

The Evolving Importance of Banks and Securities Markets

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The roles of banks and securities markets evolve during the process of economic development. As countries develop economically, (1) the size of both banks and securities markets increases relative to the size of the economy, (2) the association between an increase in economic output and an increase in bank development becomes smaller, and (3) the association between an increase in economic output and an increase in securities market development becomes larger. These findings are consistent with theories predicting that as economies develop, the services provided by securities markets become more important for economic activity, whereas those provided by banks become less important. JEL codes: O16, G1, G2, O43

Several economic theories stress that banks provide services to the economy that differ from those provided by securities markets, predicting that both the operation of banks and the functioning of securities markets have independent influences on economic development. 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 \(1992\)](#) argue that banks have a comparative advantage in reducing the market frictions associated with financing standardized, shorter-term, lower-risk, well-collateralized endeavors, whereas decentralized markets are relatively more effective in custom designing arrangements to finance more novel, longer-run, higher-risk projects that rely on intangible inputs. Consistent with these

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theories, Demirgüç-Kunt and Maksimovic (1998), Levine and Zervos (1998), and Beck and Levine (2004) provide evidence that better-functioning banks and securities markets exert robust, independent, and positive effects on economic activity.

A substantial body of economic theory emphasizes that the comparative importance of banks and markets for economic activity changes during the process of economic development, with markets becoming relatively more important for economic activity. For example, the concepts articulated in Goldsmith (1969), Allen and Gale (1995, 2000), Boot and Thakor (1997, 2000), Boyd and Smith (1998), Weinstein and Yafeh (1998), Morck and Nakamura (1999), and Song and Thakor (forthcoming) suggest that (1) banks and markets provide different, though sometimes complementary, financial services and that (2) the services provided by markets become comparatively more important for promoting economic activity as countries develop economically. In particular, these theories suggest that as economies develop, a greater number of projects require customized financial arrangements rather than standardized contracts and rely on intangible assets rather than easily collateralized capital inputs. Because these models also suggest that banks have a comparative advantage in financing standardized, well-collateralized endeavors, whereas securities markets are better at custom designing arrangements to finance novel projects that rely on intangible inputs, these theories imply that the services provided by securities markets have a greater impact on economic activity as economies grow, whereas those provided by banks become less important.

Empirical research has been largely unsuccessful at clarifying the evolving importance of banks and markets during the process of economic development, as exemplified by Beck and Levine (2002), Demirgüç-Kunt and Maksimovic (2002), and Levine (2002). Demirgüç-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. Thus, financial systems generally become more market-based during the process of economic development. However, this pattern could simply reflect reverse causality. Economic progress may boost the development of securities markets more than it boosts the development of banks. The observation that financial systems tend to become more market-based as economies develop does not necessarily imply that securities markets exert a larger impact on economic activity in more economically advanced economies.

In this paper, the changing importance of banks and securities markets with the development of economies is evaluated in two steps. First, using a newly developed database, the evolution of banks and securities markets during the process of economic development is reassessed. That is, as countries develop economically, what happens to the size of banks and securities markets relative to the size of the overall economy? Second, the changes to the associations between economic activity and bank and stock market development as

countries develop economically are examined. This investigation involves regressing economic activity on both bank and securities market development and assessing how the estimated coefficients change as countries develop economically. This analysis provides information on how the associations between economic activity and the different components of the financial system evolve during economic development.

The primary methodological contribution of this paper is the use of quantile regressions to assess how the associations between economic activity and 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, defined as a country at the average level of economic development. However, quantile regressions provide information on the relationship between economic activity and bank development at each percentile of the distribution of economic development. As emphasized throughout the paper, these quantile analyses do not yield a sharp causal interpretation. Rather, they show how the estimated coefficients of the financial development indicators vary at different levels of economic development. In this way, the analyses illustrate how the associations between economic development and both bank and securities market development change during the process of economic development.

