Optimal Financial Structures and Development:

The evolving importance of banks and markets

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Abstract

This paper examines (1) the evolving importance of banks and financial markets during the process of economic development and (2) the association between financial structure—the mixture of banks and markets operating in an economy—and economic development. We find that as economies develop, the services provided by financial markets become comparatively more important than those provided by banks. Moreover, deviations of a country's actual financial structure from the estimated optimal structure are associated with lower levels of economic activity. Financial structure matters.

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Research finds that *both* the operation of banks and the functioning of securities markets influence economic development. Empirical research finds that each of these components of the financial system enjoys a strong, independent connection with economic growth (Demirguc-Kunt and Maksimovic, 1998; Levine and Zervos, 1998). Several theoretical models indicate that banks provide different services to the economy from those provided by securities markets. For example, Acemoglu and Zilibotti (1997), Allen and Gale (1997, 1999), Boot and Thakor (1997, 2000), Dewatripont and Maskin (1995), Holmstrom and Tirole (1993), and Rajan (1992) suggest that banks have a comparative advantage in reducing the market frictions associated with financing standardized, shorter-run, lower-risk, well-collateralized endeavors, while decentralized securities markets are relatively more effective in custom-designing arrangements to finance more novel, longer-run, higher-risk projects that rely more on intangible inputs.

Economic theory also emphasizes the importance of financial structure—the *mixture* of financial institutions and markets operating in an economy. For example, Allen and Gale's (2000) theory of financial structure and their comparative analyses of Germany, Japan, the United Kingdom, and the United States suggest that (1) banks and markets provide different financial services; (2) economies at different stages of economic development require different mixtures of these financial services to operate effectively; (3) as an economy develops, therefore, it will demand different mixtures of financial services and hence different mixtures of banks and markets (Boyd and Smith, 1998); and (4) if an economy's actual financial structure differs from the "optimal" mixture of banks and markets, the economy will not obtain the appropriate blend of financial services, with deleterious effects on economic activity.[1]

[1] For example, see Allen and Gale (1995), Goldsmith (1969), Morck and Nakamura (1999), Morck, Yeung, and Yu (2000), Weinstein and Yafeh (1998), and citations in Allen and Gale (2000).

Empirical research, however, has been largely unsuccessful at clarifying the importance of financial structure. Demirguc-Kunt and Levine (2001) show that banks and securities markets tend to become more developed as economies grow and that securities markets tend to develop more rapidly than banks, so that financial systems generally become more market-based during the process of economic development. But, researchers have not yet determined whether different levels of economic development require a unique mixture of banks and markets to operate efficiently, such that deviations from such an "optimal" financial structure are associated with lower levels of economic activity. If anything, cross-country comparisons indicate that while banks and markets are each important for economic development, financial structure does not matter (Beck and Levine, 2002; Demirguc-Kunt and Maksimovic, 2002; and Levine, 2002).

In this paper, we reassess the empirical connection between financial structure and economic development. In particular, we evaluate (1) whether the sensitivities of economic development to increases in bank development and increases in securities market development change during the process of economic development and (2) whether each level of economic development is associated with an optimal financial structure, such that deviations from this optimum are associated with lower levels of economic activity. To conduct this study, we use data on 72 countries, over the period from 1980 through 2008, and we aggregate the data in 5-year averages (data permitting), so that we have a maximum of six observations per country. We use several measures of bank and securities market development, including standard indicators such as financial intermediary credit to the private sector as a share of Gross Domestic Product (GDP) and the capitalization of equity and private domestic bond markets relative to GDP.

We contribute to the literature in two ways. First, we use quantile regressions to assess how the sensitivities of economic activity to bank and securities market development evolve as

countries grow (Koenker and Basset, 1978). Ordinary least squares (OLS) regressions provide information on the association between, for example, economic development and bank development for the "average" country, the country at the average level of economic development. But, quantile regressions can assess the relationship between economic activity and bank development at each percentile of the distribution of economic development. Thus, the quantile regressions provide information on how the associations between economic development and both bank and securities market development change during the process of economic development.

Second, we evaluate whether deviations of a country's actual financial structure from our estimate of the country's optimum are associated with lower levels of economic activity. To construct an estimate of the optimal mixture of banks and markets for each level of economic development, we first regress a measure of financial structure (such as the ratio of bank development to securities market development) on GDP per capita for the sample of OECD countries, while controlling for key institutional, geographic, and structural traits. The maintained hypothesis is that conditional on these traits, the OECD countries provide information on how the optimal financial structure varies with economic development. Then, we use the coefficients from the OECD regression to compute the estimated optimal financial structure for each country-year observation for the full sample of countries. Given these inputs, we compute the Financial structure gap, which equals the natural logarithm of the absolute value of the difference between the actual and the estimated optimal financial structure. The Financial structure gap measures deviations of actual financial structure from the estimated optimum, where larger values indicate bigger deviations, regardless of whether the deviations arise because the country is "too" bank-based or "too" market-based. Finally, we examine the relationship

between the Financial structure gap and economic development to assess whether deviations of financial structure from the estimated optimum are associated with lower levels of economic activity.

There are two key results. First, the evidence is consistent with the view that the services provided by securities markets become comparatively more important for supporting efficient economic activity as economies grow, while those of banks become relatively less important. As economies develop, (1) both banks and markets become larger relative to the size of the overall economy; (2) the sensitivity of economic development to changes in bank development *decreases*; and (3) the sensitivity of economic development to changes in securities market development *increases*. Thus, the marginal increase in economic activity associated with an increase in bank development falls, while the marginal boost in economic activity associated with an increase in securities market development rises. These results suggest that the relative demand for the services provided by securities markets increases as an economy develops and that these services differ from those provided by banks as has been suggested by Allen and Gale (2000).

Second, we find that deviations of an economy's actual financial structure from its estimated optimal mixture of banks and markets—i.e., increases in the Financial structure gap—are associated with a reduction in economic output. Even when controlling for the level of bank development, the level of securities market development, a set of standard controls, and country fixed effects, there is a robust, negative relationship between the Financial structure gap and economic activity. While much work remains to identify the causal impact of financial structure on economic development, these results are consistent with the view that the mixture of banks and markets—and not just the level of bank and market development—is important for

understanding the process of economic development. We also examine whether it matters if an economy is too bank-based or too market-based. We find that the source of the financial structure gap—whether the deviations of the actual financial structure from the optimal structure are associated with the financial system being too bank-based or too market-based —is not strongly associated with economic activity.

Besides providing additional information about the role of the financial system during the process of economic development, this research is policy relevant. If the mixture of financial institutions and markets matters—and not only the development of financial institutions and markets, then this advertises financial structure as an independent financial policy consideration. And, if the optimal mixture changes as an economy develops, then this advertises the desirability of appropriately adjusting financial policies and institutions as countries develop. Furthermore, the sensitivity of economic activity to changes in bank and securities market development differs at different stages of economic development. This implies that the estimated OLS elasticities from past research of the impact of changes in bank or stock market development on economic development will yield misleading information about countries incomes far from the sample average income. Past studies do not account for the *evolving* importance of banks and markets during the process of economic development.

This paper builds on earlier cross-country investigations of the importance of financial structure for economic development. The work in Demirguc-Kunt and Levine (2001), for instance, finds the financial structure is not robustly linked with economic performance. We do not reject this finding. Rather, we show that *deviations* of actual financial structure from an economy's optimal financial structure—financial structure gaps—are strongly associated with economic activity, where optimal financial structure varies with the level of economic

development. Thus, while earlier work focused on actual financial structure, we focus on financial structure gap and stress the evolving roles of banks and markets in economic development.

This paper is a step in deriving a better understanding of the dynamic relationships among economic development, financial institutions, and securities markets, but much work remains. Future research needs to establish with more confidence the direction of causality between financial structure and economic activity. In this paper, we show that both the "supply" of securities market services and the sensitivity of economic activity to changes in securities market development increase with economic development. This suggests that the relative demand for securities market services increases with economic development. But, we do not separately identify the impact of banks, markets, and financial structure on economic outcomes. Future research also needs to identify exogenous policy determinants of financial structure to make specific policy recommendations. While considerable research examines the determinants of bank and stock market development, this paper advertises the desirability of understanding the policy and institutional determinates of the Financial structure gap.

