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INDUSTRY GROWTH AND CAPITAL ALLOCATION:  
DOES HAVING A MARKET- OR BANK-BASED SYSTEM MATTER?

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Does Having a Market- or Bank-Based System Matter?  
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**ABSTRACT**

Are market-based or bank-based financial systems better at financing the expansion of industries that depend heavily on external finance, facilitating the formation of new establishments, and improving the efficiency of capital allocation across industries? We find evidence for neither the market-based nor the bank-based hypothesis. While legal system efficiency and overall financial development boost industry growth, new establishment formation, and efficient capital allocation, having a bank-based or market-based system per se does not seem to matter much.

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## 1. Introduction

Financial economists have debated the relative merits of bank-based and market-based financial systems for over a century.<sup>1</sup> Many authors stress the advantages that banks have over markets in financing the expansion of existing firms, in promoting the establishment of new firms, and in efficiently allocating capital. Others, however, emphasize the comparative merits of markets. Historically, empirical research on the bank-based versus market-based debate has centered on Germany and Japan as bank-based systems and the United States and Great Britain as market-based financial systems. This work has produced illuminating insights concerning the operation of financial systems in *these* countries. Nevertheless, it is very difficult to draw broad conclusions about bank-based and market-based financial systems from only four countries. To ameliorate this shortcoming, we have compiled a new, broad cross-country database with measures of financial structure, i.e., the degree to which countries have bank-based or market-based financial systems.

To assess competing views of financial structure, this paper examines the impact of financial structure on industrial expansion, the creation of new establishments, and the efficiency of capital allocation. We divide the debate into four views. As noted, the *bank-based view* highlights the positive role of banks. For instance, Gerschenkron (1962) argues that banks more effectively finance industrial expansion than markets in under-developed economies: powerful banks can induce firms to reveal information and pay debts better than atomistic markets (Rajan and Zingales, 1999). Similarly, banks that are unencumbered by regulatory restrictions on their activities can exploit economies of scale and scope in financing industry growth. Gerschenkron (1962) also claims that state-owned banks can overcome market failures and funnel domestic savings to

strategically important projects. Finally, Stulz (2000) argues that banks are more effective in providing external resources to new, innovative activities that require staged financing because banks can credibly commit to making additional funding available as the project develops.<sup>2</sup>

The *market-based view* not only stresses the positive role of markets; it highlights the comparative advantages of markets over banks in effectively allocating capital.<sup>3</sup> Proponents of the market-based view emphasize that powerful banks frequently stymie innovation by extracting informational rents and protecting established firms (Hellwig, 1991; Rajan, 1992). By acquiring inside information about firms, powerful banks can extract informational rents from firms (Hellwig, 1991). The banks' market power then reduces firms' incentives to undertake profitable projects since banks extract a large share of the profits (Rajan, 1992). Also, banks – as debt issuers – have an inherent bias toward conservative investments, so that bank-based systems stymie innovation and growth (Weinstein and Yafeh, 1998; Morck and Nakamura, 1999). Further, powerful banks and banks facing few regulatory restrictions on their activities can collude with firm managers against other outside investors and thereby inhibit effective corporate control (Hellwig, 1998; Wenger and Kaserer, 1998). Finally, market-based proponents hold that state-owned banks are less interested in overcoming market frictions and more interested in achieving political goals. According to this view, state-owned banks are more likely to funnel credit to labor-intensive industries and less likely

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<sup>1</sup> See Allen and Gale (1999), Boot and Thakor (1997), Gerschenkron (1962), Goldsmith (1969), La Porta, Lopez-de-Silanes, and Shleifer (2001), Levine (1997), Stiglitz (1985), and Stulz (2000) for analyses and more references regarding the relative merits of bank- and market-based financial systems in fostering economic performance.

<sup>2</sup> Researchers advance additional arguments in favor of bank-based systems. In liquid markets, investors can inexpensively sell their shares and consequently have fewer incentives to expend resources monitoring managers (Bhide, 1993). Stiglitz (1985) argues that efficient markets reduce incentives for individuals to research firms because any new information they uncover is quickly reflected in public stock prices before the individual can exploit the fruits of the research. Bank-based systems mitigate this problem since banks reveal less information in public markets (Boot, Greenbaum, and Thakor, 1993). Also, efficient markets can minimize the effectiveness of takeovers. Atomistic shareholders have incentives to capture the benefits from a takeover by holding their shares instead of tendering them, thus making takeover attempts less profitable and less useful as a control device (Grossman and Hart, 1980). Also, corporate control through outside takeover threats could face similar limitations because insiders have greater information than outsiders. Finally, incestuous relationships frequently flourish between management and boards of directors, which can induce directors and management to collude against other shareholders (Allen and Gale, 1999).

to identify and fund truly strategic industries (La Porta, Lopez-de-Silanes, and Shleifer, 2001).

Thus, some theories stress that markets ameliorate the negative repercussions of powerful banks and promote innovative, R&D-based industries (Allen, 1993).

The *financial services view* argues that the bank-based versus market-based debate is of second-order importance. According to this view, the first-order issue is the ability of the financial system to ameliorate information and transaction costs, not whether banks or markets provide these services (Levine, 1997). Furthermore, banks and markets might act as complements in providing financial services (Boyd and Smith, 1998; Huybens and Smith, 1999).

The *law and finance view* (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000) emphasizes the role of the legal system in determining the level of financial development. The law and finance view holds that distinguishing countries by the efficiency of the legal system in supporting financial transactions is more useful than distinguishing countries by financial structure. This view argues that legal systems that protect outside investors by enforcing contracts effectively boost financial development and thereby facilitate external financing, new firm formation, and efficient capital allocation.

To evaluate these four theories, we need measures of financial structure for a broad cross-section of countries. After using a wide array of measures of financial structure, we organize our presentation around three measures and use the others as robustness checks. The first indicator of financial structure uses measures of the size and activity of banks and equity markets to construct an aggregate index of the degree to which each country is comparatively market- or bank-based. The second indicator of financial structure measures regulatory restrictions on bank activities. Using the Barth, Caprio, and Levine (2001a,b) analysis of commercial bank regulations, we construct an aggregate index of regulatory restrictions on bank activities in securities, insurance, and real estate

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<sup>3</sup> For a review of the literature on the positive role of markets, see Levine and Zervos (1998).

markets and restrictions on bank ownership of nonfinancial firms. This measure of regulatory restrictions on bank activities gauges bank power and therefore helps distinguish between the bank-based and market-based views in our empirical analyses. The third financial structure measure offers a broader conception of “financial structure” that measures state-ownership. We use La Porta, Lopez-de-Silanes, and Shleifer’s (2001) measure of the percentage of assets of the ten largest banks in each country owned by the government. A high degree of state-ownership of banks can stimulate industrial growth in some circumstances according to the bank-based view, while the market-based view predicts that state-ownership will foster inefficient resource allocation.

To assess the bank-based, market-based, financial services, and law and finance views of financial structure, we examine the impact of financial structure on industry growth, new establishment formation, and efficient capital allocation. We use two methodologies to assess these theories.

First and primarily, we use a cross-industry, cross-country panel to examine the relation between financial structure and both industry growth and new establishment formation. Using a panel of 42 countries and 36 industries, Rajan and Zingales (1998, henceforth RZ) show that industries that are externally dependent – industries that are naturally heavy users of external finance – grow relatively faster in economies with higher levels of financial development. We, however, examine whether industries that are naturally heavy users of external finance grow faster in bank-based or market-based systems. Thus, we evaluate whether financial structure influences the flow of capital to firms that depend heavily on external finance. Next, we decompose industry growth to focus on that part explained by new establishment formation. We then assess the impact of financial structure on growth in the number of new establishments. Furthermore, we extend the RZ (1998) methodology to focus on R&D-intensive and labor-intensive industries. Some of the

theories described above predict that financial structure influences innovative firms differently from other firms and that state-owned banks favor labor-intensive industries. Thus, we test whether financial structure influences the performance of R&D-intensive and labor-intensive industries. Finally, we use the cross-industry, cross-country data to examine the financial services and law and finance views. Specifically, we study whether (1) overall financial development and (2) the efficiency of the legal system influence industry growth and new establishment formation.

