the B_{t+1} banks in the banking sector.

$$B_{t+1}\pi_{t+1} \equiv \Pi_{t+1} = (1 + R_{t+1}) \frac{\upsilon}{\upsilon + B_{t+1}} K_{t+1} - zB_{t+1} \tag{27}$$

As can be seen, the number of banks will have several influences on total bank profits. If B_{t+1} increases, then the markup that banks can charge $(\upsilon/(\upsilon + B_{t+1}))$ is reduced and the fixed costs rise, both lowering profits. At the same time, an increase in banking competition raises the return on savings, drawing more deposits, so that K_{t+1} increases, adding to profits. However, this increase in K_{t+1} also lowers the return on capital, R_{t+1}, which lowers the total profit that banks can earn as they charge a constant markup.

The various influences of B_{t+1} combine to determine the critical values described in the following lemma.

Lemma 3 *Given the definition of total bank profits Π_{t+1} and the value of Y_{t1}*

- *There is a unique global maximum to Π_{t+1} on the interval $B_{t+1} \in (0, \infty)$, which is denoted B^{Π}.*
- *There is a value of $B_{t+1} \equiv B^{max} > 0$ such that $\Pi_{t+1} = 0$, and $B^{max} > B^{\Pi}$*

Proof. Using the definition of total profits in (27), incorporate the return to capital from (6) and we have

$$\Pi_{t+1} = (K_{t+1} + \alpha K_{t+1}^{\alpha} q_{t+1}^{1-\alpha} N^{1-\alpha}) \frac{\upsilon}{\upsilon + B_{t+1}} - zB_{t+1} \tag{28}$$

and maximizing this over the value of B_{t+1}, invoking the Envelope Theorem to ignore the effects on q_{t+1}, and allowing for K_{t+1} to depend on B_{t+1} as in (19) yields the following first order condition,

$$\frac{\left(1+\alpha^2 K_{t+1}^{\alpha-1} q_{t+1}^{1-\alpha} N^{1-\alpha}\right)\phi_B \upsilon(\upsilon+B_{t+1}) - (K_{t+1}+\alpha K_{t+1}^{\alpha} q_{t+1}^{1-\alpha})\upsilon}{(\upsilon+B_{t+1})^2} = z. \tag{29}$$

Examining the numerator of this first order condition, it can be seen that this is monotonically decreasing in B_{t+1}. As such, there can be only one maximum point at which the first order condition holds, denoted B^{Π}.

The limit of Π_{t+1} as B_{t+1} goes to infinity is negative, and given positive profits at the maximum and the monotonically declining value profits when $B_{t+1} > B^{\Pi}$, it must be the case that there is a point when $\Pi_{t+1} = 0$. Denote this value B^{max}. It follows that $B^{max} > B^{\Pi}$. ■

4.4 Optimization

Recall that individuals in the first period of their life earn wages, rents on land, and profits from banks. The number of banks in the economy determines how much capital the older generation provides, and hence determines the wage rate, land rental rate, and bank profits. So individuals, depending on how important each source of income is to their total income, will have different solutions for the optimal number of banks in the economy.

Individual i has an exogenously given ownership claim on both land and the profits of banks. This claim may be due to inheritance, political influence, or other mechanisms. Our interest here is how these existing claims influences the individual's preferences for competition in the banking sector. Individual i owns a share $\theta_i \in (0,1)$ of all land, and owns $\gamma_i \in (0,1)$ of total bank profits.[5]

Individual income for person i in their first period of life at time $t+1$ is therefore

$$y_{i1,t+1} = w_{t+1} + \theta_i \rho_{t+1} X + \gamma_i \Pi_{t+1} \tag{30}$$

and given the utility function described above, their utility is optimized by the maximization of this income. Given the definitions of wages and rents from (6) and the definition of bank profits from (27) we can write the optimal number of banks from an individuals perspective as

$$B_{i,t+1}^{*} = argmax(y_{i1,t+1}) \equiv B(X, K_t, N, \theta_i, \gamma_i). \tag{31}$$

As can be seen, the optimal number of banks depends on the endowments of land and capital from the prior

[5]For simplicity, the ownership claims on banks are over the total profits, rather than on individual banks.

period, as well as the ownership shares of land and profits. The following proposition describes how $B^*_{i,t+1}$ relates to the various inputs to the decision problem.

Proposition 4 *The optimal number of banks from the perspective of individual i, defined as* $B^*_{i,t+1} = B(X, K_t, N, \theta_i, \gamma_i)$*, has the following properties:*

- *If the bank ownership share is non-zero,* $\gamma_i > 0$*, then*
  - *The optimal number of banks is increasing in* K_t*, or* $B_K(X, K_t, N, \theta_i, \gamma_i) > 0$
  - *The size of this increase is decreasing in* γ_i*, or* $B_{K\gamma}(X, K_t, N, \theta_i, \gamma_i) < 0$
  - $B^*_{i,t+1} > B^{\Pi}$ *if* $(1 - q_{t+1}) > \frac{1}{N\theta_i}$
  - $B^*_{i,t+1} < B^{\Pi}$ *if* $(1 - q_{t+1}) < \frac{1}{N\theta_i}$
  - $B^*_{i,t+1} = B^{\Pi}$ *if* $(1 - q_{t+1}) = \frac{1}{N\theta_i}$
  - $lim_{q_{t+1} \to 0} B^*_{i,t+1} = B^{max}$
  - *The optimal number of banks is decreasing in the land ownership share,* $B_\theta(X, K_t, N, \theta_i, \gamma_i) < 0$
- *If the bank ownership share is zero,* $\gamma_i = 0$*, then*
  - $B^*_{i,t+1} = 0$ *if* $(1 - q_{t+1}) \leq \frac{1}{N\theta_i}$
  - $B^*_{i,t+1} = \infty$ *if* $(1 - q_{t+1}) > \frac{1}{N\theta_i}$
- *If the bank and land ownership shares are zero,* $\gamma_i = \theta_i = 0$*, then*
  - $B^*_{i,t+1} = B^{max}$