1. Data and Summary Statistics

1.1. Financial system indicators

We use several measures of bank and stock market development to analyze the relationship between economic activity and the structure of the financial system. We would like to have indictors of the degree to which banks and markets ameliorate market frictions and thereby (1) improve ex ante information about possible investments, (2) enhance the monitoring of investments after financing occurs, (3) facilitate the trading, diversification, and management

of risk, (4) ease the mobilization and pooling of savings, and (5) foster the exchange of goods, services, and financial claims. We would also like information on how the mixture of banks and markets affect the provision of these services. But, such empirical proxies do not exist for a broad cross-section of countries over the last few decades. Instead, we rely on standard measures of the size and activity of banks and securities markets. These measures are constructed over the period from 1980 to 2008, and Table 1 provides the primary sources of these indicators.

To measure "bank" development, we use **Private credit**, which equals deposit money bank credit to the private sector as a share of Gross Domestic Product (GDP). Private credit isolates credit issued to the private sector and therefore excludes credit issued to governments, government agencies, and public enterprises. Private credit excludes credits issued by central banks. Not surprisingly, there is enormous cross-country variation in Private credit. For example, averaging over the 1980-2008 period, Private credit was less than 10% of GDP in Angola, Cambodia, and Yemen, while it was greater than 85% of GDP in Austria, China, and United Kingdom. Table 2 indicates that the annual average value of Private credit across countries was 39% with a standard deviation of 35%.

To measure "market" development, we primarily use **Securities market capitalization**, which equals the capitalization of the stock market plus the capitalization of the private domestic bond markets, divided by GDP. Thus, this indicator measures the size of the two major components of securities markets around the world. There is substantial variation across countries as well. As shown in Table 2, while the mean value of Securities market capitalization is 59%, the standard deviation is 71%. In Bangladesh, Guatemala, and Romania, Securities market capitalization averaged less than 10% over the 1980-2008 sample period. In contrast, Securities market capitalization averaged over 75% in Japan, South Africa, and Taiwan. Also,

we examine other market development indicators, including Stock market capitalization, which only incorporates equity market capitalization and therefore excludes information on the size of the private bond market, and Total stock market value traded, which equals the value of stock market transactions as a share of GDP, and therefore incorporates information on market liquidity, not simply on capitalization. Specifically, we examined Stock market trading, which equals the total value of traded equities as a share of GDP. Using Stock market trading yields similar results to those reported below. Though weaker in some specifications (and stronger in others), these measures yield broadly similar conclusions about the evolving role of banks markets during the process of economic development.

To measure the mixture of banks and markets operating in an economy, we use the **Financial structure ratio**, which equals Private credit divided by Securities market capitalization. The goal is to gauge the degree to which the financial system is relatively bank-based or market-based. Financial structure differs markedly across economies. As shown in Table 2, the annual average value of the Financial structure ratio is 6.3, ranging below 0.64 (10^{th} percentile) in Singapore, South Africa, and Sweden to over 13.9 (90^{th} percentile) in Armenia, Bolivia, and Vietnam over the 1980-2008 sample period.

We also construct a measure of the **Financial structure gap**, which equals the natural logarithm of the absolute value of the difference between the actual Financial structure ratio and the estimated "optimal" financial structure ratio. We describe the estimation of the optimal financial structure below. The Financial structure gap is computed for each country in each year. The Financial structure gap becomes larger the more a country's Financial structure ratio deviates from the estimated optimum, regardless of whether the country becomes "too" bank-based or "too" market-based relative to the estimated optimum. As reported in Table 2, there is

enormous cross-country variation of the Financial structure gap (averaged over the sample period).

We also examine the degree to which a financial system is more bank-based or market-based relative to its estimated optimal financial structure. While the Financial structure gap is based on the absolute value of deviations of the actual financial structure from the estimated optimal financial structure, we also have information on the direction of the deviation. Thus, Tables 1, 2, and 3 also provide information on the actual Financial structure ratio / Optimal financial structure ratio, where we discuss the construction of the Optimal financial structure ratio below. This variable indicates that the average financial structure of countries such as Uruguay, Bulgaria, and Dominican Republic are highly distorted relative to their estimated optimum in that they are too bank-based (>6.6; 90^{th} percentile), while the financial structure of countries such as Chile, Malaysia, and Russian Federation, are highly distorted relative to their estimated optimum in that they are too market-based (<0.4; 10^{th} percentile). Appendix 1 contains a list of countries and provides an overview of the period medians for GDP per capita, Private credit, Securities market capitalization to GDP, Stock market capitalization to GDP, the Financial structure ratio, and the Financial structure ratio / Estimated optimal financial structure.

1.2. Other data

To examine how the independent relationship between financial structure and economic activity changes as an economy develops and to explore the linkages between financial structure and policy and institutional factors, we employ other information about the economy. As a measure of economic activity, we use **Log Real GDP per capita**, which equals the logarithm of GDP per capita in constant 2000 U.S. dollars. And, to assess the independent link between

finance and economic development, we control for many country characteristics that have been widely employed in the development literature.

In particular, we use different conditioning information sets. In some specifications, we use "standard controls" to evaluate the independent relationship between finance and economic activity. These standard controls include: years of schooling, openness to trade, inflation, government size, the initial GDP per capita of the economy in 1980, and dummy variables for the 5-year periods of analysis. Table 1 provides the specific definitions. In other specifications, we use "exogenous controls," which include dummy variables for the legal origin of the country along with the country's distance from the equator. Table 1 gives the detailed definitions and sources of these data and Table 2 provides descriptive statistics

1.3. Correlations

The correlations in Table 3 highlight key features about the financial system and economic development. First, bank and securities market development are positively correlated with economic development. Second, bank and securities market development are positively correlated, suggesting that financial development involves both bigger banks and bigger markets. Third, the Financial structure gap is negatively correlated with bank and securities development, as well as economic development (ρ=-0.39; $p<0.05$). Richer countries tend to have a smaller gap between their estimated optimal financial structure and their actual mixture of banks and markets (ρ=-0.07; $p<0.05$). Though simple correlations, we will see that many of these basic patterns hold when controlling for many other national traits.

2. The Relationships among Banks, Markets, and Economic Development

2.1. Quantile regressions

To assess how the relationships between economic activity and both Private credit and Securities market capitalization change as countries develop, we begin with ordinary least squares (OLS) and quantile regressions using 5-year non-overlapping periods. OLS provides information on the relationship between Log Real GDP per capita and financial development for the country at the average level of economic development. But, OLS does not provide information on how the relationship between economic activity and financial development differs for countries with different levels of economic activity.

Quantile regressions model the relation between Log Real GDP per capita and financial development at the specific percentiles (or quantiles) of Log Real GDP per capita. Thus, in a quantile regression of Log Real GDP per capita on Private credit, the procedure is able to yield a *different* estimated coefficient on Private credit for each percentile (or quantile) of Log Real GDP per capita. For example, the estimated coefficient at the 50^{th} percentile is a median regression, yielding the estimated relationship between Log Real GDP per capita and Private credit at the median level of economic activity. By computing the quantile regression for each of the 5^{th} to the 95^{th} quantiles, we assess how the relationship between economic activity and financial development differs across distinct levels of Log Real GDP per capita.

In neither the OLS nor the quanitle regressions do we identify the causal impact of bank and securities market development on economic development. This has been the focus of other studies (e.g., Demirguc-Kunt and Maksimovic, 1998; Levine and Zervos, 1998, and Beck and Levine, 2004). Rather, the goal here is to explore whether, and how, the relation between

changes in economic activity and changes in both bank and market development varies with the level of economic development.

2.2. Illustrating the quantile regression results

In Figure 1-Panel A, the graph on the upper-left-hand-side plots the coefficients from quantile regressions for each of the 5^{th} to 95^{th} percentiles of Log Real GDP per capita, where the dependent variable is Log Real GDP per capita and the regressor is Private credit. A circle indicates each coefficient estimate. The left axis provides information on the values of the coefficient estimates. The graph also plots the actual value of Private credit at each percentile. A triangle indicates these actual values, where the scale is provided on the right axis. Thus, the estimated coefficient, indicated by a circle, depicts the "sensitivity" of Log Real GDP per capita associated with a change in Private credit at each percentile of economic development. The triangles provide the average "quantity" of Private credit at each percentile of economic development. The graphs on the upper-right-hand-side of Figure 1 provide similar information on the relationship between economic activity and Securities market capitalization. The lower-hand-side charts confirm the increasingly relevant role for securities markets by documenting similar upward trends for both stock market capitalization and stock market activity as measured by stock market value traded to GDP.