The second methodology uses pure cross-country regressions to assess the impact of financial structure on the efficiency of investment flows. We use Wurgler's (2000) measure of the efficiency of investment flows, which measures the extent to which a country increases investment in growing industries and decreases investment in declining ones. We then test (a) whether the three measures of financial structure explain cross-country variation in the efficiency of investment flows, and (b) whether the overall level of financial development and legal system development explain the efficiency of investment flows. We use both the cross-industry, cross-country methodology and the pure cross-country regressions to provide empirical evidence on the bank-based, market-based, financial services, and law and finance views of financial structure.

The results give no support to either the market-based or bank-based views. Industries that depend heavily on external finance do not grow faster in either bank-based or market-based financial systems. Furthermore, measures of regulatory restrictions on banks and the extent of state-owned banks in the economy do not explain variations in industrial performance. When we decompose the industry growth rates into the growth in the number of establishments and the growth in the average size of establishments, we again find that there is not a robust relation between any of our measures of financial structure and the rate of new establishment formation. Furthermore, we do not find a strong link between financial structure and the performance of either

R&D-based or labor-intensive industries. Finally, financial structure does not explain cross-country differences in the efficiency of investment flows after controlling for financial development.

The results support both the financial services and the law and finance views. Industries that depend heavily on external finance grow faster in economies with higher levels of overall financial development. Industries that depend heavily on external finance also grow comparatively faster in economies in which the legal system effectively protects investors. Moreover, overall financial development and the legal environment explain cross-country variation in the growth in the number of establishments in externally dependent industries. In sum, while financial structure per se does not importantly explain industrial performance, overall financial development and the legal environment are critically important for industry growth and the efficiency of capital allocation.

The results are robust to a battery of sensitivity checks. Specifically, we find no evidence for the view that bank-based systems are particularly important for industrial growth or new establishment creation in less-developed economies. Also, this paper's results hold when using alternative measures of financial structure, financial development, and external dependence.

This paper is importantly different from two recent papers on financial structure and economic growth. Levine (2000) shows that financial structure is not a good predictor of growth in a cross-country growth framework: neither bank-based nor market-based financial systems are closely associated with economic growth. He, however, examines Gross Domestic Product (GDP) growth. He does not examine whether financial structure influences new establishment creation, industry expansion, or capital allocation, which is this paper's focus. Furthermore, Demirgüç-Kunt and Maksimovic (2000) use firm-level data and also show that financial structure is not a robust predictor of economic growth. Again, however, they do not examine whether financial structure



influences new establishment formation, industry expansion, and capital allocation, which are three channels highlighted by the theoretical literature discussed above.

The remainder of this paper is organized as follows. Section 2 describes the econometric model that we use to evaluate the comparative ability of the (1) bank-based, (2) market-based, (3) financial services, and (4) law and finance to explain industrial expansion, new establishment creation, and the efficiency of capital allocation. Section 3 presents the data. Section 4 provides the empirical results. Section 5 presents sensitivity analyses and Section 6 concludes.

## **2. Methodology**

This paper empirically assesses the impact of financial structure on industry growth, new establishment formation, and capital allocation across industries. First and foremost, we use a panel data set of cross-country and cross-industry observations to examine the relation between financial structure and both industry growth and the creation of new establishments. Second, we use pure cross-country regressions to analyze the impact of financial structure on the efficiency of investment flows across industries in each country. In conducting these analyses, we provide empirical evidence on the bank-based, market-based, financial services, and law and finance views of financial structure. The rest of this section explains (a) the panel estimation techniques and (b) the cross-country regressions.

### *2.1. Panel methodology: cross-industry, cross-country regressions*

RZ (1998) argue that industries that are naturally heavy users of external finance should benefit disproportionately more from greater financial development than industries that are not naturally heavy users of external finance. They note that financial intermediaries and markets help

overcome market frictions that drive a wedge between the price of external and internal finance. Better functioning financial systems lower the cost of external finance, which disproportionately fosters the growth of industries that rely heavily on external finance. Using data on a panel of 42 countries and 36 industries, RZ (1998) show that industries that rely more heavily on external finance grow faster in countries with better financial systems. Furthermore, RZ show that the effect of financial development on the industrial growth runs mostly through growth in the number of establishments rather than through growth in the average size of establishments.

To examine the bank-based, market-based, financial services, and law and finance views of financial structure, we use and extend the methodology developed by RZ (1998). We first examine whether industries that are naturally heavy users of external finance grow faster in bank-based or market-based financial systems. As noted, we focus on three measures of financial structure: (a) a measure of the comparative size and activity of markets and banks, (b) a measure of regulatory restrictions on banks, and (c) a measure of state-ownership of banks. We construct these measures so that higher values imply larger and more active markets, more regulatory restrictions on banks, and larger government ownership of banks, respectively. Second, we decompose industry growth to assess the impact of financial structure on that part accounted for by growth in the number of establishments. Third, we extend the RZ (1998) methodology to focus on R&D-intensive and labor-intensive industries rather than on externally dependent industries. This extension is important since some theories of financial structure suggest that financial structure will influence innovative firms differently from other firms and that state-controlled banks will tend to allocate capital disproportionately to labor-intensive industries. Thus, we assess whether R&D-intensive and labor-intensive industries grow faster in bank-based or market-based financial system using our three measures of financial structure. Finally, we examine the financial services and law and

finance views by examining the impact of (1) overall financial development and (2) contract enforcement efficiency on industrial growth and new establishment formation.

Econometrically, we use the following regression to assess the impact of financial development and financial structure on industry growth.

$$Growth_{i,k} = \sum_j \alpha_j Country_j + \sum_l \beta_l Industry_l + \gamma Share_{i,k} + \delta_1 (External_k * FD_i) + \delta_2 (External_k * FS_i) + \varepsilon_{i,k}, \quad (1)$$

where  $Growth_{i,k}$  is the average annual growth rate of value added or the growth in the number of establishments, in industry  $k$  and country  $i$ , over the period 1980-90.  $Country$  and  $Industry$  are country and industry dummies, respectively, and  $Share_{i,k}$  is the share of industry  $k$  in manufacturing in country  $i$  in 1980.  $External_k$  is the measure of dependence on external finance for industry  $k$  as measured for a sample of U.S. companies over the period 1980-89.  $FD_i$  and  $FS_i$  are indicators of financial development and financial structure for country  $i$ , respectively. We interact the external dependence of an industry ( $External$ ) with both (a) a measure of overall financial development ( $FD$ ) and (b) an index of the degree of market-based versus bank-based, regulatory restrictions on banks, or state-ownership of banks, i.e., an index of financial structure ( $FS$ ). We do not include financial development or financial structure on their own, since we focus on within-country, within-industry growth rates. The dummy variables for industries and countries correct for country and industry specific characteristics that might determine industry growth patterns. We thus isolate the effect that the interaction of external dependence and financial development/structure has on industry growth rates relative to country and industry means. By including the initial share of an industry we control for a convergence effect: industries with a large share might grow more slowly, suggesting a negative sign on  $\gamma$ . This effect does not correspond exactly to the convergence concept known from cross-country growth regressions. We include the share in manufacturing rather than the level, since

we focus on within-country, within-industry growth rates. As in RZ,  $\gamma$  enters significantly negative in most regressions.

We use this same framework to assess whether R&D-intensive and labor-intensive industries grow faster in bank-based or market-based financial systems using our three measures of financial structure. To do this, we replace *External* by measures of industrial labor-intensity and R&D-intensity. Thus, we can assess whether market-based financial systems, banks with few regulatory restrictions on their activities, or financial systems characterized by high levels of government ownership of banks have a particularly strong impact on R&D-intensive or labor-intensive industries.