Proof. One can write (30) using the definitions of output and factor prices as

$$y_{i1,t+1} = w_{t+1}(1 - \theta_i N(1 - q_{t+1})) + \theta_i Y_{A,t+1} + \gamma_i \Pi_{t+1} \tag{32}$$

and maximizing this over B_{t+1}, invoking the Envelope Theorem regarding q_{t+1}, yields the following first order condition

$$\frac{\partial w_{t+1}}{\partial B_{t+1}}(1 - \theta_i N(1 - q_{t+1})) + \gamma_i \frac{\partial \Pi_{t+1}}{\partial B_{t+1}} = 0. \tag{33}$$

The statements in the proposition follow from the relationship of wages to the number of banks established in Corollary 2, and from the nature of the profit function for banks established in Lemma 3. ■

The essential point of the proposition is that the optimal number of banks, from the perspective of any individual, rises with income per capita. To see how this arises, consider the perspective of an individual

who has a land-holding share of θ_i. This person earns the wage rate w_{t+1}, and this by itself would encourage them to support more banks, as wages are increasing in their number. However, by owning a θ_i share of the land, this individual also must *pay* wages to those workers who are engaged working their land.

The individual makes only w_{t+1} in wages, but must pay out $w_{t+1} \times \theta_i N(1 - q_{t+1})$ to their workers. If the individuals share of the agricultural wage bill, $\theta_i N(1 - q_{t+1})$, is large enough, then the individual is a net purchaser of labor, and their incentive is to reduce wages. To reduce wages the individual would vote for fewer banks, as this will lower the capital stock. On the other hand, if their share of the agricultural wage bill is small enough, then they are a net supplier of labor, and their incentive is to raise wages through increasing the number of banks. The marginal effect of wages on their income is negative in the first case, and positive in the second.

The marginal income from wages must be offset against the marginal income from sharing in the profits of the banks. If the individual is a net purchaser of labor, then the marginal income from wages is negative, and to offset this the marginal profits of banks must be positive. Positive marginal profits for banks imply, given that they have a unique global maximum, that the optimal number of banks must be lower than B^{Π}.

In contrast, an individual who is a net supplier of labor has a positive marginal income from wages, and so must have a negative marginal profit from banks to ensure their first order condition equals zero. A negative marginal profit rate for banks means that the number of banks is greater than B^{Π}.

Thus the point at which $q_{t+1} = 1 - 1/(N\theta_i)$ is crucial, as seem in figure 2. For any value of γ_i, the optimal choice of the number of banks only becomes greater than B^{Π} once q_{t+1} is large enough, or the economy is sufficiently industrialized that the individual is a net supplier of labor. In addition, the greater the stake in the banking sector, the less dramatic the relationship becomes. For someone with $\gamma_i = 0$, they support no banks at low levels of development because they are net labor purchasers and they gain nothing from profits. As profits become more important, and γ_i becomes larger, the incentive to support a number of banks close to B^{Π} gets stronger.

With respect to the size of the land-holdings, consider that if the share of land, θ_i, increases, then the individual is a larger purchaser of labor. In other words, it takes a higher level of capital for the individual to become a net supplier of labor. So at any given level of capital, an individual with a higher land-ownership share will support fewer banks in the economy. An increase in θ_i essentially shifts the whole diagram to the right.

As the economy develops and the potential stock of savings (the income of the old generation) increases, then the share of workers in the agricultural sector will fall, raising the marginal wage income of every individual, regardless of their land ownership. Thus as income goes up, the optimal number of banks does as well for every individual.

5 Political Effects and Dynamics

Understanding how individual's holdings of land influence their support of financial development, we can now consider how the economy may evolve and how the development of the financial sector occurs (or does not occur).

First, consider an economy in which the number of banks is fixed at $\hat{B}$. How does the capital stock (and therefore income per capita) evolve over time?

This can be summarized in the following lemma.

Lemma 5 *Given a fixed number of banks, $\hat{B}$, a steady state level of capital exists, $K_{ss} = \Delta(\hat{B})$, and $\Delta_B(\hat{B}) > 0$.*

Proof. Recall that the capital stock in period $t+1$ is a function of the number of banks and the income of the young in period t - see equation (19). Lemma 1 established that K_{t+1} is a concave function of young person income in period t. Young generation income is, given (10), monotonically increasing in K_t. Therefore, K_{t+1} is a concave function of K_t. Lemma 1 also establishes that K_{t+1} increases with B, given a level of K_t. So increasing $\hat{B}$ increases the steady state value of $K_s s$. ■

Figure 3 shows how the steady state level of the capital stock (and hence income per capita) depends on the number of banks in the economy for several important values of $\hat{B}$. There are several things to note about this diagram. First, $K_{t+1} > 0$ when $K_t = 0$. This arises because the endowment of land, X, provides a productive asset even though no capital exists. Second, this positive value of K_{t+1} is increasing in the number of banks.

Finally, note that the curve labeled $\hat{B} = 0$ represents a minimum level of K_{t+1} for any level K_t. Individuals can store output themselves and achieve a return of $r_{t+1} = 0$. So even without banks at all, from 11 we have that the savings rate will be $s_t^* = \hat{s}$. Therefore, even when $\hat{B} = 0$ we will have $K_{t+1} = \hat{s} Y_{t1}$. The economy can develop to some extent even without a financial system.

The actual choice of the number of banks depends on the political choices made by the young generation, which in turn depends on the individual optimal choice of banks for each member of the economy. If we assume that each economy begins with zero banks, then under what conditions does the economy choose to adopt a larger number of banks such that the steady state capital stock goes up? Under what conditions will the economy select the income-maximizing number of banks B^{max} as opposed to some intermediate value that preserves positive bank profits?

To have any ability to answer these questions, we require some information on a) the distribution of ownership shares in land and banks, θ_i and γ_i, and b) the political system under which the economy operates. The following sections consider two situations that seem to reasonably describe historical conditions.