Panel B of Figure 1 provides the same types of quantile analyses, while controlling for other characteristics of the national economies. We use "standard controls:" Log Real GDP per capita in 1980, Government size, Openness to trade, Inflation, Average years of schooling, and period fixed effects.

In each of the four graphs in Figure 1, we provide two additional pieces of information. First, the horizontal dotted line is the OLS estimate of the coefficient on the financial development indicator. Thus, in the graph on the upper-left-hand-side of Figure 1-Panel A, the horizontal dashed line is simply the coefficient on Private credit from an OLS regression of Log Real GDP per capita on Private credit for the full sample of country-year observations.

Second, the solid line shows the estimated linear relationship between each estimated coefficient of the financial development indicator and the GDP per capita percentile associated with the coefficient. Thus, Figure 1 illustrates the trend in the estimated coefficient on the financial indicator across income percentiles. Table 4 provides the regression estimates of these trends. As a specific example, consider the graph on the right of Figure 1-Panel B. We first collect the estimated coefficients on Securities market capitalization after conditioning on the standard controls and period fixed effects. We then regress these estimated coefficients on the GDP per capita percentile associated with the estimates. Table 4, column (4) provides the results from this regression. The estimated coefficient on GDP per capita percentile provides the trend line graphed in Figure 1.

2.3. Quantile Results

In terms of bank development, Figure 1 shows that as Log Real GDP per capita rises, two things happen: (1) Private credit rises (triangles) and (2) the marginal increase in Log Real GDP per capita associated with an increase in Private credit *falls* (circles). Put differently, quantities rise and sensitivities fall. As reported in Table 4, the reduction in the sensitivity of Log Real GDP per capital to an increase in Private credit as economic activity increases is statistically significant.

The results are different for securities market development. As Log Real GDP per capital rises, (1) Securities market capital rises and (2) the marginal increase in Log Real GDP per capita associated with an increase in Securities market capitalization *rises*. That is, quantities *and* sensitivities rise. Table 4 shows that this effect is statistically significant: the sensitivity of economic activity to Securities market capitalization increases as Log Real GDP per capita rises. These results suggest that the relationship between bank development and economic activity differs from that between securities market development and economic activity.

2.4. Broader implications of quantile analyses

The evidence is consistent with insights from Allen and Gale (2000) and Boyd and Smith (1998), who argue that economic development increases the demand for the services provided by securities markets relative to the services provided by banks, such that the optimal financial structure becomes more market-based as higher levels of economic development. As economies grow, the quantities of bank and market services increase, but the sensitivity of economic activity to changes in bank development falls while the sensitivity of economic activity to changes in market development increases. While one could argue that the "supply" of Private credit increases with economic development, reducing its marginal sensitivity with economic development, the same argument cannot be made about Securities market capitalization where both the "supply" and "sensitivity" increase. While still exploratory, the quantile regressions suggest that optimal financial structure changes—becoming more market-oriented—as economies develop.

3. The Financial Structure Gap

3.1. Computing the Financial Structure Gap

To provide information on whether deviations of an economy's actual financial structure from its "optimal" mixture of banks and markets are associated with less economic activity, we need to construct a measure of each economy's optimal financial structure. This is challenging. Many factors influence the operation of banks, markets, and the mixture of banks and markets. Fortunately, existing research provides guidance on constructing an acceptable proxy of optimal financial structure (Rajan and Zingales, 1998). We do not need a perfect estimate of each country's optimal financial structure in each year. Rather, we require that the country-year estimates are positively correlated with the true optimal financial structure and that our estimates are not systematically biased in such a manner that drives the results.

We proceed as follows: First, we select benchmark countries that, arguably, have few impediments to their financial systems achieving an optimal financial structure. We use the OECD countries from 1980 through 2008.[2] We assume that the OECD countries have optimal financial structures, after conditioning on key national characteristics. This approach is similar to that employed by Rajan and Zingales (1998), who use the United States (and other highly developed countries such as Canada) as a benchmark for a "perfectly" functioning financial system.

Second, for these benchmark countries, we regress the Financial structure ratio on key national traits that might affect each country's optimal financial structure. Table 5 provides the results. We use six regressors. First and foremost, Real GDP capita captures the insights mentioned above that the optimal mixture of banks and markets changes as economies develop. We also include dummy variables for the legal origin of the country (English, French,

[2] The OECD countries in this sample are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Rep., Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, and United States.

Scandinavian, with German as the omitted category). Considerable research suggests that the common law is more conducive to securities market development (La Porta et al., 1998), suggesting that the optimal financial structure of such countries will be more market-based. Further, to condition on the geographic characteristics and economic structure of the countries, we control for the country's distance to the equator, population size and density, along with the role of natural resources in the economy as discussed in Beck (2010) and Haber and Menaldo (2011a, b).

The regression results are presented in Table 5-Panel A, where the dependent variable is the Financial structure ratio (the ratio of Private credit to Securities market capitalization). The table presents two types of regressions: OLS and a robust regression that reduces the impact of outliers on the coefficient estimates. There are several ways to deal with "influential" observations, observations that exert disproportionately large influence on the coefficient estimates. One option is to ignore them and use the OLS estimates. A second option is to exclude the influential observations and use the OLS estimates from such a subsample. Another option, and the one that we employ, is to use weighted regressions, using smaller weights on highly influential observations.[3]

The major finding from this second stage of the process for deriving estimates of optimal structure is that the Financial structure ratio falls—financial systems become more market-based—as economies grow (Table 5-Panel A). The results also indicate that large countries, as measured by population, tend to be more market-based. Further, compared to the German legal

[3] The procedure works iteratively. In the first iteration, outliers with Cook's distance larger than 1 are excluded from the regression. Next, the procedure performs regressions and uses residuals as the basis to determine observation weights for the next iteration. Intuitively, observations with small residuals receive weights close to 1, whereas cases with large residuals are assigned gradually smaller weights. The procedure converges when the maximum weight change drops below a default threshold. Details on the weight functions can be found in the description of the *rreg* command in StataCorp (2007).

origin countries, other countries tend to be more market-based, but the precise nature of this relationship across the OECD countries depends on the treatment of influential observations. Figure 2 provides a partial scatter plot of this regression. The solid dots are the OECD countries, which is the sample of countries from which we compute the regression line. We also add the values for the non-OECD countries based on the coefficient estimates from the OECD sample, and indicate the non-OECD countries with open circles.

Third, we compute the "optimal" financial structure for each country-year observation using the parameter estimates from the benchmark regressions in Table 5. That is, for each country-year observation, including both OECD and non-OECD countries, we compute the projected financial structure and call this the optimal financial structure.

Fourth, we compute the Financial structure gap for every country-year observation as the logarithm of the absolute value of actual financial structure minus the estimated optimal financial structure, i.e.,

$$\text{Financial structure gap} = \text{Ln}(\mid \text{financial structure} - \text{estimated optimal financial structure} \mid).$$

We compute the Financial structure gap using both the simple OLS estimates and the robust regression estimates from Table 5. The Financial structure gap is our estimate of deviations of financial structure from the optimal level for a country at a particular stage of economic development. The Financial structure gap can potentially take on values between negative and positive infinity, where smaller values signify smaller deviations of financial structure from the estimated optimum.

While the Financial structure gap is clearly measured with error, as suggested by the partial scatter plot in Figure 2, there seems little reason for believing that these errors bias the results in a particular manner. Specifically, the difference between the regression line (which provides the estimated optimal financial structure at each level of Log Real GDP per capita, while conditioning on the characteristics noted above) and a particular dot or circle (which provides the actual financial structure of an economy in a particular year) forms the basis of the Financial structure gap. Clearly, these differences can be large, and the Financial structure gap could be estimated so imprecisely that it provides little information.

Table 5-Panel B provides descriptive statistics on the Financial structure gap for different groups of countries. It provides these statistics when using both OLS and robust regressions to estimate the parameters in the benchmark analyses of OECD countries. The average Financial structure gap is smallest among the OECD countries, largest for the group of low-income economies, and the group of high-income, non-OECD countries falls in the middle.

3.2. Relationship between the Financial Structure Gap and Economic Development

Figure 3 presents the estimated coefficients from quantile regressions of Log Real GDP per capita on the Financial structure gap. We again graph the coefficients from the 5^{th} through the 95^{th} percentile of Log Real GDP per capita. We provide results both from quantile regressions without controls and from quantile analyses using the "standard controls" defined above.