New data contribute to these analyses of finance and development with the construction of a database that covers 72 countries over the period from 1980 through 2008. For the analyses, the data are aggregated into five-year averages (data permitting), so there are a maximum of six observations per country. In addition to using standard indicators, such as bank credit to the private sector as a share of gross domestic product (GDP), stock market capitalization relative to GDP, and the value of stock market transactions relative to GDP, the analyses employ data on the capitalization of private domestic bond markets relative to GDP (for country averages, please see table S1 in the supplemental appendix, available at <http://wber.oxfordjournals.org/>).

Both banks and securities markets become larger relative to the size of the overall economy as countries develop economically, confirming the results in Demirgüç-Kunt and Levine (2001). These findings hold across various measures of bank and securities market development, including measures incorporating private domestic bond markets. It is important to note that the measures of bank and securities market development are scaled by GDP. Thus, the findings show that the growth of marketable securities and bank loans outpaces the growth of economic activity as countries develop economically.

The analyses also indicate that (1) the association between economic activity and bank development decreases with economic development, but (2) the association between economic activity and securities market development increases as countries grow. Put differently, as economies develop, the marginal increase in economic activity associated with an increase in bank development falls,

whereas the marginal increase in economic activity associated with an increase in securities market development rises. Although instrumental variables are not employed to identify a causal effect, these results are consistent with the predictions emerging from the large body of theoretical research discussed above: as economies develop economically, the services provided by securities markets will become more important for future economic development, whereas those provided by banks will become less important.

This research is policy relevant. First, if the optimal mixture of banks and markets changes as an economy develops, such a relationship is an indication of the costs of policy and institutional impediments to the evolution of the financial system. This is the first paper to show that the association between economic activity and stock market development increases as economies grow, whereas the association between economic activity and bank development decreases. Furthermore, this work suggests that the associations between economic activity and both bank and securities market development change with economic development. This change implies that the estimated elasticities from previous research regarding the impact of changes in bank or stock market development on economic development will yield misleading information about countries with incomes that are far from the sample average. Previous studies do not account for the *evolving* importance of banks and markets during the process of economic development.

The new data, methods, and analyses contribute to a better understanding of the dynamic relationships among economic development, financial institutions, and securities markets, but these contributions come with qualifications and limitations. First, although the analyses are policy relevant, direct policy instruments and levers are not studied. Thus, the results suggest that impediments to the evolution of financial systems will hinder economic activity, but they do not provide guidance on exactly which types of policies foster the healthy development of financial systems.

Second, although the analyses reduce concerns about reverse causality, they do not specify a particular causal mechanism, nor do they rule out reverse causality or omitted variable bias. A substantial body of theory predicts that as economies develop, financial systems will become more market based and the marginal impact of securities markets on economic activity will increase, whereas that of banks will decrease. Our findings are consistent with these predictions and inconsistent with simple reverse causality scenarios. Although a simple reverse causality scenario might predict that economic development increases the size of banks and securities markets relative to the size of the overall economy and that securities markets grow faster than banks, a simple reverse causality scenario does not yield predictions about the differential change in the association between economic activity and bank and securities market development as economies grow. That is, a simple reverse causality scenario does not predict that the association between economic activity and bank development diminishes in magnitude while the association between economic

activity and securities market development increases in magnitude as countries develop economically. Although these differential effects might be accounted for by sophisticated reverse causality scenarios, potential omitted variable biases, or as yet unformalized theories of finance and development, this paper provides the first empirical evidence that is consistent with an influential theoretical body of literature predicting that securities markets become more important for economic activity and that banks become less important as countries develop economically.

DATA AND SUMMARY STATISTICS

Several measures of bank and stock market development are constructed and used to analyze the relationship between economic activity and the structure of the financial system. Economic theory highlights the advantages of developing indicators reflecting 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. However, such empirical proxies do not exist for a broad cross-section of countries over the last few decades. Instead, measures of the size and activity of banks and securities markets are compiled and employed to examine the relationship between financial systems and economic development. These measures are constructed over the period from 1980 to 2008, and the primary sources of these indicators are provided in table 1.