The different hypotheses imply different predictions about the sign and significance of  $\delta_1$  and  $\delta_2$ . The market-based view predicts that industries that are dependent on external finance or that are R&D-intensive grow faster in economies with market-oriented financial systems and higher levels of financial development, thus implying  $\delta_1 > 0$  and  $\delta_2 > 0$ , when using the financial structure measure of the comparative size and activity of stock markets. As noted above, proponents of the market-based view also believe that state-owned banks and banks that do not face many regulatory restrictions on their activities will exert a negative influence on resource allocation and growth. Thus, when using the measure of state-ownership of banks, the market-based view predicts that  $\delta_2 < 0$ , but it predicts that  $\delta_2 > 0$  when using the measure of regulatory restrictions on banks.

The bank-based view predicts that industries that are dependent on external finance or that are R&D-intensive grow faster in economies with (a) bank-oriented financial systems, (b) banks that face few regulatory restrictions on their activities, and (c) higher levels of financial development. This prediction implies that  $\delta_1 > 0$  and  $\delta_2 < 0$ , when using (i) the financial structure measure of the comparative size and activity of stock markets relative to banks or (ii) the measure of regulatory

restrictions on banks. Furthermore, some proponents of the bank-based view stress that state-owned banks boost industrial growth in externally dependent industries. This view implies  $\delta_2 > 0$ , when using the state-ownership of banks measure. Finally, some theories stress that state-owned banks favor the growth of labor-intensive industries, implying  $\delta_2 > 0$ .

The financial-services view predicts that industries that depend heavily on external finance grow faster in economies with a higher level of overall financial development, but financial structure per se does not matter. Thus, the financial-services view predicts that  $\delta_1 > 0$  and  $\delta_2 = 0$ .

The law and finance view predicts that industries that depend heavily on external finance grow faster in economies that protect the rights of outside investors more efficiently, but financial structure per se is not important. If we replace  $FD_i$  with an indicator of the efficiency of the legal system, the law and finance view predicts that  $\delta_1 > 0$  and  $\delta_2 = 0$ .

We run Two Stage Least Squares (TSLS) regressions to address the issue of endogeneity of financial development and financial structure. By using appropriate instruments, we control for simultaneity bias and reverse causality. We will use the legal origin and the religious composition of countries as instrumental variables for the level and structure of financial sector development. Legal systems with European origin can be classified into four major legal families (Reynolds and Flores, 1996): the English common law and the French, German, and Scandinavian civil law countries. Most countries have acquired their legal systems through occupation and colonialism, so that the legal origin can be regarded as exogenous. Furthermore, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998) have shown that the legal origin of a country materially influences its legal treatment of creditors and shareholders, its accounting standards and the efficiency of contract enforcement. Since these regulatory and informational characteristics determine the efficiency of financial intermediaries and markets, we regard the legal origin of

countries as good instruments for financial development. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999) also show that the dominant religion of a country influences institutional development. Where possible we also run regressions using only legal origin as instrumental variables, with very similar results.

## 2.2. Cross-country methodology: investment flow efficiency

We also explore the importance of financial structure for the efficient allocation of capital. Wurgler (2000) computes an investment elasticity measure that gauges the extent to which a country increases investment in growing industries and decreases investment in declining ones. He shows that countries with a higher level of financial development increase investment more in growing industries and decrease investment more in declining industries than financially underdeveloped countries. He uses data for 65 countries for the period 1963-95.

In this paper, we examine the impact of financial structure on the elasticity of investment. Specifically, we assess whether financial structure influences the efficiency of investment flows across industries or whether it is the overall level of financial development and the legal system that determine the efficiency of investment flows. We have data for 39 countries and use the following cross-country regression to assess the different views:

$$Elasticity_i = \delta_0 + \delta_1 FD_i + \delta_2 FS_i + \varepsilon_i \quad (2)$$

where *Elasticity* is the elasticity of investment flows and measures the degree to which a country increases investment in growing industries and decreases it in declining industries. *FD* is an indicator of financial development, *FS* is an indicator of financial structure,  $\varepsilon$  is the error term and *i* indicates the country. The four different views of financial structure make the same predictions about the signs of  $\delta_1$  and  $\delta_2$  in the Elasticity regressions as they do in the panel growth regressions

specified above. We run these regressions using Ordinary Least Squares (OLS) due to the low number of observations. However, Two-Stage Least Squares, with the legal origin and religious composition as instruments, produces similar conclusions.

### **3. Data**

This section describes (i) the indicators of financial structure, financial development, and the legal system, (ii) the dependent variables – industry growth of value added and of the number of establishments and investment elasticity -, and (iii) the industry characteristics - external dependence, labor-intensity, and R&D-intensity. The data are for 42 countries and 36 industries. All industries are in manufacturing. Table 2 provides descriptive statistics and correlations for the cross-country variables. We do not include correlations for the industry characteristics (external dependence, labor intensity and R&D intensity), since they have no cross-country variance. While labor-intensity is not correlated with either external dependence or R&D-intensity, external dependence and R&D-intensity are positively correlated. The two dependent panel variables are positively and significantly correlated.

#### *3.1. Indicators of financial structure, financial development, and the legal system*

##### *3.1.1. Indicators of financial structure*

To examine the relation between financial structure and industrial expansion, new establishment formation and capital allocation, we need measures of financial structure. Since there is no widely accepted empirical definition of financial structure, we use a wide array of different measures. Specifically, we construct measures of (i) the comparative size and activity of stock

markets and banks, (ii) the regulatory restrictions on banks, and (iii) the extent of state-ownership of banks. We use further measures of financial structure in the sensitivity analysis.

Our first indicator, *Structure-Aggregate* is the first principal component of two variables that measure the comparative activity and size of markets and banks. Each of the underlying variables is constructed so that higher values indicate more market-based financial systems. The first variable (*Structure-Activity*) equals the log of the ratio of Value Traded to Bank Credit. Value Traded equals the value of stock transactions as a share of national output. It is frequently used as an indicator of stock market liquidity.<sup>4</sup> Bank Credit equals the claims of the banking sector on the private sector as a share of GDP. Levine and Zervos (1998) find a robust link from both Value Traded and Bank Credit to subsequent economic growth. The second variable (*Structure-Size*) equals the log of the ratio of Market Capitalization to Bank Credit. Market Capitalization is defined as the value of listed shares divided by GDP, and is a measure of the size of stock markets relative to the economy.<sup>5</sup> We use data for Structure-Aggregate averaged over the period 1980-89 for the panel analysis and averaged over 1980-95 for the cross-country regressions.<sup>6</sup> We also construct alternative measures of financial structure, controlling for the ownership concentration of listed firms and isolating private banks, and discuss these results in the sensitivity section below.

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<sup>4</sup> Levine and Zervos (1998) point out a potential pitfall of Value Traded. If forward-looking stock markets anticipate large corporate profits and therefore higher economic growth, this will boost stock prices and therefore boost Value Traded. Thus, a positive relation between Value Traded and growth might reflect a spurious correlation due to this price effect. This price effect, however, does not arise in our model, since we focus on within-country, within-industry growth rates. If markets anticipate higher growth in one industry, the resulting larger value of Value Traded would be the same for all industries in this country. Moreover, when we use the turnover ratio, which equals value traded divided by market capitalization, we get the same results. Turnover does not suffer from this price effect because stock prices enter into the numerator and denominator.

<sup>5</sup> We will only report results with Structure-Aggregate. A previous version of this paper reports results with Structure-Activity and Structure-Size, which are very similar to the results using Structure-Aggregate. Correlations between these three measures are over 0.65 and significant at the 1%-level.

<sup>6</sup> The underlying measures of stock market and banking sector development are listed in Appendix Table A1. Note that we do not have data for stock market development available for a large number of countries before 1980. Although the dependent variable in the cross-country regressions is measured over 1963-95, we therefore have to restrict the time period of financial structure and development data to the period 1980-95.



Structure-Aggregate provides a measure of the comparative role of banks and markets in the economy. The underlying measures of bank development and stock market liquidity exert a strong influence on economic growth.<sup>7</sup> Furthermore, Demirgüç -Kunt and Levine (2000) show that countries with strong shareholder rights and high accounting standards tend to have higher values of Structure-Aggregate. Thus, key legal and regulatory differences match-up with this financial structure indicator that we use to assess the relation between industrial performance and the degree to which countries are bank-based or market-based.