5.1 A Singular Elite

In this case, we'll assume that a fraction λ of the population is part of a "singular elite", meaning that they own all the land *and* all of the bank profits. Within the singular elite, each member holds an equal share. Therefore we have for the elite that

$$\theta = \frac{1}{\lambda N} \tag{34}$$

$$\gamma = \frac{1}{\lambda N}. \tag{35}$$

For the remaining citizens, the optimal number of banks is obvious. They would always prefer to have B^{max}, as they are always net suppliers of labor and so benefit from the increase in wages that follows from an increase in the number of banks.

For the elite, their decision process is more difficult. Their optimal choice of B will never be B^{max}, as they always retain some incentive to earn profits from banks, regardless of the size of the economy. However, as shown in Proposition 4, their optimal choice of the number of banks is increasing in the size of the economy.

If we imagine that in addition to owning all the land and bank profits, this singular elite controls the political system, then their preferences over B dictate the actual number of banks. Figure 4 shows the results of such a political arrangement. The curve labeled $B(\lambda')$ shows how the elites optimal choice of banks responds to increases in the capital stock. The point labeled $\hat{K}'$ denotes the amount of capital at which $q_{t+1} = 1 - \lambda_0$ and the choice of the elite flips over to supporting $B > B^{\Pi}$.

The line labeled $K_{ss}(B)$ shows the relationship between the number of banks and the steady state level of K, as seen in figure 3. Where this curve crosses $B(\lambda')$ is the steady state to which the economy will converge, with K'_{ss} in capital and B' banks. At capital stocks below this level, the capital stock is increasing, and as it increases the optimal number of banks increases as well.

Now what happens if we increase inequality in the economy by *decreasing* the size of the elite. In other words, reduce λ' to λ". This has the effect of increasing the ownership share in both land and banks of the elite. At any given capital stock, as noted in Proposition 4, the optimal number of banks decreases. This is captured by the downward shift to the $B(\lambda$") curve. However, this change in λ" does nothing to affect the $K_ss(B)$ relationship. Therefore the steady state level of the capital stock falls to $K"_{ss}$ and the number of banks in steady state is only B". In other words, an increase in inequality will reduce financial development and overall development as the elite block progress to ensure that wages stay low and rental rates remain high.

5.2 Conflicting Elites

A simple alternative to the singular elite is that the owners of land are a separate class from those who own the bank profits. In this case they will be at odds over what the optimal number of banks should be. The landowners have $\theta > 0$ while $\gamma = 0$. The bankers have $\theta = 0$ while $\gamma > 0$. The remaining citizens have $\theta = \gamma = 0$. Again, assume that only those who hold land or shares of banks are able to set policy.

Figure 5 displays the optimal choice of banks for both classes. The landowners, because they hold no share in bank profits, prefer to have zero banks so long as they are net purchasers of labor. Therefore their optimal choice is horizontal at zero up to the point $\hat{K}_\theta$, at which point the economy is sufficiently advanced that they become net suppliers of labor and switch discreetly to preferring B^{max}.

Bankers own no land, and so are always net suppliers of labor, meaning that they prefer to have $B_t > B^\Pi$ at all times. At low levels of development wages are so low that they can earn more by supporting large bank profits, so their optimal choice is close to B^Π. As the economy advances the wage effect becomes more powerful and over time the bankers will asymptote towards supporting B^{max}.

Politically, we can imagine that the actual choice of the number of banks is some weighted average of the preferences of the land-owners and the bankers, denoted $\hat{B}$. Figure 5 shows a situation in which the landowners are relatively powerful, and the implemented number of banks is close to their preference. As drawn, this results in a situation in which the economy reaches a steady state at K_{ss}, which is below the cutoff at which landowners support widespread financial development. The economy remains relatively poor.

In contrast, consider the situation in figure 6 where we presume that bankers are relatively powerful and the implemented number of banks (denoted by $\hat{B}$) is close to their preferences. As drawn here, the economy has a relatively small number of banks at low levels of capital, but there are sufficient banks to ensure that the economy reaches $\hat{K}_\theta$ and landowners shift to supporting financial development.

In this situation, as in the singular elite model, there is a distinct effect of land inequality on the development of the financial sector. In either figure 5 or 6 increasing inequality will limit the number of banks allowed to operate at any given time. Higher land inequality means that $\hat{K}_\theta$ is larger, or the point where landowners support financial development is harder to reach. For a any given level of political influence for landowners, an increase in land inequality will lower the possibility of development and smaller the number of banks in steady state.

The more limited the number of banks, the higher the net interest margin of banks, and the smaller the scale of the financial sector as individuals decide against saving. Thus the model can replicate the empirical results from the cross-country work that showed land inequality causing lower financial development and working through bank efficiency.

Modeling any specific instance of financial reform would require more details on the relative political influence of bankers, landowners, and workers, but the overall results of the model suggest a framework within which these situations can be analyzed. The crucial point is that land inequality, *ceteris paribus*, will make financial development less likely.

6 Conclusion

Long-run development often involves the coincident evolution of a sophisticated financial sector. History has also shown that the development of the financial sector is not simply an economic but a highly political phenomenon. Much of the political confrontation over financial innovation and expansion has involved overcoming the opposition of agricultural interests.

This historical intuition is confirmed by cross-country evidence of a significant effect of land inequality on the depth of the financial sector. Those places in which agricultural land is more highly concentrated have distinctly smaller financial sectors. Moreover, the evidence showed that much of this operated through the efficiency with which the financial sector operates.

The model of financial development presented in this paper incorporates these various facts to explain both financial and overall development. It is shown that, ceteris paribus, land-owners optimal level of financial development is lower than those without land holdings. In a dynamic setting, this opposition can result in an economy reaching a relatively poor steady state in which both the financial sector and the overall economy are limited in size. Increasing land inequality only strengthens the incentives of landowners to oppose financial development and the economy will be more likely to end up in a poor steady state because of this.

An advantage of the current model is that it provides a dynamic explanation of long-run financial development, as opposed explanations that have only level effects, such as legal origins. The model also demonstrates how the general institutional structure of the economy may be altered over time endogenously, without appealing to exogenous historical circumstances. Finally, the model also reproduces a natural increase in the savings rate over time, in line with general observations regarding the course of development.