Private credit is used to measure bank development and equals deposit money bank credit to the domestic private sector as a share of GDP. Private credit isolates the credit issued to the private sector and excludes the credit issued to governments, government agencies, and public enterprises. Private credit also excludes credits issued by central banks. Not surprisingly, there is enormous cross-country variation in private credit. For example, averaging the 1980–2008 period, private credit was less than 10 percent of GDP in Angola, Cambodia, and Yemen, and it was greater than 85 percent of GDP in Austria, China, and the United Kingdom. Table 2 indicates that the annual average value of private credit across countries was 39 percent, with a standard deviation of 36 percent.

Stock value traded is used to measure market development and equals the value of the stock market transactions as a share of GDP. This market development indicator incorporates information on the size and activity of the stock market, not simply the value of the listed shares. Previous work by Levine and Zervos (1998) indicates that the trading of ownership claims on firms in an economy is closely tied to the rate of economic development. There is substantial variation across countries. As shown in table 2, although the mean value of the stock value traded is approximately 29 percent of GDP, the standard

TABLE 1. Variable Definitions and Sources

Name	Source	Definition
Dependent variable and baseline financial sector controls		
Log real GDP per capita	World Development Indicators	Logarithm of real GDP per capita (constant 2000 USD).
Private credit	International Financial Statistics	Deposit money bank credit to the private sector as a percentage of GDP.
Stock value traded	Standard & Poor's	Value of stock market transactions as a percentage of GDP.
Stock market capitalization	Standard & Poor's	The value of listed shares on a country's stock exchange as a percentage of GDP.
Securities market capitalization	Standard & Poor's; Bank of International Settlements	Stock market capitalization plus domestic private bond market capitalization as a percentage of GDP.
Standard controls		
Log initial GDP per capita	World Development Indicators	Log initial real GDP per capita (constant 2000 USD).
Log average years of schooling	Barro and Lee (2010)	Log (1 + average years of schooling).
Log openness to trade	World Development Indicators	Log sum exports and imports of goods and services as a percentage of GDP.
Log government size	World Development Indicators	Log general government consumption as a percentage of GDP.
Log inflation rate	International Financial Statistics	Log (1 + annual change of CPI).

TABLE 2. Descriptive Statistics

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	39.28	35.90	319.71	0.00
Stock value traded	28.80	57.44	632.34	0.00
Stock market capitalization	47.70	58.39	561.44	0.00
Securities market capitalization	59.08	71.20	588.27	0.00
Standard controls				
Log average years of schooling	1.86	0.50	2.65	0.03
Log openness to trade	4.26	0.61	6.12	-1.18
Log inflation rate	0.15	0.37	5.48	-0.52
Log government size	2.72	0.43	4.42	0.32

Note: Descriptive statistics are calculated on all available annual data for the 1980–2008 period.

deviation is approximately double this value. In Armenia, Tanzania, and Uruguay, the stock value traded annually averaged less than 0.23 percent over the 1980–2008 sample (10th percentile). In contrast, the stock value traded

averaged over 75 percent in Hong Kong, Saudi Arabia, Switzerland, and the United States (90th percentile). This paper's results are robust to using other market development indicators, such as *stock market capitalization*, which simply measures the value of the listed shares on a country's stock exchanges as a share of GDP, and *securities market capitalization*, which equals the capitalization of the stock market plus the capitalization of the private domestic bond markets divided by GDP.

Log real GDP per capita is used to measure economic activity and equals the logarithm of GDP per capita in constant 2000 US dollars. Consistent with theories guiding the empirical analyses (which are discussed in the introduction), log real GDP per capita is examined rather than GDP per capita growth to obtain estimates of the association between economic activity and both bank and securities market development. With the current specification, the estimated coefficients provide information on how log real GDP per capita changes when, for example, securities market development changes.

To assess the independent link between finance and economic development, the regressions control for many country characteristics. Some specifications include standard controls, such as years of schooling, openness to trade, inflation, government size, initial GDP per capita of the economy in 1980, and dummy variables for the five-year periods of analysis.