The second financial structure indicator that we use measures regulatory restrictions on bank activities. *Restrict* aggregates measures that indicate whether bank activities in the securities, insurance, and real estate markets and ownership and control of nonfinancial firms are unrestricted (1), permitted (2), restricted (3) or prohibited (4). The aggregate indicator has therefore a possible maximum variation between four and 16, with higher numbers indicating more restrictions on bank activities and nonfinancial ownership and control. *Restrict* is computed in 1999 and is taken from Barth, Caprio, and Levine (2001a,b). As shown by Barth, Caprio, and Levine (2001c) for a smaller sample of countries, however, *Restrict* has changed extraordinarily little over the last 20 years. Lower values of *Restrict* indicate a financial system in which banks face fewer restrictions and are therefore potentially more powerful. Compared to Structure-Aggregate, *Restrict* focuses on the policy environment that determines the structure of the financial system, specifically, the activities of banks relative to other financial institutions.

The third measure of financial structure focuses on government ownership of banks. Instead of focusing on bank- or market-based financial systems, La Porta, Lopez-de-Silanes, and Shleifer (2001) suggest a broader conception of “financial structure” that includes ownership of banks. We

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<sup>7</sup> For evidence on the impact of financial intermediation on growth, see Levine, Loayza, and Beck (2000). For evidence on the impact of stock markets on growth, see Levine and Zervos (1998) and Rousseau and Wachtel (2000).

therefore use their measure of *State Ownership* that equals the percentage of assets of the ten largest banks in each country owned by the government. Specifically, La Porta, Lopez-de-Silanes, and Shleifer (2001) compute the government's share of ownership of each of the ten largest banks in each country. They also have the total assets of each bank. Thus, they multiply government's share of ownership by the total assets for each bank. They sum this over the ten largest banks and divide by the total assets of those banks to compute the percentage of assets of the ten largest banks owned by the government. They compute this in 1995 and 1985. We use the average of these two observations in our regressions.

Table 1 presents the ranking of countries according to our three indicators of financial structure. The three measures of financial structure frequently give quite different country rankings. Furthermore, although many countries fit our pre-conceived categorization as bank-based or market-based, some of the country-rankings are counter-intuitive

Structure-Aggregate makes the intuitively attractive classification that New Zealand, Great Britain, and the U.S. are market-based financial systems, while Germany and France have low values of Structure-Aggregate. Structure-Aggregate also identifies Japan as a market-based financial system because it has a large, active market. Based on Structure-Aggregate, Brazil and Mexico are also classified as market-based but this is not because they have large, active stock markets. Rather, they are classified as market-based because they have very under-developed banks. Similarly, Nigeria and Bangladesh are identified as bank-based because their stock markets are practically nonexistent, not because they have well-developed banking systems.

Restrict offers some intuitively attractive classifications. Until very recently, the U.S. imposed large restrictions on its banks' activities. In contrast, Germany and France impose very few restrictions on their banks. However, contrary to common grouping of Germany and Japan as

having similar financial structure, Japan imposes more restrictions on its banks than the U.S. (in 1999). Also, contrary to common groupings, Great Britain imposes as few restrictions on its banks as Germany.

Table 2 indicates that there is not a significant correlation between Structure-Aggregate and Restrict. While Structure-Aggregate identifies New Zealand as the most market-based financial system, Restrict classifies it as the country with the least restrictions on banks. Great Britain and Canada have high values of Structure-Aggregate, but they impose few restrictions on their banks.

The correlations in Table 2 suggest that bank-based financial systems also tend to be dominated by state-owned bank. The countries with no state-ownership in the ten largest banks – Canada, Japan, South Africa, Great Britain, and the U.S. are also identified by Structure-Aggregate as market-based financial systems. Bangladesh, Pakistan, and Costa Rica, the countries with the highest share of state-owned banks in our sample, are also among the most bank-based financial systems (countries with the lowest Structure-Aggregate values). Countries whose banking systems are dominated by state-owned banks also tend to impose more restrictions on their banks. Egypt, Bangladesh, and Israel have both high state ownership of banks and large restrictions on banks' activities, while Great Britain, Canada, and Spain have few state-owned banks and impose few restrictions on their banks.

These tables show that different measures of financial structure give different country rankings and produce some anomalous rankings. Therefore, some could argue that these results imply that distinguishing countries by financial structure is not very useful. We take a different approach before drawing such a conclusion. We consider a wide array of financial structure indicators and assess whether any of these indicators is useful in explaining industrial growth, new establishment formation, or the efficiency of investment flows.

### 3.1.2. Indicators of financial development

The financial services view argues that the bank-based versus market-based discussion is of second order and that it is the overall level of financial development that matters most for industry expansion, new establishment creation and capital allocation. We therefore need a measure of the degree to which national financial systems assess firms, monitor managers, facilitate risk management, and mobilize savings. There is no single, fully satisfactory measure of financial development. Based on work by Levine and Zervos (1998) and Levine, Loayza, and Beck (2000), we use *Finance-Aggregate*, which equals the first principal component of two underlying measures of financial development. The first underlying measure (*Finance-Activity*) is a measure of the overall activity of the financial intermediaries and markets. It equals the log of the product of Private Credit (the value of credits by financial intermediaries to the private sector divided by GDP) and Value Traded (the value of total shares traded on the stock market exchange divided by GDP). Private Credit includes credits by both bank and nonbank intermediaries. Recent work shows that both Private Credit (Levine, Loayza, and Beck, 2000; Beck, Levine, and Loayza, 2000) and Value Traded (Levine and Zervos, 1998) exert large influences on economic growth. The second underlying measure of financial development (*Finance-Size*) is a measure of the overall size of the financial sector and equals the log of the sum of Private Credit and Market Capitalization. We aggregate data over the period 1980-89 for the panel analysis and over the period 1980-95 for the cross-country regressions. In the main text, we will focus on Finance-Aggregate. The other measures of overall financial development (Finance-Activity and Finance-Size) confirm our results. The correlations between these three indicators are at least 0.9 and significant at the 1%-level.

Table 2 indicates that financially developed economies tend to be more market-based (Structure-Aggregate), have fewer regulatory restrictions on bank activities (Restrict), and have less state-ownership of banks (State Ownership). There are, however, exceptions. For example, Japan and the United States have highly developed financial systems, but severely restricted bank activities in 1999.

### *3.1.3. The legal environment*

The law and finance view emphasizes the role of the legal system in shaping financial development and thus economic growth (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 2000). To measure the legal environment, we experiment with an assortment of indicators of the efficiency of the legal system. We focus our presentation on an indicator of overall legal system efficiency.

*Judicial Efficiency* is an assessment of the efficiency and integrity of the legal environment, produced by the country-risk rating agency Business International Corporation. This indicator is averaged over 1980-83 and ranges from one to ten, with higher numbers indicating higher levels of judicial efficiency. We use the 1980-83 period to avoid problems of simultaneity bias.

Furthermore, Judicial Efficiency is less correlated with GDP per capita than other measures of the efficiency of the legal environment, such as *Rule of Law*, an assessment of the law and order tradition of a country that ranges from one to six and is made available by the International Country Risk Guide (ICRG). However, we confirm all our results, using Rule of Law, measured in 1982.

We also examined the specific laws protecting creditors and minority shareholders (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998). Including these variables, however, reduces our sample and does not improve the explanatory power of the regressions significantly beyond that produced by including Judicial Efficiency. Moreover, when we include the measures of creditor

rights and minority shareholder rights, we draw the same conclusions about the impact of the overall legal environment on industry growth, new establishment formation, and efficient capital allocation.

The correlations in Table 2 indicate that Judicial Efficiency is positively correlated with Finance-Aggregate and Structure-Aggregate and negatively correlated with State Ownership. Countries with more efficient legal systems experience higher levels of financial development, more market-based systems, and less state-ownership of banks.