There are two noteworthy results. First, the estimated coefficients are negative for each Log Real GDP per capita percentile. That is, an increase in the Financial structure gap is associated with a reduction in economic activity at each level of Log Real GDP per capita.

Second, the reduction in economic activity associated with an increase in the Financial structure gap diminishes at higher levels of Log Real GDP per capita. The upwards sloping linear fit of the estimated coefficients formally confirms that the sensitivity of output to marginal increases in deviation of financial structure from the estimated optimum is largest in lower income economies.

Next, we examine the relationship between Log Real GDP per capita and financial structure while also conditioning on the level of bank and securities market development. Table 6 presents panel OLS regressions for 5-year non-overlapping periods over the period 1980-2008 of Log Real GDP per capita on the Financial structure gap, Private credit, and Securities market capitalization, while controlling for several country characteristics and adjusting the errors for country clustering. Specifically, we control for country fixed effects in all of the regressions; thus, we control for all time-invariant national characteristics. Regressions 4 to 6 also control for period fixed effects to account for common time-varying factors associated with economic activity in all countries. Finally, we also add time-varying, nation specific characteristics, i.e., the standard controls in Regression 6.

We find that Log Real GDP per capita is negatively associated with the Financial structure gap when controlling for bank development, market development, and time-invariant country traits (Table 6-columns 2 and 4). The economic magnitude of the relationship between economic activity and the Financial structure gap is large. From column (2), a one-standard deviation increase in the Financial structure gap (1.5) is associated with a drop in Log Real GDP per capita of 0.06 (=1.5*(-0.04)), i.e., a six percent reduction in economic activity. Thus, for example, such an increase in the Financial structure gap for India would involve a drop in 2008 real GDP per capita from US$724 to US$681. The estimated coefficients on bank and market

development also suggest economically meaningful associations with economic activity, consistent with earlier research, e.g., Beck and Levine 2004, Demirguc-Kunt and Maksimovic (1998, 2002), and Levine and Zervos (1998).

When controlling for both country and period fixed effects and the standard controls, the association between the Financial structure gap and economic activity weakens, but does not vanish (regression 6 of Table 6). The size of the estimated coefficients drops in magnitude by about 50% and the p-values rises from less than 0.01 to 0.07. Nevertheless, given the nature of the available data, the results are quite robust relative to other cross-country studies. Besides controlling for country and period fixed effects and time-varying country characteristics, the regression includes three measures of the functioning of the financial system. It is unsurprising, therefore, that there is quite a bit of multicollinearity. Nevertheless, the Financial structure gap still enters negatively and significantly at the 10-percent significance level. In robustness checks, we find similar results when we using the value of stock market transactions, rather than securities market capitalization, in constructing the Financial structure gap.

We extend the analyses by assessing whether the nature of the Financial structure gap matters; that is, does it matter whether an economy is too bank-based or too market-based? Recall that the Financial structure gap measures is constructed to be larger when the deviations of actual financial structure from the estimated optimal structure are larger, regardless of whether actual financial structure is bigger or smaller than the estimated optimum. In unreported tests, we also examined whether the sign of the deviation matters. We found that the direction of the deviation from the optimum did not matter and it is the Financial structure gap that matters, not whether the country is too bank- or too market-based.

4. Conclusions

This paper provides an empirical exploration of the evolving importance of bank and markets during the process of economic development. As economies grow, both the banking system and financial markets become more developed, but the sensitivity of economic output to changes in bank development tends to fall while the sensitivity of economic output to changes in financial market development tends to increase. These results suggest that the services provided by financial markets become comparatively more important as countries grow.

This paper also examines the association between financial structure—the mixture of banks and financial markets operating in an economy—and economic development. More specifically, we assess whether deviations of a country's actual financial structure from our estimated optimal structure—the Financial structure gap—is associated with lower levels of economic activity. We find that financial structure matters. After controlling for the bank development, financial market development, a set of standard controls, and country fixed effects, we find that the Financial structure gap is negatively associated with economic activity.

This paper's results are consistent with the view that (a) financial institutions provide different financial services from those provided by financial markets; (b) as economies grow, they require different mixtures of these financial services to operate efficiently; (3) thus, the optimal mixture of financial institutions and markets will evolve to provide the efficient mixture of financial services; and (4) if an economy's actual financial structure differs from the "optimum," the economy will not obtain an efficient blend of financial services with harmful effects on economic activity.

References

Acemoglu, D., Zilibotti, F. 1997. “Was Prometheus unbound by chance? Risk, diversification, and growth”, Journal of Political Economy 105, 709-775.

Allen, F., Gale, D. 1995. “A welfare comparison of the German and U.S. financial systems”. European Economic Review 39, 179-209

Allen, F., Gale, D. 1997. “Financial markets, intermediaries, and intertemporal smoothing”. Journal of Political Economy 105, 523-546.

Allen, F., Gale, D. 1999. “Diversity of opinion and financing of new technologies”. European Economic Review 39, 179-209.

Allen, F., Gale, D. 2000. Comparing Financial Systems. MIT Press, Cambridge, MA.

Barth, J.R., Caprio, G. Jr., Levine, R. 2005. Rethinking Bank Regulation: Till Angles Govern. Cambridge University Press, Cambridge, UK.

Beck, T. (2010). “Finance and Oil: Is there a resource curse in financial development?” European Banking Center Discussion Paper No. 2011-004.

Beck, T. Demirguc-Kunt, A., Levine, R. 2003. “Law, endowments, and finance”. Journal of Financial Economics 70, 137-181.

Beck, T., Levine, R. 2002. “Industry growth and capital accumulation: Does having a market- or bank-based system matter?”. Journal of Financial Economics 64, 147-180.

Beck, T., Levine, R. 2004. “Stock markets, banks, and growth: Panel evidence”. Journal of Banking and Finance 28, 423-442.

Boot, A.W.A., Thakor, A. 1997. “Financial system architecture”. Review of Financial Studies 10, 693-733.

Boot, A.W.A., Thakor, A. 2000. “Can relationship banking survive competition?” Journal of Finance 55, 679-713.

Boyd, J. H., Levine, R., Smith, B.D. 2001. “The impact of inflation on financial sector performance”, Journal of Monetary Economics 47, 221-248.

Boyd, J.H., Smith, B.D. 1998. “The evolution of debt and equity markets in economic development”. Economic Theory 12, 519-560.

Demirguc-Kunt, A., Levine, R. 2001. Financial Structures and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. MIT Press, Cambridge, MA.

Demirguc-Kunt, A., Maksimovic, V. 1998. “Law, finance, and firm growth”. Journal of Finance 53, 2107-2137.

Demirguc-Kunt, A., Maksimovic, V. 2002. “Funding growth in bank-based and market-based financial systems: Evidence from firm level data”. Journal of Financial Economics 65, 337-363.

Dewatripont, M., Maskin, E. 1995. “Credit efficiency in centralized and decentralized economies”. Review of Economic Studies 62, 541-555.

Goldsmith, R.W. 1969. Financial Structure and Development. Yale University Press, New Haven, CT.

Haber, S., Menaldo, V. 2011. “Do natural resources fuel authoritarianism? A reappraisal of the resource curse”. American Political Science Review 105, 1-26.

Haber, S., Menaldo, V. 2011. “Rainfall and democracy”. Stanford Center for International Development Working Paper.

Holmstrom, B., Tirole, J. 1993). "Market liquidity and performance monitoring”, Journal of Political Economy 101, 678-709.

Huybens, E., Smith B.D. 1999. “Inflation, financial markets, and long-run real activity”. Journal of Monetary Economics 43, 283-315.

Koenker, T., and G. Basset, 1978. “Quantile regressions”. Econometrica 46:1, 33-50.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R. 1998. “Law and finance”. Journal of Political Economy 106, 1113-1155.

Levine, R., 2002. “Bank-based or market-based financial systems: Which is better?”. Journal of Financial Intermediation 11, 398-428.

Levine, R., Zervos, S. 1998. “Stock markets, banks, and economic growth”. American Economic Review 88, 537-558.

Morck, R., Nakamura, M. 1999. “Banks and corporate control in Japan”, Journal of Finance 54, 319-340.

Morck, R., Yeung, B., Yu, W. 2000. “The information content of stock markets: Why do emerging markets have synchronous stock price movements”, Journal of Financial Economics 58, 215-260.

Rajan, R.G. 1992. “Insiders and outsiders: The choice between informed and arms length debt”. Journal of Finance 47, 1367-1400.