Appendix

Oligopsony Among Banks

Each bank i has profits of

$$\pi_i = (R_{t+1} - r_{t+1})s_i - z \tag{36}$$

and the B_{t+1} banks set s_i simultaneously, taking the decisions of other banks as given.

From (11) and (12), the inverse supply of savings can be written as

$$1 + r_{t+1} = \left(\frac{\sum_i s_i}{Y_{t1} \hat{s}} \right)^{\upsilon} \tag{37}$$

where $\sum_i s_i = S_t$, or the sum of the individual bank deposits must equal the total supply of savings.

Each accepts deposits knowing the inverse supply function, so they try to maximize

$$\pi_i = \left(1 + R_{t+1} - \left(\frac{\sum_i s_i}{Y_{t1} \hat{s}} \right)^{\upsilon} \right) s_i - z \tag{38}$$

over the value of s_i, taking the deposits of other banks as given. The first order condition yields

$$1 + R_{t+1} = (1 + r_{t+1}) \left(1 + \frac{s_i \upsilon}{\sum_i s_i} \right). \tag{39}$$

There are B_{t+1} such first order conditions, one for each bank. The symmetric Nash equilibrium involves solving the B_{t+1} first order conditions simultaneously. This yields values for each s_i, and therefore for $\sum_i s_i$.

The solution can be seem more easily by noting that since banks are identical it must be that $s_i = \frac{1}{B_{t+1}} \sum_i s_i$ and therefore the equilibrium rate of return on savings must be

$$1 + r_{t+1} = \frac{1 + R_{t+1}}{\frac{\upsilon}{B_{t+1}} + 1}. \tag{40}$$

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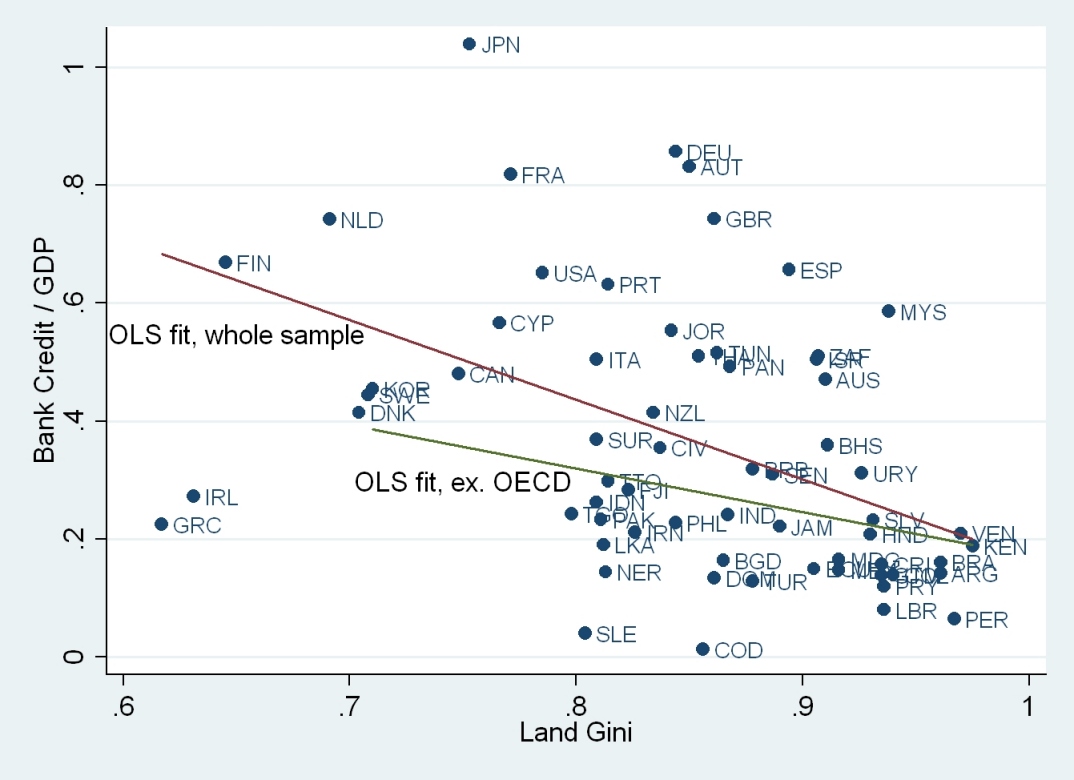

Figure 1: Relationship of Land Inequality and Bank Credit

Notes: Land inequality is measured by the Gini coefficient of land holdings using data from the FAO and calculated as described in the appendix. Bank Credit relative to GDP is an average of the period 1980-1995, from Demirguc and Levine (2000).