### 3.2. Industry growth rates and investment elasticity

Our dependent variables in the country-industry panel regressions are the average annual growth rate of real value added and the growth in the number of establishments over the period 1980-90. We use establishments, since there are no cross-country data available on firms. An establishment is defined as a “unit that engages, under a single ownership or control, in one, or predominantly one, kind of activity at a single location.” The growth in the number of establishments is defined as the log difference of the number of establishments in 1990 and 1980. We use the data obtained by RZ from the *Industrial Statistics Yearbook* database put together by the United Nations Statistical Division (1993).

For the cross-country regressions we use the elasticity of investment to industry value added, as estimated by Wurgler (2000) for 28 industries in 65 countries over the period 1963-95. Using data from the *Industrial Statistics Yearbook* database he regresses the annual growth rates of industry fixed capital formation on annual growth rate of industry value added, for each country in the sample:

$$\text{Ln}(I_{i,c,t}/I_{i,c,t-1}) = \alpha + \beta \text{Ln}(V_{i,c,t}/V_{i,c,t-1}) + U_{i,c,t}, \quad (3)$$

where  $I$  is gross fixed capital formation,  $V$  is value added,  $i$  indexes manufacturing industry,  $c$  indexes country, and  $t$  indexes year. The slope coefficient  $\beta$  is the elasticity used in this paper.

The correlations in Table 2 indicate that countries that have developed financial systems, impose fewer restrictions on their banks, have less state-ownership of banks, and have more efficient judicial systems tend to allocate their capital more efficiently.

### *3.3. External dependence, labor-intensity and R&D-intensity*

The industry-level data on external dependence are from RZ (1998). The underlying assumption in RZ – and our work -- is that for technological reasons some industries depend more heavily on external finance than others. Scale economies, gestation period or intermediate product intensity might constitute some of these technological reasons. Unfortunately, we can only observe the actual use of external finance, but not the demand for it. If financial markets were relatively frictionless, the actual use of external finance would represent the equilibrium of supply and demand. For countries with very well developed financial systems, RZ note that external funds will be supplied very elastically to large firms, so that the actual use of external finance would primarily reflect the demand for external finance. Assuming that the variance of the need of external finance across industries persists across countries we can thus use the actual external dependence of industries as observed in a country with a very well developed financial system as a proxy for the “natural” dependence of industries on external finance. As in RZ, we use the United States to compute the natural external dependence and then we confirm our results using Canadian data to compute the natural external dependence of industries.

The data are from Standard and Poor's Compustat for U.S. firms in 36 industries. This database contains only publicly listed firms. A firm's dependence on external finance is defined as the share of investment that cannot be financed through internal cash flows; or as capital

expenditures minus cash flow from operations divided by capital expenditures. Both numerator and denominator are averaged over the 1980s to smooth temporal fluctuations. The industry values are calculated as medians rather than means to thus prevent outliers from dominating the results. We have data for 36 industries, varying from Tobacco, an industry with no demand for external finance, to Drugs, the industry with the highest need for external finance.

We also consider two other industry characteristics, labor-intensity and R&D-intensity. We calculate both measures for the U.S. over the sample period 1980-89. We calculate U.S. labor-intensity data by dividing wages and salaries paid to employees by value added, and obtain this data from the UNIDO database on three-digit industries over the period 1980-89. We have data available for 30 industries, ranging from Tobacco, the least labor-intensive industry, to Ship Building, the most labor-intensive industry. The R&D-intensity variable equals the share of R&D expenses in value added for U.S. industries over the period 1980-89 and was obtained from the OECD's Main Industrial Indicators database. Unfortunately, we have data available for only ten industries, ranging from metal products, the least R&D-intensive industry, to Office and Computing, the most R&D-intensive industry. The reduction in observations occurs because of a different industry split in the OECD than in the RZ data.

## **4. Results**

The results in panel A of Table 3 indicate that industries requiring more external finance grow faster in financially more developed economies, but financial structure does not have a significant impact on industrial growth patterns. Unlike RZ we include the indicators of financial sector development in logs instead of levels to allow for the nonlinearity in the relation between financial development and growth illustrated by Levine, Loayza, and Beck (2000). Since U.S data are used to calculate our measure of external dependence, the U.S. is dropped from all regressions. The



positive coefficient on the interaction term of Finance-Aggregate and external dependence enters significantly at the 1%-level. The coefficient on the interaction of Structure-Aggregate and external dependence enters insignificantly. The number of establishments in financially dependent industries also grows faster in well-developed financial systems, but financial structure again does not enter significantly. The results are consistent with the financial services view, but inconsistent with the market-based and bank-based views.

Table 3 also shows that financial structure (Structure-Aggregate) does not influence growth in labor-intensive or R&D-intensive firms. Due to data availability, the R&D regressions only employ about one-third of the observations in the external dependence regressions. Overall, financial development does not enter these regressions significantly either.

The results in panel B of Table 3 confirm the results by Wurgler (2000) and show that financial development is positively linked with the elasticity of industry investment to value added. However, financial structure (Structure-Aggregate) does not explain a significant amount of the cross-country variation in the efficiency of investment flows. These results support the financial services view but are inconsistent with predictions by the market-based and bank-based views.

Table 4 confirms the absence of a strong relation between financial structure and industrial growth patterns across countries. Here we use the indicator of regulatory restrictions on banks, Restrict. The interaction of external dependence with Restrict enters insignificantly in both the industry growth and new establishment regressions. Also, the interactions of Restrict and both labor-and R&D-intensity do not enter significantly. Finally, Restrict is negatively associated with capital allocation efficiency as illustrated in panel B of Table 4. It enters with a p-value of 0.06, providing weak support for the view that systems with fewer restrictions on banks allocate capital more efficiently.

Table 4 also confirms the strong positive relation between overall financial development and industrial performance. New establishments are created more easily in financially more developed economies as the interaction of external dependence and Finance-Aggregate enters with a p-value of 0.001. The interaction of external dependence and Finance-Aggregate enters positively, with a p-value of 0.053, in the regression of industry growth. Furthermore, overall financial development exerts a positive impact on the formation of new establishments in R&D-intensive industries (the interaction of Finance-Aggregate and R&D-intensity enters positively, with a p-value of 0.03). This result provides limited support for the hypothesis that new establishments in R&D-intensive industries are created more easily in well-developed financial systems. Finally, Finance-Aggregate enters significantly positive in the regression of investment flow efficiency. These findings are consistent with the financial services view.

Table 5 confirms the importance of overall financial development, but does not provide evidence of a positive role for state-owned banks in spurring industrial performance and efficient capital allocation. The interaction of Finance-Aggregate with external dependence enters positively in the industry growth regression with a p-value of 0.066. It also enters positively in the new establishments regression with a p-value of 0.01. Furthermore, the interaction term of R&D-intensity with financial development enters positively and significantly with a p-value of 0.058 in the new establishments regression. This result provides some support for the hypothesis that new establishments in R&D-intensive industries are established more easily in well-developed financial systems. State Ownership does not enter significantly in any of the regressions. The cross-country regression of investment flow efficiency confirms the previous results; while financial development enters significantly and positively, State Ownership does not enter significantly.

The results in Table 6 provide evidence in favor of the law and finance view and show that externally dependent industries grow faster and new establishments are more easily created in economies with efficient legal systems. The interaction term of Judicial Efficiency with external dependence enters significantly in the regressions of industry growth and the growth in the number of establishments. When we use interaction terms with legal origin as regressors instead of Judicial Efficiency, they are jointly significant, which further confirms the law and finance view. Furthermore, we get very similar results when we use Rule of Law, measured either over the period 1982-89 or in 1982. As before, financial structure enters insignificantly. The cross-country regressions indicate that capital is allocated more efficiently in economies with more efficient judicial systems, while financial structure has no effect on the efficiency of capital allocation. We also run regressions using labor intensity and R&D intensity as industry characteristics. None of the financial structure indicators or Judicial Efficiency enters significantly in any of the regressions. Results are reported in Appendix Tables A2 and A3.