Rajan, R., Zingales, L. 1998. “Financial dependence and growth”. American Economic Review 88, 559-586.

StataCorp. 2007. “Base Reference Manual.” Stata Press, College Station, TX.

Sylla, R.E. 1998. “U.S. Securities markets and the banking system, 1790-1840”. Federal Reserve Bank of St. Louis Review 80, 83-104.

Weinstein, D.E., Yafeh, Y. 1998. “On the costs of a bank-centered financial system: Evidence from the changing main bank relations in Japan”. Journal of Finance 53, 635-672.

Table 1: Variable definitions and sources

Name	Source	Definition
Dependent variable and baseline financial sector controls		
Real GDP per capita	World Development Indicators (WDI)	Log real GDP per capita (constant 2000 USD).
Private credit to GDP	International Financial Statistics (IFS)	Bank credit to the private sector as % of GDP.
Securities market capitalization to GDP	Standard & Poor's and Bank of International Settlements	Stock market capitalization + Domestic private bond capitalization as % of GDP.
Stock market capitalization to GDP	Standard & Poor's	Stock market capitalization as % of GDP.
Stock value traded	Standard & Poor's	Stock value traded as % of GDP.
Financial structure		
Financial structure ratio	Authors' calculations	Bank private credit / securities market capitalization
Expected financial structure ratio	Authors' calculations	The expected ratio is derived by regressing the financial structure ratio on log GDP per capita, legal origin, distance to the equator, population size and density, and natural resource as % of exports using robust regression on annual OECD data. A robust regression reduces the influence of outliers.
Financial structure gap	Authors' calculations	Log absolute value of the difference between the expected and the actual financial structure ratio.
Fin. structure ratio/Optimal fin. structure ratio	Authors' calculations	Actual financial structure ratio / Expected financial structure ratio
Standard controls		
Initial GDP per capita	WDI	Log Initial real GDP per capita (constant 2000 USD).
Avg. years of schooling	Barro and Lee (2010)	Log (1 + Average years of schooling).
Openness to trade	WDI	Log Sum ex- and imports of goods and services as % of GDP.
Government size	WDI	Log General government consumption as % of GDP.
Other controls		
Legal origin	Global Development Network Growth Database	Set of five dummy variables that refers to the legal origin of each country: British, French, Socialist, German and Scandinavian.
Distance from equator	Shleifer (2002)	Latitude.
Natural resources as % of total exports	WDI	Value of fuel exports plus ores and metals exports as a fraction of total merchandise exports.
Population size	WDI	Population size (millions).
Population density	WDI	Number of people per square km.

Table 2: Descriptive statistics
Descriptive statistics are calculated on all available annual data in the period 1980-2008.

Variable	Mean	Standard deviation	Maximum	Minimum
Dependent variable and baseline controls				
Log Real GDP per capita (constant 2000 USD)	7.58	1.57	10.94	4.13
Private credit to GDP (%)	39.28	35.90	319.71	0.00
Securities market capitalization to GDP (%)	59.08	71.19	588.27	0.00
Stock market capitalization to GDP (%)	47.70	58.39	561.44	0.00
Stock value traded to GDP (%)	28.75	57.26	632.34	0.00
Financial Structure				
Financial structure ratio	6.31	73.66	2,937.08	0.13
Expected financial structure ratio	1.91	0.62	3.21	0.33
Financial structure gap	-0.28	1.47	6.79	-5.86
Fin. structure ratio/Optimal fin. structure ratio	2.37	11.86	367.57	0.07
Standard controls				
Avg. years of schooling	6.20	2.99	13.08	0.03
Openness to trade	83.48	48.66	456.65	0.31
Government size	16.52	7.00	83.16	1.38
Controls				
Natural resources as a % of total exports	22.16	28.59	100	0.00
Distance from equator	0.28	0.19	0.72	0.00
Population size (mln.)	29.94	114.02	1,325.64	0.03
Population density (1,000 per square km)	252.39	1191.74	18,658.80	1.06

Table 3: Correlations

Correlations are calculated on all available annual data in the period 1980-2008. * indicates a significant correlation coefficient at the 5% level or better.

Panel A:

Correlations	Log Real GDP per capita	Private Credit/GDP	Securities Market/GDP	Stock Market Capitalization/GDP	Financial structure gap	Fin. Structure Ratio / Optimal Fin. Structure Ratio	Average years of schooling	Openness to trade	Inflation rate
Private Credit to GDP	0.67*	1							
Securities Market to GDP	0.57*	0.64*	1						
Stock Market Capitalization to GDP	0.48*	0.55*	0.94*	1					
Financial structure gap	-0.39*	-0.27*	-0.30*	-0.21*	1				
Fin. structure ratio / Optimal fin. structure ratio	-0.07*	-0.04	-0.12*	-0.11*	0.38*	1			
Average years of schooling	0.71*	0.52*	0.35*	0.28*	-0.25*	-0.01	1		
Openness to trade	0.27*	0.25*	0.32*	0.41*	0.03	-0.00	0.25*	1	
Inflation rate	-0.06*	-0.05*	-0.06*	-0.06*	0.05*	0.06*	-0.00	-0.03*	1
Government size	0.22*	0.16*	0.10*	0.03	-0.24*	-0.05*	0.25*	0.18*	-0.02

Table 3 (continued): Correlations
Correlations are calculated on all available annual data in the period 1980-2008. * indicates a significant correlation coefficient at the 5% level or better.

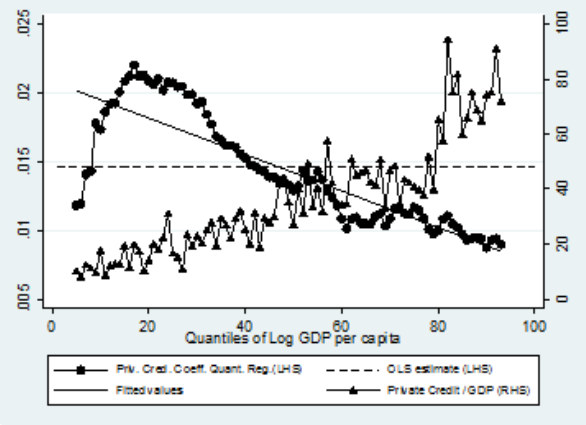
Panel B:

Correlations	Log Real GDP per capita	Private Credit/GDP	Securities Market/GDP	Stock Market Capitalization/GDP	Financial structure gap	Fin. Struct. Ratio / Optimal Fin. Struct. Ratio	Population size
Private Credit/GDP	0.67*	1					
Securities Market/GDP	0.57*	0.64*	1				
Stock Market Capitalization/GDP	0.48*	0.55*	0.94*	1			
Financial structure gap	-0.39*	-0.27*	-0.30*	-0.21*	1		
Fin. St. Ratio / Optimal Fin. St. Ratio	-0.07*	-0.04	-0.12*	-0.11*	0.38*	1	
Population size	-0.11*	0.02	-0.01	-0.05*	-0.14*	-0.05	1
Population density	0.19*	0.30*	0.21*	0.27*	-0.06*	-0.01	-0.03*

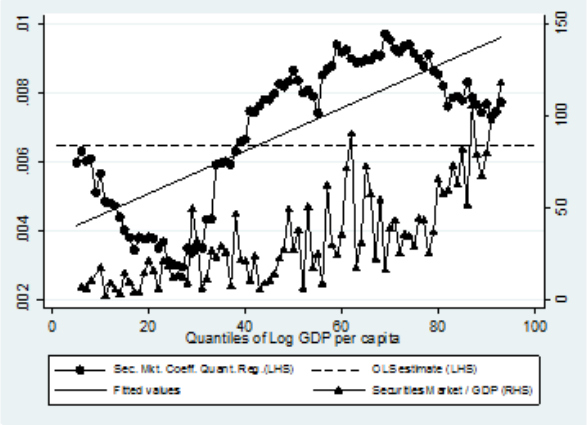
Figure 1: Quantile coefficients for Private credit and Securities Market Capitalization
The dependent variable is log GDP per capita. The figures depict the coefficients of quantile regressions of private credit to GDP and securities market capitalization to GDP for each of the 5th to 95th percentiles of the GDP per capita distribution on the left axis. Percentile values of the Private Credit to GDP and Securities Market to GDP are reported on the right axis. Data are 5-year non-overlapping country averages. Panel A does not control for additional variables. Panel B controls for Standard controls: Initial GDP per capita in 1980, Government size, Openness to trade, Inflation, Average years of schooling, and period-fixed effects. The horizontal dotted line depicts the OLS estimate. The solid lines represent linear fits.