The correlations in table 3 highlight the key features of the financial system and economic development. First, both bank development and securities market development are positively correlated with economic development. Second, bank development and securities market development are positively correlated with each other, suggesting that financial development involves both larger banks and larger markets. Although these are simple correlations, these basic patterns hold when controlling for many other national traits.

THE RELATIONSHIPS AMONG BANKS, MARKETS, AND ECONOMIC DEVELOPMENT

To assess how the relationships between economic activity and both bank development and stock market development evolve with economic development, quantile regressions are used with data averaged over non-overlapping five-year periods. OLS provides information on the relationship between log real GDP per capita and financial development for a country at an average level of economic development. However, OLS does not provide information on how the relationship between economic activity and financial development differs for countries at different levels of economic activity.

The quantile regressions model the relationship between log real GDP per capita and financial development at the specific percentiles (or quantiles) of the 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 of private credit for each percentile (or quantile) of log real GDP per

TABLE 3. Correlations

<i>Correlations</i>	Log real GDP per capita	Private credit	Stock value traded	Log average years of schooling	Log openness to trade	Log inflation rate	Log government size
Private credit	0.67***	1					
Stock value traded	0.41***	0.51***	1				
Log average years of schooling	0.71***	0.49***	0.26***	1			
Log openness to trade	0.25***	0.21***	0.08***	0.31***	1		
Log inflation rate	-0.15***	-0.16***	-0.12***	-0.03**	-0.13***	1	
Log government size	0.28***	0.21***	0.04**	0.25***	0.28***	-0.08***	1

Source: Author's analysis based on data described in the text.

Note: Correlations are calculated on all available annual data for the 1980–2008 period.

*, **, and *** denote the significance level of correlation at the 10, 5, and 1 percent levels, respectively.

capita. For example, the estimated coefficient at the 50th percentile is a median regression, yielding the estimated relationship between the log real GDP per capita and private credit at the median level of economic activity. By computing the quantile regression for each of the 5th to the 95th quantiles, the analyses provide information on how the relationship between economic activity and financial development differs across distinct levels of log real GDP per capita.

Neither the OLS nor the quantile regressions identify the causal impact of bank and securities market development on economic development. Rather, the goal is to explore whether and how the relationship between changes in economic activity and changes in both bank and market development varies with the level of economic development.

Illustrating the Quantile Regression Results

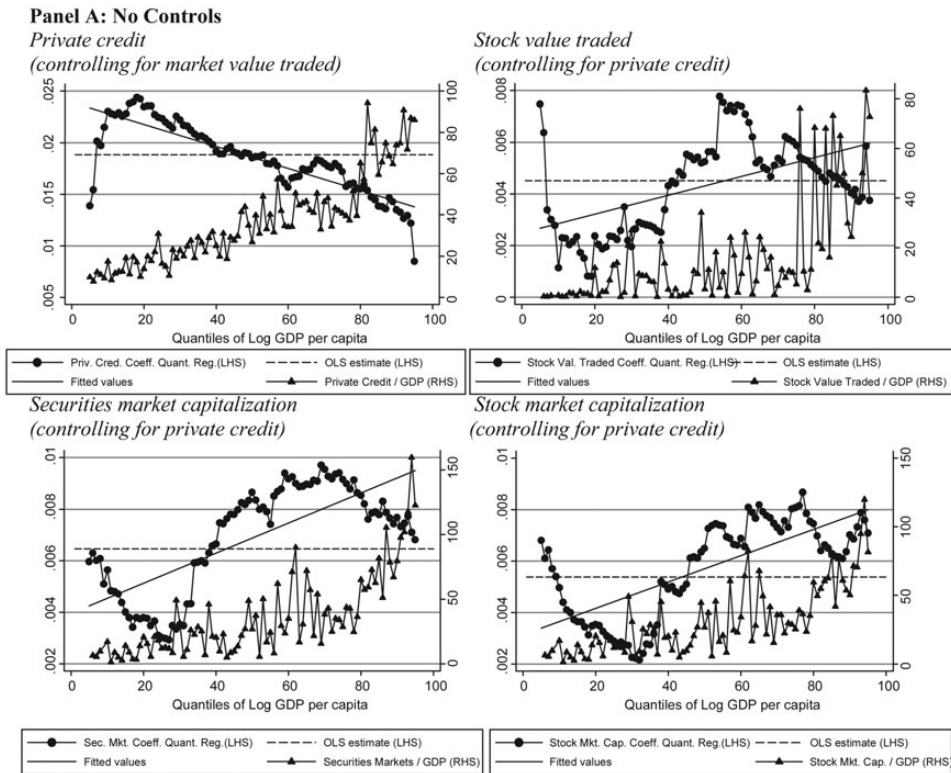
In panel A of figure 1, the graph on the upper left side plots the coefficients from 91 separate quantile regressions for each percentile from the 5th through the 95th percentiles of log real GDP per capita, where the dependent variable is log real GDP per capita, and the main regressor is private credit. The regressions control for stock value traded. A circle represents each coefficient estimate produced by the quantile regression associated with the corresponding percentile. The left axis provides information on the values of the coefficient estimates. Thus, the estimated coefficient depicts the sensitivity of log real GDP per capita associated with a change in private credit at each percentile of economic development. These estimates are statistically significant. Additional information on the sensitivity of these estimates is provided below. The graph also plots the actual values of private credit at each percentile, which are designated with a triangle. The scale of the values of private credit is provided on the right axis. The graphs in the remainder of panel A of figure 1 provide similar information on the relationship between economic activity and stock market development. The upper-right graph provides information for stock value traded. The lower graphs confirm the increasingly relevant role of securities markets by documenting similar upward trends for both securities market capitalization and stock market capitalization.