In sum, these results indicate that the overall level of financial development and its legal determinants help externally dependent industries grow faster and help the start-up of new establishments in these industries. The cross-country regressions indicate that capital is more efficiently allocated in countries with well-developed financial systems and more efficient legal systems.<sup>8</sup> We find limited evidence that financial development helps the start-up of new establishments in R&D-intensive industries. Taken together, these findings support the financial services and the law and finance views. We do not find robust evidence in support of the market- or bank-based views. We do not find any evidence that state-ownership has an independent effect on

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<sup>8</sup> While productivity growth rates are not available on the industry level for our sample, cross-country regressions of productivity growth on financial development and financial structure, controlling for other growth determinants, confirm our results. While financial development enters significantly positive, financial structure does not. See Levine (2000).

industry performance beyond its negative effect on financial development as shown by La Porta, Lopez-de-Silanes and Shleifer (2001). We do not find any evidence that financial development or a specific financial structure favors labor-intensive industries.

## **5. Robustness tests**

This section assesses the robustness of the core results to alternative measures of financial structure, financial development and external dependence, as well as alternative hypotheses. These results are available on request in Appendix B.

First, we used the underlying indicators of financial structure and development, Structure-Activity, Structure-Size, Finance-Activity, and Finance-Size. Using these measures confirms our results. While financial structure does not explain the expansion, creation of new establishments in externally dependent industries, and capital allocation across industries, financial development and the efficiency of the legal system do explain industrial performance.<sup>9</sup>

Second, we adjust our indicators of financial development and structure to take into account cross-country variance in the ownership concentration of listed firms. More concentrated ownership can decrease the importance of external finance raised through stock markets. We compute modified stock market and financial market indicators. Specifically, we multiply Value Traded and Market Capitalization by one minus the median ownership of the largest three shareholders in the largest ten companies. Data are from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) and for some countries these numbers are calculated using less than ten companies. We then re-compute the indicators of financial structure and development and re-do all of the analyses. The correlation between Structure-Aggregate and the modified indicator is 0.97. Adjusting for ownership concentration of listed firms in this way does not change our main

conclusions. However, Restrict now enters significantly negative in the cross-country regressions indicating that financial systems that impose fewer restrictions on their banks allocate capital more efficiently. Further, State Ownership enters significantly negative in the cross-country regressions indicating that state-ownership of banks hurts the efficiency of capital allocation.

Third, we construct alternative measures of financial development and structure based only on data for privately owned banks (and therefore excluding the assets of state-owned banks). Using the data by La Porta, Lopez-de-Silanes and Shleifer (2001) on the share of state-ownership in the banking sector, we construct two new measures of (1) credit to the private sector by privately owned deposit money banks and (2) credit to the private sector by privately owned financial intermediaries. Specifically, we multiply the measures discussed above by one minus the share of state-owned banks. The correlations between our two new measures and the original ones are 88% and 92%, respectively. We then recalculate all our indicators of overall financial development and financial structure using these measures. Although the government share refers only to commercial and development banks, we assume that the nonbank financial sector presents a similar ownership structure for each country. These new measures confirm our earlier findings: Neither bank- nor market-based systems, systems with specific bank regulations or ownership structure have a robust link with the growth patterns of externally dependent industries, the creation of new establishments, or capital allocation. The results strongly support the law and finance view. In sum, these additional measures of financial development and structure do not alter the paper's findings.

Fourth, recognizing that there is not a universally accepted definition of bank-based versus market-based, we isolate those countries with extremely bank-based or market-based systems. Perhaps, very "unbalanced" financial systems hurt industrial performance. *Unbalanced-Bank* equals one if Bank Credit is greater than the sample median and Value Traded is less than the

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<sup>9</sup> These results are available in an earlier working paper version of this paper.

sample median, and zero otherwise. Austria, Chile, Denmark, Finland, and Portugal are classified as having unbalanced bank-based systems. *Unbalanced-Market* equals one if Value Traded is greater than the sample median and Bank Credit less than the sample median, and zero otherwise.

Australia, Brazil, India, New Zealand, and Sweden are classified as having unbalanced market-based systems. Finally, *Unbalanced* equals one if either *Unbalanced Bank* or *Unbalanced Market* equals one, and zero otherwise. The results provide some weak evidence for the proposition that having very unbalanced financial system hurts industrial performance. The results indicate that while externally dependent industries do not grow faster in market-or bank-based financial systems, new establishments are more easily formed in balanced financial systems. The results further indicate that labor-intensive industries grow faster in balanced financial systems. None of the other interaction terms with Unbalanced enters significantly. The cross-country regressions confirm that capital is more efficiently allocated in financially developed economies, while “unbalancedness” has no impact on the efficiency of capital allocation.

Fifth, we assess the law and finance view using two alternative measures of financial structure proposed by Demirgüç-Kunt and Maksimovic (2000). Specifically, we regress Value Traded on Rule of Law, the British legal origin dummy, the inflation rate and the La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) measure of the extent to which the law protect minority shareholders.<sup>10</sup> The residuals of this regression reflect the component of stock market development not predicted by the legal and macroeconomic environment. Similarly, we regress Bank Credit on Rule of Law, the British legal origin dummy, the inflation rate and the La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) measure of the extent to which the law protects firm creditors. Positive residuals from these two regressions, which we call *Excess-Market* and *Excess-Bank*, indicate stock market and banking sector development that goes beyond the predicted development. We then

include interaction terms of external dependence, labor-intensity, or R&D-intensity with both residual series in our regressions. A positive coefficient on either interaction term would indicate that industries with specific characteristics grow faster in countries in which the stock market or banks are larger than predicted by the legal or macroeconomic environment. The results indicate that externally dependent industries do not grow faster, establishments in these industries are not created faster, and capital is not allocated more efficiently in financial systems with banks or stock markets that are larger than predicted. These results support the law and finance view.

Sixth, we assess whether the impact of financial structure on industrial growth and new establishment formation depends on the level of economic development. Gerschenkron (1962), Boot and Thakor (1997), Boyd and Smith (1998), and Rajan and Zingales (1999) all suggest that bank-based systems maybe particularly important for economic performance in under-developed economies with poorly functioning institutions. Then, as countries develop and institutions improve, equity markets play an increasingly important and necessary role. To assess this view empirically, we modify the basic equation by adding an extra term that interacts three variables: external dependence, financial structure, and a dummy variable that takes on the value zero for all countries classified by the World Bank as high or upper-middle-income and one otherwise (“low-income”). The summation of the coefficients on (a) the “simple” interaction term and (b) the extra interaction term of external dependence, financial structure, and the dummy variable for low-income countries gives the impact of financial structure on industry growth in low-income countries. We find no support for the view that bank-based systems are particularly important for industrial growth or new establishment formation in developing economies. The simple interaction term of external dependence and financial structure does not enter significantly at the 5%-level. Moreover, the summation of (a) the coefficient on the simple interaction term and (b) the coefficient

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<sup>10</sup> Boyd, Levine, and Smith (2001) show that inflation tends to reduce stock market liquidity and banking sector activity.

on the interaction term of external dependence, financial structure, and the low-income dummy is insignificant.

Seventh, we assess the robustness of the results using three alternative measures of external dependence. The three alternative measures of external dependence are significantly correlated with our principal measure of external dependence at the 1%-level, with correlation coefficients being at least 60%. RZ show that the demand for external finance is highest during the early years of a company. Using a sample of young firms to calculate the dependence on external finance might therefore give a more appropriate picture of the need for external finance. Therefore, we first use the dependence on external finance of firms that went public during the previous ten years. Using the external dependence of young firms does not alter our main result: financial structure does not robustly explain industrial growth patterns, the creation of new establishments, or capital allocation. However, when using young firms to define external dependence, there are some specifications in which overall financial development and Judicial Efficiency enter insignificantly. This paper's conclusions are robust to using the second alternative measure of external dependence that is calculated over the period 1970-79. If countries other than the U.S. use older technologies, the external dependence as measured over the 80s might not appropriately reflect external financing needs in other countries. Also, since the U.S. was "more" bank-based in the 70s than in 80s, using this historic measure of external dependence has another advantage. It allows us to test the sensitivity of our results to a bias that might have been introduced by using the external dependence of industries measured for a sample of firms in a market-based economy. Our results are similar to the ones obtained with our principal measure of external finance, as measured over the 80s. The third alternative measure of external dependence is calculated for a sample of Canadian firms, which RZ note is the only other country for which firm-level flow of funds are available. We



confirm our results concerning financial structure. However, using the Canadian data, our results concerning the law and finance view and the financial services view are weakened. These results might be partly explained by the fact that we have data for only 27 industries in the Canadian sample, whereas there are at least 36 industries in the text specification. Furthermore, the sample size drops from 1222 to 918.