Panel A: No controls

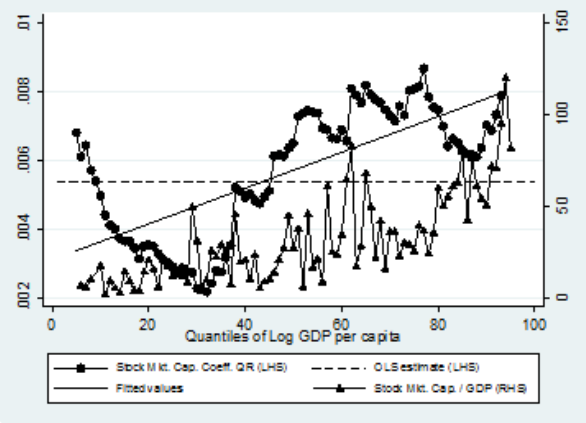
Private credit to GDP



Securities market capitalization to GDP



Stock market capitalization to GDP



Total stock market value traded to GDP

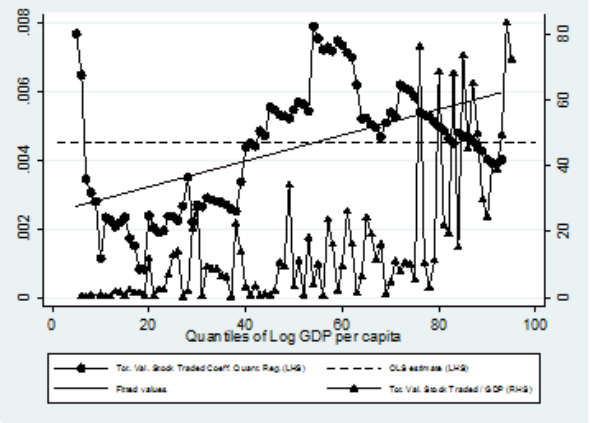
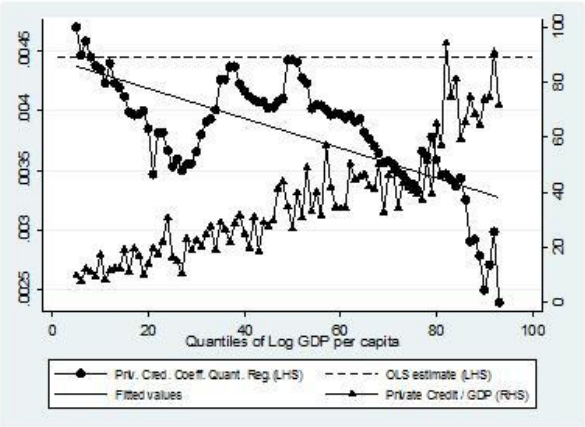


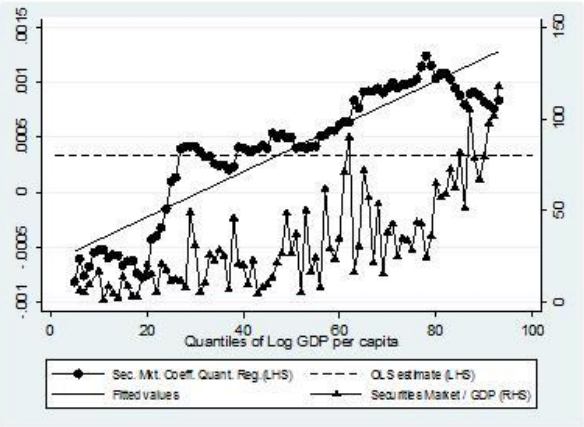
Figure 1 (continued): Quantile coefficients for Private credit and Securities Market Capitalization

Panel B: Accounting for Standard Controls

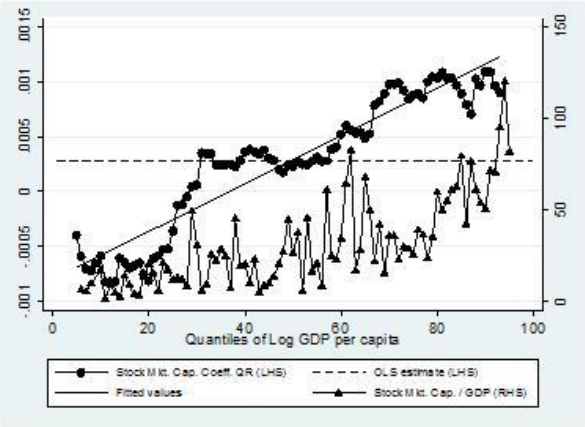
Private credit to GDP



Securities market capitalization to GDP



Stock market capitalization to GDP



Total stock market value traded to GDP

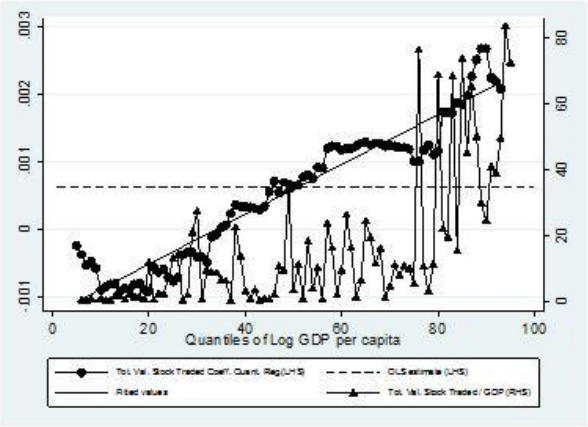


Table 4: Robust regression results of linear regression fits of Figure 1

The table displays robust regressions results of the linear fits in Panels A and B of Figure 1. The dependent variables are coefficients of quantile regressions of private credit to GDP and securities market capitalization for each of the 5th to 95th percentiles of the GDP per capita distribution, respectively, on 5-year non-overlapping country averages. The independent variables are a constant and the percentile associated with the coefficient. Columns 1 and 3 use coefficients of quantile regressions without additional controls (Panel A of Figure 1). Columns 2 and 4 use coefficients of quantile regressions that include standard controls: Initial GDP per capita in 1980, Government size, Openness to trade, Inflation, Average years of schooling, and time-fixed effects (Panel B of Figure 1). The p-values in brackets are based on robust country-level clustered standard errors. *, **, *** denote significance on the 10, 5, and 1-percent level, respectively.

	Dep. Var.: Percentile regression coefficient Private credit to GDP		*Dep. Var.: Percentile regression coefficient Securities Market Capitalization to GDP*	
	1 (No controls)	2 (With controls)	3 (No controls)	4 (With controls)
Percentile	-1.56E-04***	-1.18E-05***	6.21E-05***	2.11E-05***
	[0.00]	[0.00]	[0.00]	[0.00]
Constant	2.23E-02***	4.42E-03***	3.87E-03***	-6.50E-04***
	[0.00]	[0.00]	[0.00]	[0.00]
Standard controls	No	Yes	No	Yes
Observations	89	89	89	89

Table 5: Constructing the Financial Structure Ratio and Gap

Panel A shows regression results. The dependent variable is the financial structure ratio (the ratio of private credit to securities market capitalization). The financial structure gap is based on the expected relationship between the financial structure ratio and GDP per capita controlling for legal origin dummies, population size and density, distance to equator and exports of natural resources. This relationship is estimated on annual OECD data using robust regression to account for influential outliers. The expected ratios for non-OECD countries are estimated out-of-sample using the OECD model. The financial structure gap is defined as the log absolute value of the residual. Panel B reports the descriptive statistics. The p-values in brackets are based on robust country-level clustered standard errors. *, **, *** denote significance on the 10, 5, and 1-percent level, respectively.