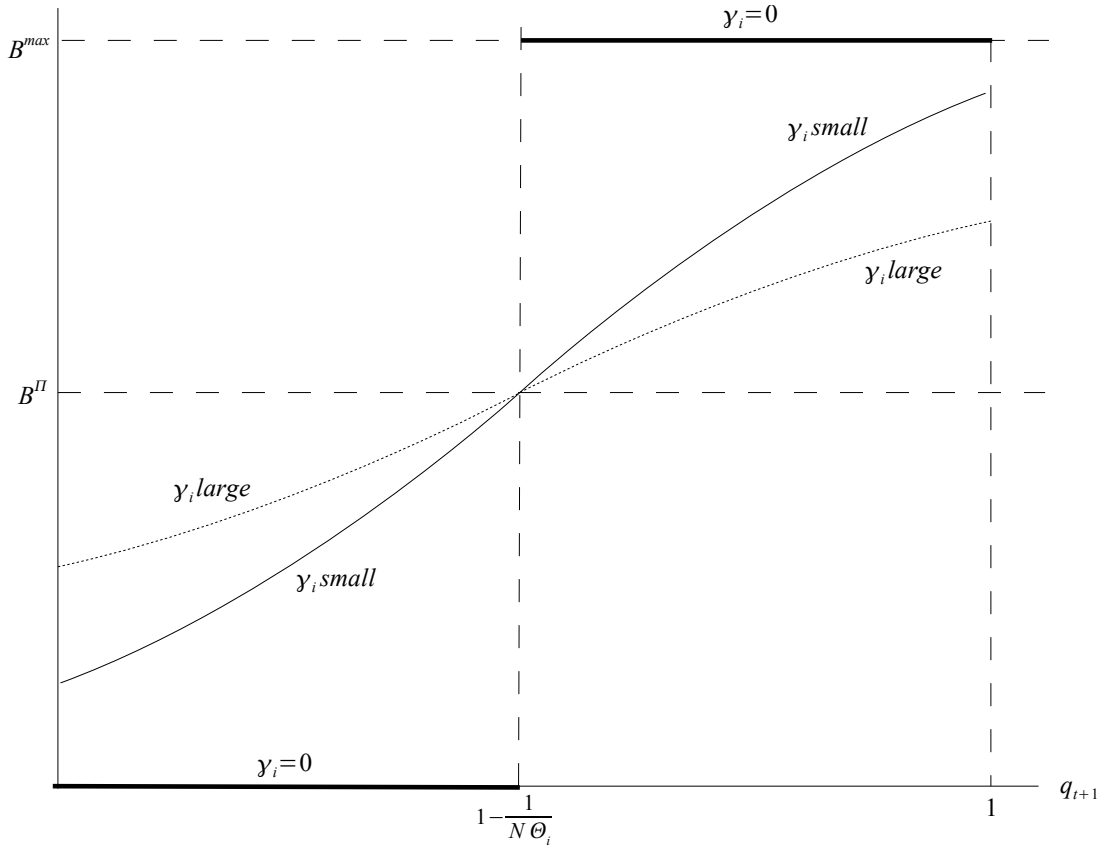

Figure 2: Optimal bank choice as a function of industrial labor share q_{t+1}

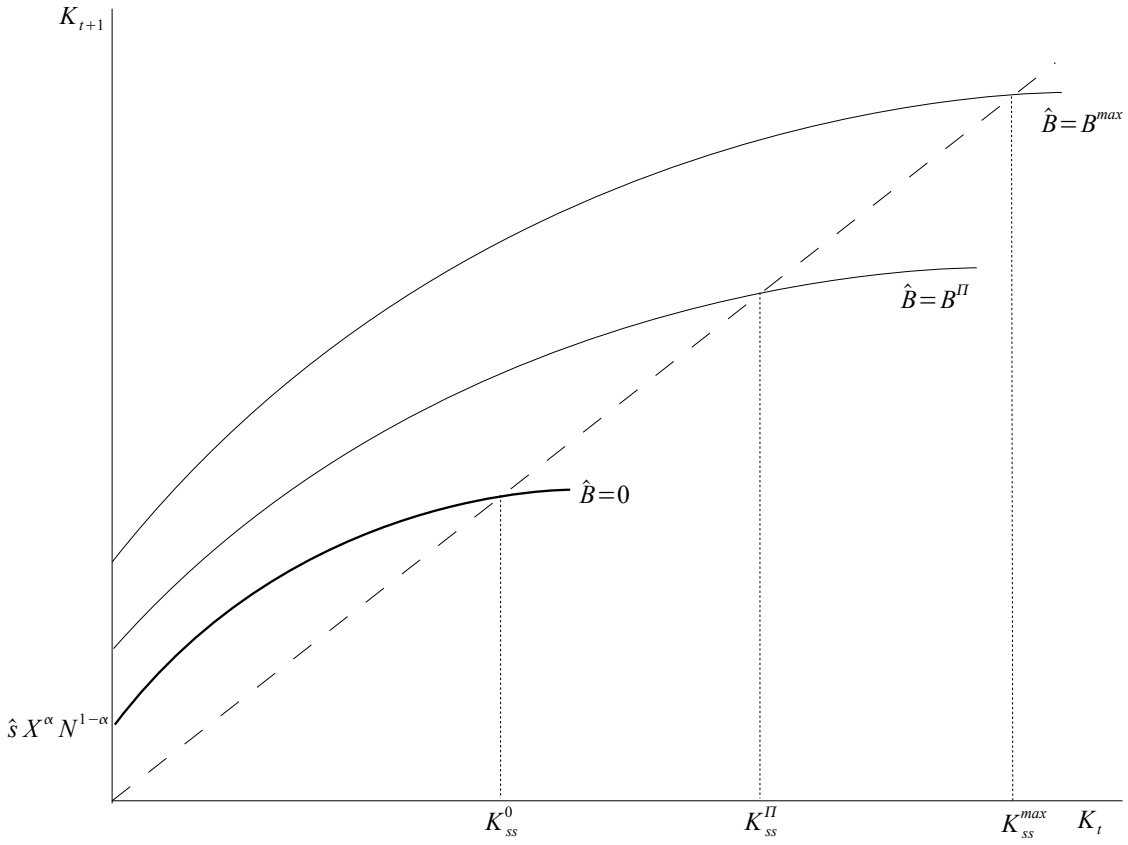

Figure 3: Steady state values of K_{ss} with different numbers of banks

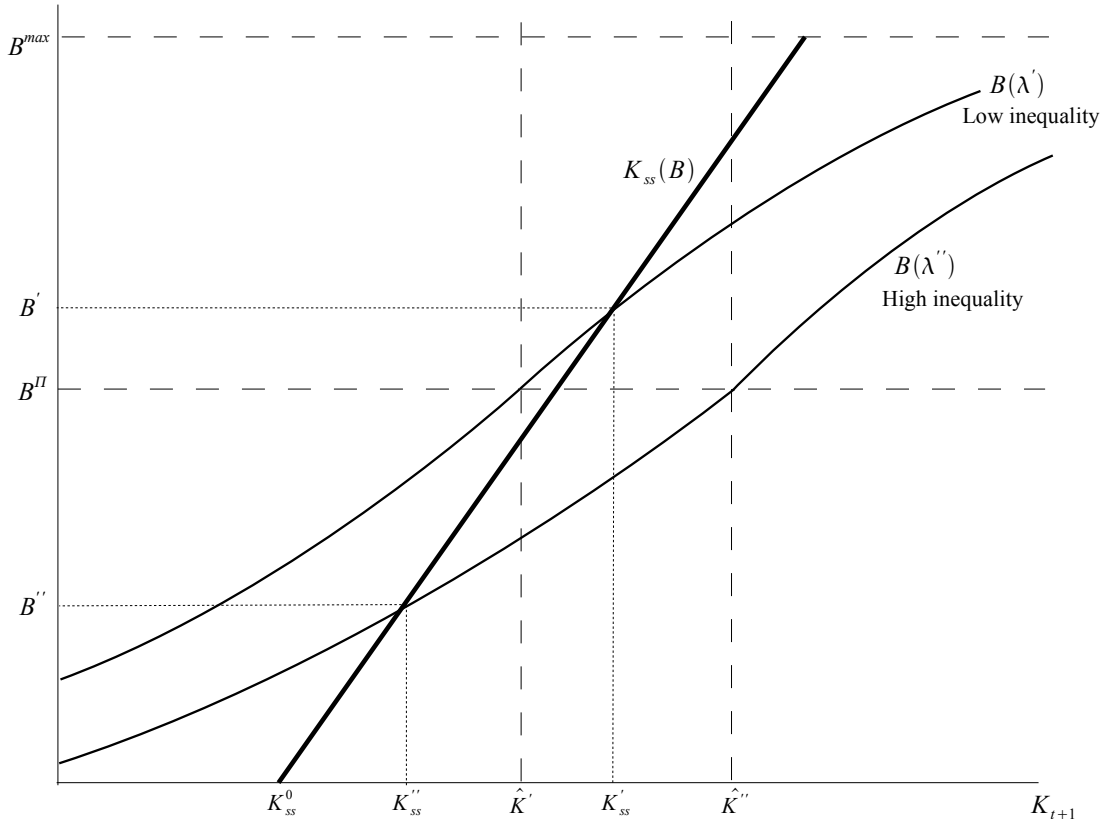

Figure 4: Steady state capital stock determination with a singular elite

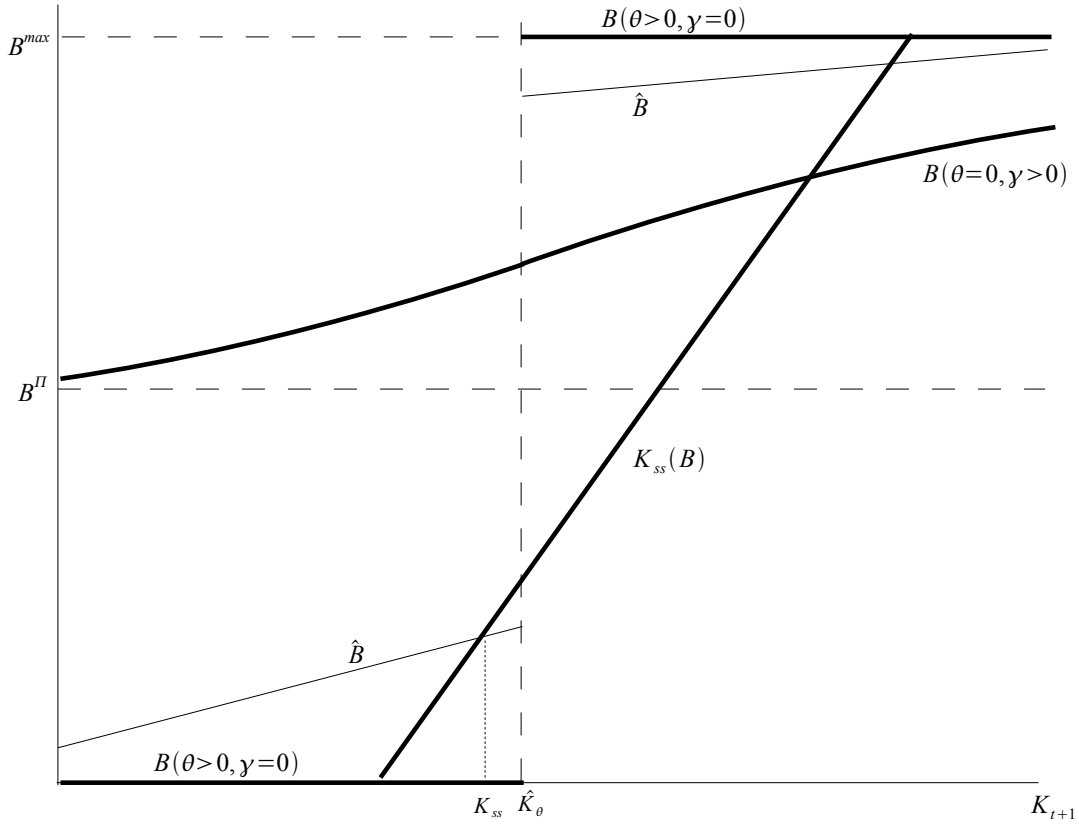

Figure 5: Steady state capital stock determination with a strong landowner class

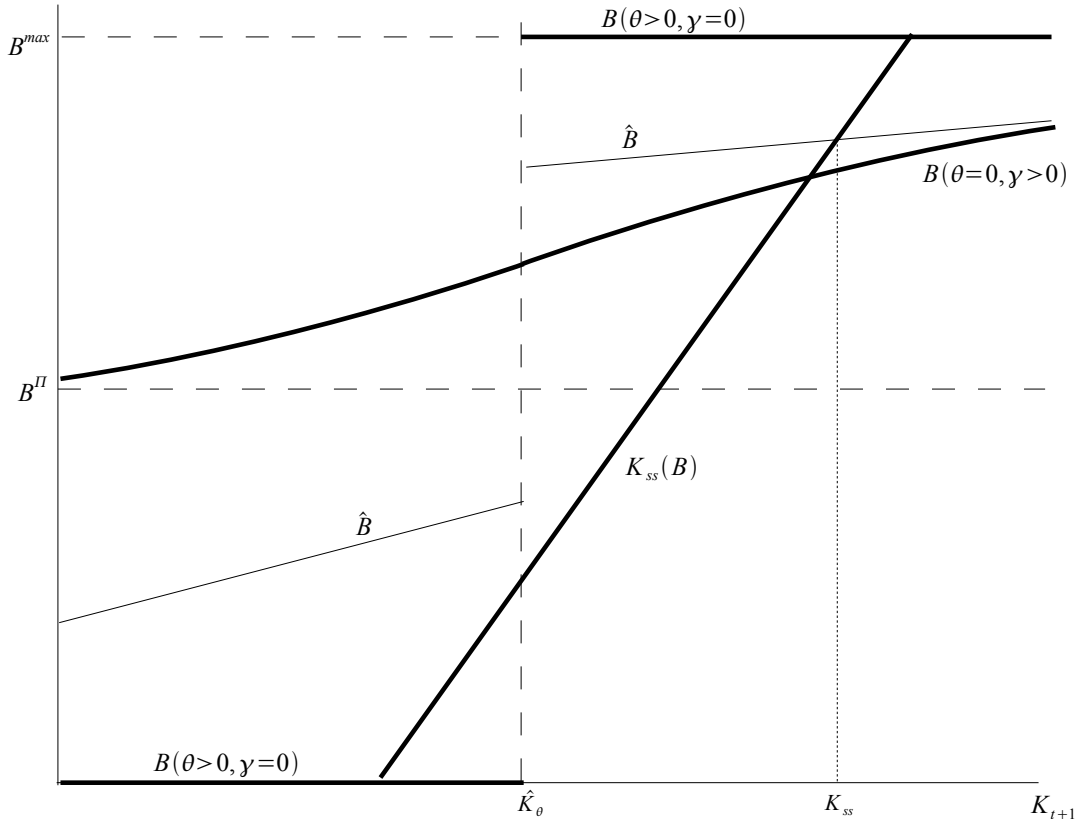

Figure 6: Steady state capital stock determination with a strong banking class

Table 1: Country Level Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Land Gini	54	0.849	0.090	0.617	0.975
Bank Credit / GDP	54	0.374	0.237	0.040	1.039
Liq. Liab. / GDP	54	0.481	0.266	0.140	1.683
Overhead costs	54	0.043	0.027	0.002	0.123
Net interest margin	54	0.043	0.024	0.007	0.120
Institutions index	54	0.419	0.820	-1.040	1.740
Ethnic fract.	54	0.374	0.262	0.002	0.879
Religious fract.	54	0.412	0.247	0.005	0.860
Income Gini	47	0.407	0.088	0.257	0.623