Thus, with some qualifications, the robustness checks confirm the text's main conclusions: (1) industries that are heavily dependent on external finance do not grow faster in bank-based or market-based financial system, (2) externally dependent industries do, however, tend to grow faster in countries with better-developed financial systems and especially in economies that efficiently protect the legal rights of outside investors, and (3) overall financial development and the legal protection of investors facilitate the creation of new establishments and improve the efficiency of capital allocation.

## **6. Conclusions**

This paper examines the bank-based, market-based, financial services, and law and finance theories of financial structure. More specifically, we address the following questions: Do industries that depend heavily on external finance or are R&D-intensive grow faster in bank-based or market-based systems? Are new establishments in these industries more likely to be created in a bank- or market-oriented financial system? Is capital allocated more efficiently in a specific financial structure? Alternatively, is it the overall level of financial development or the legal system that explains industrial growth patterns, the emergence of new establishments, and the allocation of capital across countries?

The results support the financial services and law and finance views. Industries that are heavy users of external finance grow faster in countries with higher overall levels of financial development and in countries with efficient legal systems. Moreover, the findings show that the overall level of financial development along with effective contract enforcement mechanisms foster new establishment formation and more efficient capital allocation. In contrast, we find no support for either the bank-based or the market-based views. Measuring whether a country is bank-based or market-based does not help explain industrial growth patterns or the efficiency of capital allocation. In sum, the results are broadly consistent with the view that distinguishing countries by overall financial development and legal system efficiency is more useful than distinguishing countries by whether they are relatively bank-based or market-based.

Since the results confirm the financial services and law and finance theories, the results send a strong message to policy makers. There is no evidence for using policy tools to tip the playing field in favor of banks or markets. Instead policy maker should focus on legal reforms that foster the development of financial intermediaries *and* markets.

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**Table 1: Country Classification of Financial Structure**

Country	Structure- Aggregate	Country	Restrict	Country	State Ownership	Country	Finance- Aggregate
New Zealand	1.46	Zimbabwe***	14	Canada***	0.00	Japan	1.73
Singapore	1.42	Marocco*	13	Japan***	0.00	Singapore	1.51
South Africa	1.39	Egypt***	13	South Africa*	0.00	USA	1.44
Great Britain	1.38	Israel***	13	Great Britain***	0.00	Netherlands	1.18
Australia	1.18	Japan***	13	USA***	0.00	South Africa	1.08
USA	1.10	Bangladesh*	12	Cyprus**	0.00	Great Britain	0.96
Japan	1.07	Mexico***	12	Trinidad and Tobago**	1.54	Germany	0.95
Canada	1.06	Turkey***	12	Spain***	1.98	Malaysia	0.95
Malaysia	1.05	USA***	12	Ireland**	4.48	Sweden	0.94
Brazil	1.03	Jordan*	11	Netherlands***	9.20	Australia	0.92
Sweden	0.83	Chile***	11	New Zealand***	11.73	Canada	0.92
Israel	0.76	Brazil*	10	Malaysia***	12.20	Korea	0.70
Jordan	0.73	Venezuela*	10	Denmark***	13.12	France	0.69
Belgium	0.63	Colombia***	10	Panama**	17.08	Jordan	0.67
Mexico	0.62	India***	10	Australia***	17.65	Norway	0.59
Korea	0.57	Italy***	10	Singapore*	22.41	Israel	0.53
Netherlands	0.54	Malaysia***	10	Chile***	22.63	Spain	0.49
Zimbabwe	0.40	Pakistan***	10	Sweden***	25.55	Austria	0.43
Peru	0.32	Kenya**	10	Jordan*	26.03	New Zealand	0.38
Denmark	0.07	Korea*	9	Belgium***	27.59	Finland	0.25
Germany	0.02	Nigeria*	9	Zimbabwe***	30.04	Italy	0.13
Philippines	0.00	Belgium***	9	Finland***	30.65	Portugal	0.12
Chile	-0.06	Greece***	9	Philippines***	30.82	Chile	0.08
India	-0.07	Portugal***	9	Peru***	34.56	Denmark	0.07
Norway	-0.11	Sweden***	9	Korea*	35.06	Belgium	-0.15
Finland	-0.30	Trinidad and Tobago**	9	Germany***	36.36	Brazil	-0.32
Spain	-0.30	Singapore*	8	Ecuador**	37.20	Philippines	-0.35
Italy	-0.34	South Africa*	8	Tunisia**	39.12	India	-0.36
France	-0.45	Australia***	8	Brazil*	42.82	Venezuela	-0.41
Colombia	-0.63	Denmark***	8	France***	46.18	Greece	-0.46
Sri Lanka	-0.73	Norway***	8	Kenya**	48.13	Zimbabwe	-0.80
Pakistan	-0.73	Peru***	8	Marocco*	50.45	Pakistan	-0.84
Greece	-0.92	Cyprus**	8	Italy***	50.70	Egypt	-0.93
Venezuela	-0.98	Ireland**	8	Nigeria*	52.20	Colombia	-0.97
Egypt	-1.18	Panama**	8	Turkey***	56.46	Mexico	-1.02
Turkey	-1.19	Canada***	7	Austria***	57.01	Sri Lanka	-1.28
Austria	-1.35	Spain***	7	Portugal***	58.02	Morocco	-1.36
Costa Rica	-1.46	Finland***	7	Norway***	59.22	Turkey	-1.50
Morocco	-1.49	Sri Lanka***	7	Venezuela*	60.67	Peru	-1.50
Portugal	-1.49	Philippines***	7	Colombia***	64.54	Costa Rica	-1.66
Nigeria	-1.52	France***	6	Israel***	64.64	Nigeria	-1.76
Bangladesh	-2.30	Netherlands***	6	Mexico***	67.81	Bangladesh	-2.06
		Austria***	5	Greece***	77.82		
		Germany***	5	Sri Lanka***	85.70		
		Great Britain***	5	Egypt***	89.76		
		New Zealand***	4	India***	90.77		
				Costa Rica*	90.92		
				Pakistan***	91.86		
				Bangladesh*	95.00		

Structure-Aggregate is the first principal component of Structure-Activity [ $\log(\text{Total value traded} / \text{commercial banks claims on the private sector})$ ] and

Structure-Size [ $\log(\text{Market capitalization} / \text{commercial bank claims on the private sector})$ ]

Restrict measures regulations restricting banks from engaging in securities market activities, insurance, real estate transactions, and owning nonfinancial firms. Higher values indicate more regulatory restrictions. Source: Barth, Caprio, and Levine (2001a,b).

State Ownership is the percentage of assets of the ten largest banks owned by the government. Source: La Porta, Lopez-de-Silanes and Shleifer (2001).

Finance-Aggregate is the first principal component of Finance-Activity [ $\log(\text{Total value traded as share of GDP times financial intermediary claims on the private sector as share of GDP})$ ] and Finance-Size [ $\log(\text{Market capitalization plus financial intermediary claims on the private sector as share of GDP})$ ]

The data for Structure-Aggregate and Finance-Aggregate only include data for the industry-country panel regressions (1980-89), while data for Restrict and State Ownership include data for both the industry-country panel regressions and cross-country regressions.