Panel A: Financial Structure Ratio regression results (estimated on OECD sample)

Dep. Var.: Financial Structure Ratio	**OLS**	**Robust Regression**
	1	2
Log GDP per capita	-2.34**	-0.35***
	[0.03]	[0.00]
English Legal Origin	0.36	-0.24**
	[0.53]	[0.02]
French Legal Origin	-1.12*	-0.13*
	[0.08]	[0.06]
Scandinavian Legal Origin	-1.43***	-0.77***
	[0.00]	[0.00]
Distance to equator	4.17	0.17
	[0.10]	[0.62]
Log Population Size	-0.36**	-0.20***
	[0.03]	[0.00]
Log Population Density	0.21*	-0.03
	[0.06]	[0.34]
Natural Resources Exports	0.01	-0.00
	[0.49]	[0.87]
Constant	23.08**	5.43***
	[0.01]	[0.00]
Observations	502	502
R-squared (Root mean squared error)	0.09 (5.345)	0.34 (0.575)

Panel B: Descriptive statistics of the Financial Structure Gap

	Mean Financial Structure Gap (log absolute value of the residual)		**Mean Country Group Differences and 2-sided T-tests for Financial Structure Gap**		
	Linear fit, OLS	Linear fit, robust regression		Linear fit, OLS	Linear fit, robust regression
Low inc., non-OECD	1.706	0.085	Low vs. high, non-OECD	0.793*	0.082
	(0.722)	(1.211)		[0.000]	[0.366]
High inc., non-OECD	0.913	0.003	Low, non-OECD vs. OECD	2.156*	1.142*
	(1.034)	(1.419)		[0.000]	[0.000]
OECD	-0.450	-1.057	High, non-OECD vs. OECD	1.363*	1.059*
	(1.153)	(1.263)		[0.000]	[0.000]

Standard deviation in parentheses. P-value of t-tests in brackets. T-tests allows for unequal variance. * and ** denote significance at the 1 and 10-percent levels, respectively.

Figure 2: The Financial Structure Ratio and Gap

The figure shows the partial scatter plot of e(Financial Structure Ratio | X) and e(Log GDP per capita | X) using robust regression. The financial structure ratio is defined as Private credit / Securities markets capitalization). The financial structure gap is based on the expected relationship between the financial structure ratio and GDP per capita controlling for legal origin dummies, population size and density, distance to equator and exports of natural resources. This relationship is estimated on annual OECD data using robust regression to account for influential outliers. The financial structure gap is defined as the log absolute value of the residual.

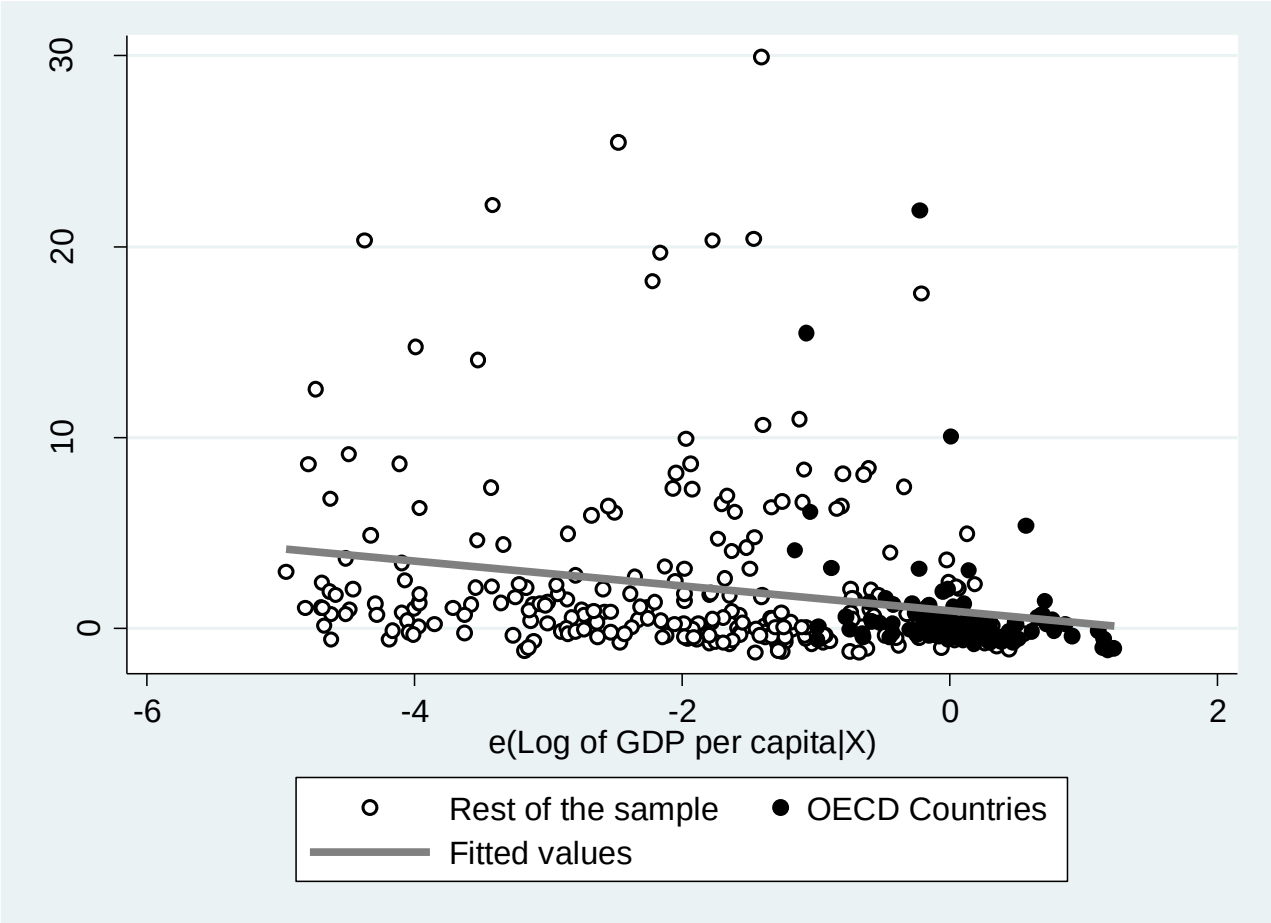
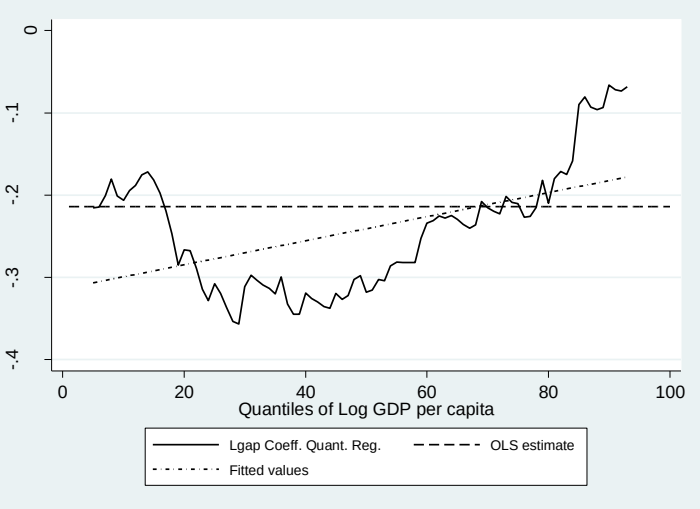


Figure 3: Quantile coefficients for the Financial Structure Gap
The figures depict the coefficients of quantile regressions of the financial structure gaps for each of the 5th to 95th percentiles of the GDP per capita distribution. Data are 5-year non-overlapping country averages. Panel A only controls for private credit to GDP and securities market capitalization to GDP. Panel B also accounts for a set of standard controls: Initial GDP per capita in 1980, Government size, Openness to trade, Inflation, Average years of schooling, and period-fixed effects. The financial structure gap is based on the expected relationship between the financial structure ratio (the ratio of private credit to securities market capitalization) and GDP per capita. In addition, the regression controls for legal origin dummies, population size and density, distance to equator and exports of natural resources. This relationship is estimated on annual OECD data according to a linear fit using robust regression. The expected ratios for non-OECD countries are estimated out-of-sample using the OECD model. The financial structure gap is defined as the log absolute value of the residual. The horizontal dotted line depicts the OLS estimate. The finer-dotted lines represent linear fits.