Notes: The land Gini is from Vollrath and Erickson (2007), and incorporates data on both the size distribution of land-holdings as well as the extent of landlessness. Bank credit, liquid liabilities, overhead costs, and net interest margin are all from Beck, Demirgüç-Kunt, and Levine (2001). Institutions are from Kaufman, Kraay, and Zoido (1999), while the fractionalization measures are from Alesina et al (2006). The income Gini is from Deininger and Squire (1998).

Table 2: Country Level Inequality and Financial Statistics

Country	Land Gini	Bank Credit/GDP	Liq. Liab./GDP	Overhead	Net Int. Margin
Argentina	0.961	0.143	0.140	0.112	0.082
Australia	0.910	0.471	0.564	0.026	0.019
Austria	0.850	0.832	0.830	0.025	0.019
Bahamas	0.911	0.359	0.507	0.030	0.021
Bangladesh	0.865	0.165	0.274	0.023	0.007
Barbados	0.878	0.319	0.526	0.045	0.033
Brazil	0.961	0.161	0.193	0.120	0.120
Canada	0.748	0.481	0.685	0.024	0.018
Colombia	0.940	0.141	0.265	0.083	0.064
Costa Rica	0.935	0.158	0.375	0.065	0.052
Denmark	0.704	0.415	0.539	0.036	0.049
Dominican Rep	0.861	0.134	0.225	0.065	0.063
Ecuador	0.905	0.150	0.210	0.077	0.072
El Salvador	0.931	0.233	0.312	0.033	0.039
Finland	0.645	0.670	0.511	0.016	0.016
France	0.771	0.819	0.680	0.044	0.035
Germany	0.844	0.857	0.641	0.028	0.025
Greece	0.617	0.225	0.664	0.040	0.035
Guatemala	0.935	0.139	0.229	0.061	0.054