Panel B of figure 1 provides the same types of quantile analyses while controlling for other characteristics of the national economies. The standard controls are log real GDP per capita in 1980, government size, openness to trade, inflation, average years of schooling, and period fixed effects.

Each of the eight graphs in panels A and B of figure 1 provides two additional pieces of information. First, the horizontal dotted line is the OLS estimate of the coefficient of the financial development indicator. Thus, in the graph on the upper left side of panel A in figure 1, this line is simply the coefficient of private credit from an OLS regression of log real GDP per capita on private credit for the full sample of country-year observations, controlling for stock value traded. When moving away from the mean log real GDP per capita, the quantile estimates become statistically different from the OLS estimates. The

nature of these deviations is explored below. Second, the solid line shows the estimated linear relationship between each estimated coefficient of the financial development indicator (i.e., the circles) and the GDP per capita percentile associated with the coefficient. As a specific example, consider the graph in the upper-right quadrant of panel B in figure 1. The estimated coefficients of stock value traded after conditioning on the standard controls and period fixed

Figure 1. Quantile Coefficients for Private Credit and Securities Market Activity

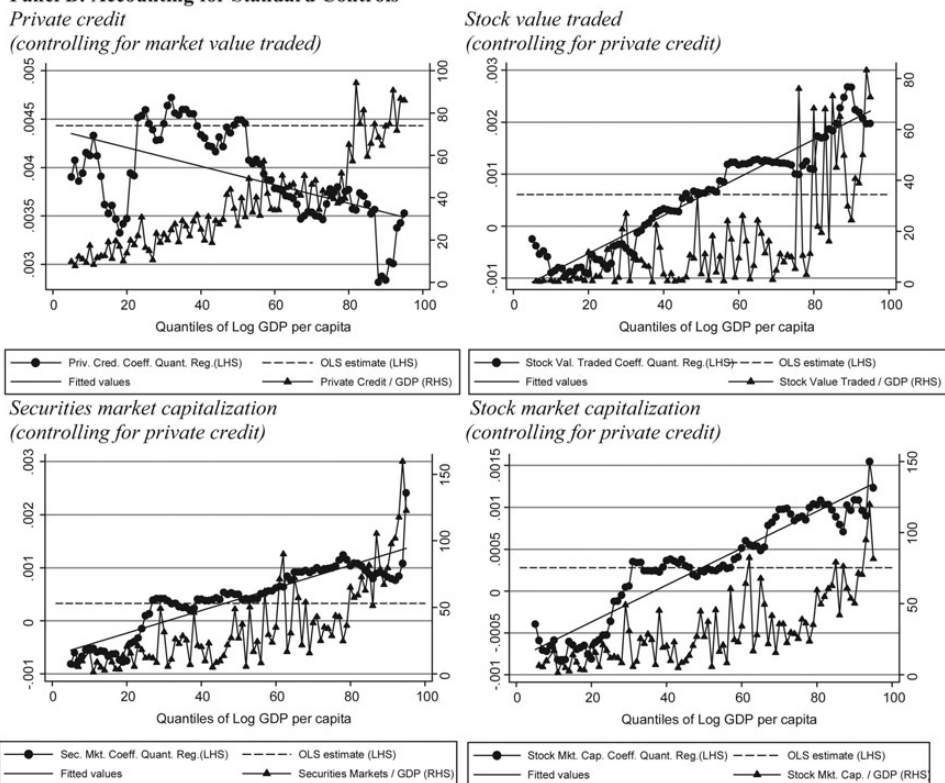


Source: Author’s analysis based on the data described in the text.

Note: The dependent variable is log real GDP per capita. The figure depicts the coefficients of the quantile regressions of private credit, stock value traded, securities market capitalization, and stock market capitalization as independent variables for each of the 5th to 95th percentiles of the GDP per capita distribution on the left axis. Private credit is defined as deposit money bank credit to the private sector as a percentage of GDP. Stock value traded is the value of stock value transactions as a percentage of GDP. Stock market capitalization is the value of listed shares on a country’s stock exchanges as a percentage of GDP. Securities market capitalization is defined as stock market capitalization plus domestic private bond market capitalization as a percentage of GDP. Percentile values are reported on the right axis. Data are five-year non-overlapping country averages. Panel A does not control for additional variables. Panel B controls for standard controls: initial GDP per capita, government size, openness to trade, inflation, average years of schooling, and time-fixed effects. The horizontal dotted line depicts the OLS estimate. The solid lines represent the linear fit.