Panel A: No controls



Panel B: Standard controls

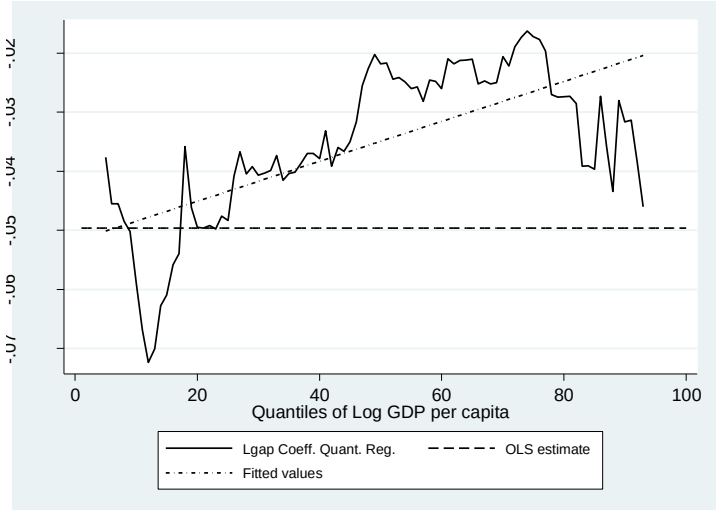


Table 6: Economic development and the Financial Structure Gap

OLS panel estimates. The dependent variable is log GDP per capita. Data are 5-year non-overlapping country averages. The main independent variable is the financial structure gap defined as the log of the absolute deviation from the expected financial structure ratio of private credit to securities market capitalization. The expected ratio is estimated on annual OECD data using a linear log GDP per capita fit of a robust regression. In addition, this robust regression controls for legal origin dummies, population size and density, distance to equator and exports of natural resources. Standard controls are Average years of schooling, Openness to trade, Annual inflation, Government size and period-fixed effects. Note: Private credit to GDP and Securities Markets Capitalization to GDP were pre-divided by 1000 to obtain informative coefficients. The p-values in brackets are based on robust country-level clustered standard errors. *, **, *** denote significance on the 10, 5, and 1-percent level, respectively.

Dep. var.: Log GDP per capita	1	2	3	4	5	6
Financial Structure Gap		-0.04***		-0.02*		-0.02*
		[0.00]		[0.10]		[0.07]
Private Credit to GDP	5.92***	7.29***	3.87***	5.06***	3.87***	4.67***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Securities Market Capitalization to GDP	3.24***	2.99***	0.30	0.38	0.06	0.11
	[0.00]	[0.00]	[0.54]	[0.45]	[0.89]	[0.81]
Constant	7.31***	7.19***	7.38***	7.27***	7.41***	7.40***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Standard controls	No	No	No	No	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-fixed effects	No	No	Yes	Yes	Yes	Yes
Observations	320	263	320	263	289	238
Adjusted R-squared	0.47	0.56	0.70	0.75	0.71	0.76
Countries	86	72	86	72	75	64

Appendix 1: Countries and medians for selected indicators

The table provides country medians for the period 1980-2008 of Private credit to GDP, Stock market capitalization to GDP, Securities markets capitalization to GDP, Financial structure ratio, and Actual Financial structure ratio / Estimated Optimal financial structure ratio.

Country	Real constant GDP per capita	Private credit to GDP (%)	Stock market capitalization to GDP (%)	Securities market capitalization to GDP (%)	Financial structure ratio	Fin. structure ratio/Optimal fin. structure ratio
Argentina	7,169	19.9	18.6	20.3	0.9	0.6
Armenia	683	7.4	0.9	0.9	11.8	4.5
Azerbaijan	825	5.9	0.1	0.1	45.7	16.8
Bangladesh	277	16.7	2.5	2.5	9.3	4.3
Bolivia	987	35.2	16.0	16.0	2.8	1.2
Botswana	2,595	14.7	17.3	17.3	0.8	0.3
Brazil	3,586	37.8	29.3	39.1	0.9	0.7
Bulgaria	1,564	41.7	6.6	6.6	3.1	1.3
Chile	3,917	55.8	87.0	102.1	0.5	0.3
China	600	93.0	31.2	33.2	3.3	2.1
Colombia	2,333	30.1	15.5	15.9	1.8	1.0
Costa Rica	3,549	19.0	7.7	7.7	2.3	1.1
Croatia	4,823	36.5	15.0	15.0	2.5	1.2
Côte d'Ivoire	635	20.0	11.0	11.0	1.4	0.5
Dominican Republic	2,071	26.5	0.7	0.7	31.5	15.4
Ecuador	1,335	21.0	7.9	7.9	2.9	1.3
Egypt, Arab Rep.	1,182	29.2	26.6	26.6	1.8	1.0
El Salvador	1,877	34.9	15.5	15.5	2.9	1.4
Georgia	1,075	7.8	4.0	4.0	2.6	0.9
Ghana	234	5.2	16.2	16.2	1.0	0.4
Guatemala	1,599	19.1	0.9	0.9	23.0	10.7
Honduras	1,107	33.4	8.3	8.3	3.8	1.6
Hong Kong, China	23,345	148.0	282.7	296.4	0.5	0.5
India	352	25.9	32.2	32.6	0.7	0.5
Indonesia	773	24.7	20.9	20.9	1.3	0.8
Iran, Islamic Rep.	1,486	22.8	14.4	14.4	1.8	0.9
Israel	16,920	68.6	45.0	45.0	1.5	1.2
Jamaica	3,469	24.0	35.4	35.4	0.6	0.3
Jordan	1,901	66.0	73.6	73.6	0.9	0.4
Kazakhstan	1,397	21.2	8.7	8.7	1.7	0.8
Kenya	421	24.2	14.4	14.4	1.7	0.7
Kuwait	16,929	56.5	69.3	69.3	0.5	0.4
Kyrgyz Republic	321	5.3	1.6	1.6	4.6	1.5
Latvia	3,588	22.8	7.4	7.4	4.1	1.7
Lebanon	4,459	73.5	11.3	11.3	6.9	3.1

Appendix 1 (continued): Countries and medians for selected indicators

Country	Real constant GDP per capita	Private credit to GDP (%)	Stock market capitalization to GDP (%)	Securities market capitalization to GDP (%)	Financial structure ratio	Fin. structure ratio/Optimal fin. structure ratio
Lithuania	3,506	16.8	12.4	12.4	1.3	0.6
Macedonia, FYR	1,752	23.9	4.8	4.8	5.0	2.9
Malawi	144	8.9	8.1	8.1	0.9	0.3
Malaysia	3,366	105.7	136.6	188.8	0.6	0.4
Mexico	5,277	17.2	28.2	33.1	0.6	0.4
Moldova	512	13.3	22.1	22.1	1.0	0.3
Mongolia	464	11.1	3.3	3.3	4.0	1.1
Morocco	1,234	29.0	24.1	24.1	1.6	0.8
Namibia	2,052	46.6	6.7	6.7	7.9	3.4
Nepal	199	18.3	7.7	7.7	3.3	1.5
Nigeria	368	13.2	9.7	9.7	1.3	0.6
Oman	7,537	24.7	19.7	19.7	1.7	0.9
Pakistan	503	24.6	16.1	16.1	1.5	0.8
Panama	3,480	60.4	24.0	24.0	3.2	1.6
Papua New Guinea	630	18.1	65.2	65.2	0.2	0.1
Paraguay	1,399	20.1	3.6	3.6	6.8	2.8
Peru	2,049	13.3	22.0	24.4	0.8	0.4
Philippines	941	29.3	40.6	41.5	0.7	0.4
Poland	4,251	27.5	14.1	14.1	1.9	1.1
Romania	1,896	37.5	5.3	5.3	1.6	0.8
Russian Federation	2,037	16.2	28.3	28.3	0.5	0.3
Saudi Arabia	9,402	22.7	39.8	39.8	0.6	0.5
Singapore	18,451	90.0	162.3	173.0	0.6	0.5
Slovenia	9,595	35.5	13.9	13.9	2.7	1.3
South Africa	3,181	58.0	160.7	173.0	0.4	0.2
Sri Lanka	676	21.8	13.9	13.9	2.0	0.8
Tanzania	264	5.4	4.2	4.2	1.7	0.7
Thailand	1,827	95.6	47.7	58.8	1.7	1.0
Tunisia	1,639	53.8	11.4	11.4	5.3	2.5
Turkey	3,580	17.8	16.6	17.1	0.9	0.6
Uganda	215	4.2	1.0	1.0	8.8	3.6
Ukraine	944	11.1	8.0	8.0	2.1	0.9
United Arab Emirates	22,586	47.4	27.1	27.1	2.0	3.5
Uruguay	6,068	35.3	0.7	0.7	38.8	20.1
Venezuela, RB	5,030	16.5	6.9	5.8	1.6	1.0
Vietnam	328	37.3	5.7	5.7	42.0	20.3
Zambia	369	8.2	8.9	8.9	0.9	0.3