Honduras	0.930	0.208	0.282	0.043	0.069
India	0.867	0.241	0.416	0.029	0.030
Indonesia	0.809	0.262	0.274	0.029	0.041
Ireland	0.631	0.273	0.487	0.002	0.016
Italy	0.809	0.505	0.697	0.036	0.036
Ivory Coast	0.837	0.355	0.286	0.039	0.044
Jamaica	0.890	0.222	0.455	0.076	0.091
Japan	0.753	1.039	1.683	0.014	0.018
Jordan	0.842	0.554	1.000	0.026	0.022
Kenya	0.975	0.189	0.404	0.037	0.073
Korea, Rep	0.710	0.455	0.461	0.025	0.023
Madagascar	0.916	0.165	0.207	0.033	0.060
Malaysia	0.938	0.587	0.921	0.016	0.025
Mexico	0.916	0.148	0.234	0.050	0.053
Netherlands	0.691	0.743	0.818	0.010	0.015
New Zealand	0.834	0.414	0.554	0.027	0.025
Pakistan	0.811	0.234	0.397	0.030	0.029
Panama	0.868	0.493	0.442	0.016	0.020
Paraguay	0.936	0.121	0.207	0.064	0.065
Peru	0.967	0.065	0.146	0.105	0.072
Philippines	0.844	0.229	0.331	0.051	0.042
Portugal	0.814	0.632	0.732	0.026	0.035
Sierra Leone	0.804	0.040	0.180	0.123	0.074
South Africa	0.907	0.510	0.455	0.036	0.039
Spain	0.894	0.657	0.728	0.035	0.038
Sri Lanka	0.812	0.191	0.359	0.047	0.051
Sweden	0.708	0.445	0.498	0.031	0.027
Thailand	0.854	0.511	0.607	0.020	0.030
Trinidad	0.814	0.299	0.512	0.045	0.037
Tunisia	0.862	0.516	0.478	0.019	0.022
Turkey	0.878	0.129	0.218	0.064	0.094