Figure 1. Continued

Panel B: Accounting for Standard Controls



effects are collected. Then, these estimated coefficients are regressed on the GDP per capita percentile associated with the estimates. Panel A in table 4, column (4) provides the results of this regression. The estimated coefficient for each GDP per capita percentile provides the trend line graphed in figure 1.

Discussing the Quantile Regression Results

In terms of bank development, figure 1 shows that as the log real GDP per capita rises, (1) private credit rises (triangles) and (2) the marginal increase in the log real GDP per capita associated with an increase in private credit diminishes (circles). Put differently, the level of bank development increases, but its association with economic activity diminishes. In panel A of table 4, the significance of this association is tested formally. In this panel, the dependent variable is the estimated linear association between economic activity and either bank development or securities market development at each percentile of the distribution of GDP per capita underlying figure 1. Regressions (1) and (2) show that this relationship is statistically significant: as economic activity

TABLE 4. Robust Regression Results of the Linear Regression Fits from Figure 1

Panel A: Linear model				
	<i>Dep. Var.: Percentile regression coefficient Private credit</i>		<i>Dep. Var.: Percentile regression coefficient Stock value traded</i>	
	1 (No controls)	2 (With all controls)	3 (No controls)	4 (With all controls)
Percentile	-1.24E - 04*** [0.00]	-1.02E - 05*** [0.00]	4.18E - 05*** [0.00]	3.79E - 05*** [0.00]
Constant	2.51E - 02*** [0.00]	4.45E - 03*** [0.00]	2.05E - 03*** [0.00]	-1.34E - 03 [0.00]
Controls	No	Yes	No	Yes
Observations	91	91	91	91
Panel B: Quadratic model				
Percentile	-1.09E - 04*** [0.00]	2.67E - 05*** [0.00]	2.13E - 04*** [0.00]	4.88E - 05*** [0.00]
Square of percentile	-1.37E - 07 [0.00]	-3.69E - 07*** [0.00]	-1.63E - 06*** [0.00]	-1.02E - 07** [0.00]
Constant	2.48E - 02*** [0.00]	3.77E - 03*** [0.00]	-1.44E - 03*** [0.00]	-1.58E - 03 [0.00]
Controls	No	Yes	No	Yes
Observations	91	91	91	91

Source: Author's analysis based on data described in the text.