Table 2: Country Level Inequality and Financial Statistics

Country	Land Gini	Bank Credit/GDP	Liq. Liab./GDP	Overhead	Net Int. Margin
United Kingdom	0.861	0.744	0.650	0.023	0.020
United States	0.785	0.652	0.626	0.036	0.039
Uruguay	0.926	0.312	0.419	0.059	0.056
Venezuela	0.970	0.209	0.448	0.067	0.078

Notes: The land Gini is from Vollrath and Erickson (2007), and incorporates data on both the size distribution of landholdings as well as the extent of landlessness. Bank credit, liquid liabilities, overhead costs, and net interest margin are all from Beck, Demirgüç-Kunt, and Levine (2001).

Table 3: Bank Credit and Land Inequality

	Dependent variable: Bank Credit to GDP, avg. 1980-1995					
Exp. Variables	(1)	(2)	(3)	(4)	(5)	(6)
Land Gini	-1.061***	-2.455***	-2.263***	-1.116**	-0.744	-1.483*
	(0.363)	(0.607)	(0.741)	(0.496)	(0.489)	(0.891)
French origin			0.009	0.070	0.100*	0.059
			(0.074)	(0.064)	(0.060)	(0.074)
German origin			0.301*	0.309***	0.312***	0.264*
			(0.171)	(0.114)	(0.107)	(0.157)
Scand. origin			-0.219	-0.128	-0.056	-0.155
			(0.151)	(0.131)	(0.128)	(0.166)
Institutions Index				0.153***	0.131***	0.140***
				(0.043)	(0.038)	(0.050)
Ethnic frac.				0.102	0.107	0.099
				(0.108)	(0.096)	(0.133)
Religious frac.				0.136	0.153	0.162
				(0.155)	(0.141)	(0.171)
Bank overhead costs					-2.316**	
					(0.973)	
Net interest margin					-0.291	
					(0.993)	
Income Gini						0.273
						(0.483)
Method	OLS	2SLS	2SLS	2SLS	2SLS	2SLS
N	54	54	54	54	54	47
Sargan statistic		0.801	0.600	0.189	0.371	0.108
Sargan test p-value		0.371	0.438	0.663	0.542	0.742
First stage F-stat		19.316	11.957	8.611	7.694	3.031

Notes: Standard errors are robust to heteroscedasticity and reported in parentheses. * denotes significance at 10%, ** denotes 5%, and *** denotes 1%. Bank credit to GDP is from Demirguc and Levine (2000). The Land Gini is constructed from FAO data on the size of land holdings, as described in the appendix. Legal origins are dummy variables indicating the source of legal systems, from La Porta et al (1998). The institutions index is from Kraay et al (2000), and is an aggregate of six dimensions of institutional quality. Ethnic and religious fractionalization are from Alesina et al. (2000). Bank overhead costs are non-interest expenses divided by assets, while net interest margin is the reported difference between lending and deposit rates, both from Demirguc and Levine (2000). The income Gini coefficient is from Deininger and Squire (1998). The Sargan test in columns (2)-(6) has one degree of freedom.

Table 4: Liquid Liabilities and Land Inequality

	Dependent variable: Liquid Liabilities to GDP, avg. 1980-1995					
Exp. Variables	(1)	(2)	(3)	(4)	(5)	(6)
Land Gini	-1.183***	-2.545***	-2.600***	-1.565***	-1.215**	-2.438*
	(0.373)	(0.642)	(0.663)	(0.573)	(0.527)	(1.381)
French origin			-0.028	-0.014	-0.000	-0.031
			(0.074)	(0.065)	(0.068)	(0.089)
German origin			0.249	0.265	0.269	0.263
			(0.251)	(0.223)	(0.218)	(0.302)
Scand. origin			-0.408***	-0.369***	-0.322**	-0.433**
			(0.141)	(0.138)	(0.141)	(0.207)
Institutions Index				0.142***	0.133***	0.132*
				(0.053)	(0.048)	(0.072)
Ethnic frac.				0.127	0.129	0.168
				(0.136)	(0.129)	(0.173)
Religious frac.				-0.028	-0.028	-0.033
				(0.173)	(0.166)	(0.219)
Bank overhead costs					-2.982**	
					(1.288)	
Net interest margin					1.229	
					(1.622)	
Income Gini						0.718
						(0.735)
Method	OLS	2SLS	2SLS	2SLS	2SLS	2SLS
N	54	54	54	54	54	47
Sargan statistic		0.109	0.216	0.001	0.006	0.048
Sargan test p-value		0.741	0.642	0.972	0.940	0.826
First stage F-stat		19.316	11.957	8.611	7.694	3.031

Notes: Standard errors are robust to heteroscedasticity and reported in parentheses. * denotes significance at 10%, ** denotes 5%, and *** denotes 1%. Liquid liabilities to GDP is from Demirguc and Levine (2000). The Land Gini is constructed from FAO data on the size of land holdings, as described in the appendix. Legal origins are dummy variables indicating the source of legal systems, from La Porta et al (1998). The institutions index is from Kraay et al (2000), and is an aggregate of six dimensions of institutional quality. Ethnic and religious fractionalization are from Alesina et al. (2000). Bank overhead costs are non-interest expenses divided by assets, while net interest margin is the reported difference between lending and deposit rates, both from Demirguc and Levine (2000). The income Gini coefficient is from Deininger and Squire (1998). The Sargan test in columns (2)-(6) has one degree of freedom.