Note: The table displays the robust regressions results of the linear fits depicted in figure 1. The dependent variables are coefficients of the quantile regressions of private credit and stock value traded for each of the 5th to 95th percentiles of the GDP per capita distribution, respectively, on five-year non-overlapping country averages. Panel A reports a linear model where the regressors are a constant and the income percentile associated with the coefficient. Panel B shows the results for the quadratic model using the same independent variables in the linear model plus the square of the percentile associated with the coefficient. Columns 1 and 3 use the coefficients of quantile regressions without additional controls (panel A of figure 1). Columns 2 and 4 use the coefficients of quantile regressions that include standard controls: Initial GDP per capita, 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.

*, **, and *** denote the significance on the 10, 5, and 1 percent levels, respectively.

increases, there is a significant reduction in the estimated coefficient of private credit.

The results are the opposite for securities market development. As log real GDP per capita rises, (1) stock value traded rises, and (2) the marginal increase in log real GDP per capita associated with an increase in stock value traded rises. That is, as countries develop economically, securities market development increases, and its association with economic activity increases. Regressions (3) and (4) in panel A of table 4 show that this effect is statistically significant: the association between economic activity and stock value traded increases as the log real GDP per capita rises. These results suggest that the relationship between bank development and economic activity differs from the relationship between securities market development and economic activity.

Figure 1 suggests that there might be a nonlinear relationship (1) between economic activity and bank development and (2) between economic activity and securities market development. To assess the sensitivity of our findings and provide more information on the nature of the relationship, we examine these relationships more rigorously in panel B of table 4, which includes a quadratic term to allow for a potential nonlinear, parabolic relationship. This potential relationship makes it possible to estimate the level of economic activity at which the associations between financial and economic development start to decrease as the economy develops further.

Consistent with figure 1, the regression results in panel B of table 4 suggest that there are a nonlinear associations between economic activity and both bank and securities market development. At very low levels of economic development, the association between economic activity and bank development is increasing in economic development, but the slope quickly becomes negative. In particular, regressions (1) and (2) of panel B indicate that the slope of the association between economic activity and bank development becomes negative after real GDP per capita reaches \$1,032 in 2000 US dollars (36th percentile). For securities market development, panel B of table 4 indicates that the association between economic activity and securities is always increasing in the 5th to 95th percentile interval of economic development, but at a decreasing rate (regressions (3) and (4)). In other words, only the upward sloping part of the estimated parabola is relevant. For example, the regression (4) estimates suggest that as economies grow and move to the next percentile, the coefficient increases by more than 5 percent for countries below the 20th percentile. In contrast, the coefficient increases by just 0.7–1.0 percent for each additional percentile from the 78th percentile upward.

Broader Implications of Quantile Analyses

The results of the above analysis are consistent with several lines of theoretical research on the evolving importance of banks and financial markets during the process of economic development. As noted in the introduction of this paper, Allen and Gale (2000), Boot and Thakor (1997, 2000), Boyd and Smith

(1998), Song and Thakor (forthcoming), and others stress that at higher levels of economic development, economies require the types of custom-designed financial arrangements that ease the financing of novel, longer-term investments that often employ more intangible inputs than the types of projects that dominate economic activity at lower levels of economic development. These theories predict that securities markets are comparatively better than banks at financing these activities. Thus, influential lines of theoretical analysis predict that the services provided by securities markets will become more important for fostering economic activity as economies grow, whereas those provided by banks will tend to become less important. The quantile regression results are consistent with these predictions. However, the quantile regression results are inconsistent with the view that economic development is simply associated with an increase in bank and stock market development with no differential effect on their association with economic activity. That is, as countries develop economically, the association between economic activity and bank development tends to weaken, whereas the association with securities market development tends to strengthen.

CONCLUSIONS

Banks and markets evolve during the process of economic development. As economies grow, both the banking system and financial markets become more developed, but the association between economic activity and bank development tends to fall, and the association between economic activity and securities market development tends to increase. For the first time, the quantile analyses employed in this paper directly assess the predictions emerging from an influential line of theoretical work on financial structure. The findings are consistent with the view that (a) financial institutions provide different financial services from those provided by financial markets, and (b) as economies grow, the services provided by securities markets become more important for promoting economic activity, whereas those provided by banks become less important. As such, this research suggests that policies and institutions that impede the evolution of the structure of financial systems as economies grow can have detrimental ramifications for economic development.

REFERENCES

- Acemoglu, D., and F. Zilibotti. 1997. "Was Prometheus Unbound by Chance? Risk, Diversification, and Growth." *Journal of Political Economy* 105: 709–775.
- Allen, F., and D. Gale. 1995. "A Welfare Comparison of the German and U.S. Financial Systems." *European Economic Review* 39: 179–209.
- . 1997. "Financial Markets, Intermediaries, and Intertemporal Smoothing." *Journal of Political Economy* 105: 523–546.

- . 1999. "Diversity of Opinion and Financing of New Technologies." *European Economic Review* 39: 179–209.
- . 2000. *Comparing Financial Systems*. Cambridge, MA: MIT Press.
- Beck, T., and R. Levine. 2002. "Industry Growth and Capital Accumulation: Does Having a Market- or Bank-based System Matter?" *Journal of Financial Economics* 64: 147–180.
- . 2004. "Stock Markets, Banks, and Growth: Panel Evidence." *Journal of Banking and Finance* 28: 423–442.
- Boot, A. W. A., and A. Thakor. 1997. "Financial System Architecture." *Review of Financial Studies* 10: 693–733.
- . 2000. "Can Relationship Banking Survive Competition?" *Journal of Finance* 55: 679–713.
- Boyd, J. H., R. Levine, and B. D. Smith. 2001. "The Impact of Inflation on Financial Sector Performance." *Journal of Monetary Economics* 47: 221–248.
- Boyd, J. H., and B. D. Smith. 1998. "The Evolution of Debt and Equity Markets in Economic Development." *Economic Theory* 12: 519–560.
- Demirgüç-Kunt, A., and R. Levine. 2001. *Financial Structures and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*. Cambridge, MA: MIT Press.
- Demirgüç-Kunt, A., and V. Maksimovic. 1998. "Law, Finance, and Firm Growth." *Journal of Finance* 53: 2107–2137.
- . 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., and E. Maskin. 1995. "Credit Efficiency in Centralized and Decentralized Economies." *Review of Economic Studies* 62: 541–555.
- Goldsmith, R. W. 1969. *Financial Structure and Development*. New Haven, CT: Yale University Press.
- Holmstrom, B., and J. Tirole. 1993. "Market Liquidity and Performance Monitoring." *Journal of Political Economy* 101: 678–709.
- Koenker, T., and G. Basset. 1978. "Quantile Regressions." *Econometrica* 46(1): 33–50.
- Levine, R. 2002. "Bank-based or Market-based Financial Systems: Which Is Better?" *Journal of Financial Intermediation* 11: 398–428.
- Levine, R., and S. Zervos. 1998. "Stock Markets, Banks, and Economic Growth." *American Economic Review* 88: 537–558.
- Morck, R., and M. Nakamura. 1999. "Banks and Corporate Control in Japan." *Journal of Finance* 54: 319–340.
- Rajan, R. G. 1992. "Insiders and Outsiders: The Choice between Informed and Arm's Length Debt." *Journal of Finance* 47: 1367–1400.
- Song, F., and A.V. Thakor. Forthcoming. "Financial System Architecture and the Co-evolution of Bank and Capital Markets." *Economic Journal*.
- Weinstein, D. E., and Y. Yafeh. 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.