\* included in the industry-country panel regressions

\*\* included in the cross-country regressions

\*\*\* included in both the industry-country panel and the cross-country regressions

**Table 2: Descriptive Statistics and Correlations****Summary Statistics**

	Mean	Median	Standard Deviation	Maximum	Minimum	Observations
Industry Growth	3.34	2.89	9.84	100.00	-44.74	1258
Establishment Growth	1.41	0.83	8.02	94.37	-41.42	1111
External dependence	0.32	0.23	0.41	1.49	-0.45	36
Labor intensity	0.39	0.41	0.11	0.57	0.13	30
R&D intensity	12.75	5.09	14.85	45.40	1.37	10
Industry Elasticity	0.53	0.56	0.27	0.99	0.06	39
Structure-Aggregate	0	0.01	1.00	1.46	-2.30	42
Restrict	9.07	9.00	2.41	14.00	4.00	46
State Ownership	38.52	35.06	29.04	95.00	0.00	49
Finance-Aggregate	0	0.13	1.00	1.73	-2.06	42
Judicial Efficiency	7.87	7.50	1.84	10.00	4.00	41

**Correlations across countries**

	Structure Aggregate	Restrict	State Ownership	Finance Aggregate	Judicial Efficiency	Industry Elasticity
Structure-Aggregate	1					
Restrict	-0.177 (0.268)	1				
State Ownership	-0.730 (0.001)	0.307 (0.051)	1			
Finance-Aggregate	0.712 (0.001)	-0.341 (0.029)	-0.715 (0.001)	1		
Judicial Efficiency	0.517 (0.001)	-0.303 (0.054)	-0.476 (0.002)	0.649 (0.001)	1	
Industry Elasticity	0.290 (0.108)	-0.455 (0.009)	-0.576 (0.001)	0.53 (0.002)	0.496 (0.004)	1

p-values are reported in parentheses

Industry growth is the growth rate in real value added for 1980-90 for each industry in each country. Source: Rajan and Zingales (1998)

Establishment growth is the log difference in the number of establishment between 1990 and 1980 for each industry in each country. Source: Rajan and Zingales (1998)

External dependence is the fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry between 1980-89. Source: Rajan and Zingales (1998)

Labor intensity is wages and salaries paid to employees divided by value added, calculated for a sample of U.S. firms over the period 1980-89, using UNIDO data.

R&D intensity is the share of R&D expenses in value added for U.S. industries over the period 1980-89, using data from the OECD's Main Industrial Indicators database.

Industry elasticity is the elasticity of industry fixed capital formation to value added, computed over the 1963-95 period. Source: Wurgler (2000)

Finance-Aggregate is the first principal component of Finance-Activity [ $\log(\text{Total value traded as share of GDP times financial intermediary claims on the private sector as share of GDP})$ ] and Finance-Size [ $\log(\text{Market capitalization plus financial intermediary claims on the private sector as share of GDP})$ ]

Structure-Aggregate is the first principal component of Structure-Activity [ $\log(\text{Total value traded / commercial banks claims on the private sector})$ ] and Structure-Size [ $\log(\text{Market capitalization / commercial bank claims on the private sector})$ ]

Restrict measures regulations restricting banks from engaging in securities market activities, insurance, real estate transactions, and owning nonfinancial firms. Higher values indicate more regulatory restrictions. Source: Barth, Caprio, and Levine (2001a,b).

State Ownership is the percentage of assets of the ten largest banks owned by the government. Source: La Porta, Lopez-de-Silanes and Shleifer (2001).

Judicial Efficiency is a measure of the efficiency of the legal system. Source: La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998)

**Table 3: Financial Development, Bank- vs. Market-Based Systems, and Industry Performance**

<u>A. Cross-country, Cross-Industry</u>						<u>B. Cross-Country</u>				
<u>External dependence</u>			<u>Labor intensity</u>			<u>R&amp;D intensity</u>			<u>Industry Elasticity</u>	
Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Elasticity <sup>3</sup>	
Interaction (external dependence x Structure-Aggregate)	-2.595 (0.116)	0.011 (0.992)	Interaction (labor intensity x Structure-Aggregate)	-7.133 (0.243)	-1.946 (0.711)	Interaction (R&D intensity x Structure-Aggregate)	-0.138 (0.297)	-0.059 (0.566)	Structure-Aggregate	0.003 (0.948)
Interaction (external dependence x Finance-Aggregate)	4.302 (0.002)	2.753 (0.009)	Interaction (labor intensity x Finance-Aggregate)	1.568 (0.787)	2.944 (0.579)	Interaction (R&D intensity x Finance-Aggregate)	0.146 (0.208)	0.117 (0.182)	Finance-Aggregate	0.159 (0.007)
Observations	1222	1082	Observations	990	884	Observations	329	298	Observations	39

The p-values for heteroskedasticity robust standard errors are in parentheses.

1. Dependent variable equals the growth rate in real value added for 1980-90 for each industry in each country. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

2. Dependent variable equals the log difference in the number of establishment between 1990 and 1980. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

3. Dependent variable is the elasticity of industry fixed capital formation to value added, computed over the 1963-95 period. Source: Wurgler (2000)

Finance-Aggregate is the first principal component of Finance-Activity [ $\log(\text{Total value traded as share of GDP times financial intermediary claims on the private sector as share of GDP})$ ] and Finance-Size [ $\log(\text{Market capitalization plus financial intermediary claims on the private sector as share of GDP})$ ]

Structure-Aggregate is the first principal component of Structure-Activity [ $\log(\text{Total value traded / commercial banks claims on the private sector})$ ] and Structure-Size [ $\log(\text{Market capitalization / commercial bank claims on the private sector})$ ]

External dependence is the fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry between 1980-89. Source: Rajan and Zingales (1998)

Labor intensity is wages and salaries paid to employees divided by value added, calculated for a sample of U.S. firms over the period 1980-89, using UNIDO data.

R&D intensity is the share of R&D expenses in value added for U.S. industries over the period 1980-89, using data from the OECD's Main Industrial Indicators database.



**Table 4: Financial Development, the Power of Banks, and Industry Performance**

<u>A. Cross-country, Cross-Industry</u>						<u>B. Cross-Country</u>				
<u>External dependence</u>			<u>Labor intensity</u>			<u>R&amp;D intensity</u>		<u>Industry Elasticity</u>		
	Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>	Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Elasticity <sup>3</sup>	
Interaction (external dependence x Restrict)	0.170 (0.679)	0.170 (0.508)	Interaction (labor intensity x Restrict)	1.859 (0.269)	-0.315 (0.783)	Interaction (R&D intensity x Restrict)	0.015 (0.525)	0.020 (0.277)	Restrict	-0.032 (0.061)
Interaction (external dependence x Finance-Aggregate)	2.713 (0.053)	3.030 (0.001)	Interaction (labor intensity x Finance-Aggregate)	-0.608 (0.900)	0.932 (0.810)	Interaction (R&D intensity x Finance-Aggregate)	0.060 (0.314)	0.096 (0.030)	Finance-Aggregate	0.134 (0.007)
Observations	1190	1082	Observations	964	884	Observations	322	298	Observations	37

The p-values for heteroskedasticity robust standard errors are in parentheses.

1. Dependent variable equals the growth rate in real value added for 1980-90 for each industry in each country. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

2. Dependent variable equals the log difference in the number of establishment between 1990 and 1980. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

3. Dependent variable is the elasticity of industry fixed capital formation to value added, computed over the 1963-95 period. Source: Wurgler (2000)

Finance-Aggregate is the first principal component of Finance-Activity [ $\log(\text{Total value traded as share of GDP times financial intermediary claims on the private sector as share of GDP})$ ] and Finance-Size [ $\log(\text{Market capitalization plus financial intermediary claims on the private sector as share of GDP})$ ]

Restrict measures regulations restricting banks from engaging in securities market activities, insurance, real estate transactions, and owning nonfinancial firms. Higher values indicate more regulatory restrictions. Source: Barth, Caprio, and Levine (2001a,b).

External dependence is the fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry between 1980-89. Source: Rajan and Zingales (1998)

Labor intensity is wages and salaries paid to employees divided by value added, calculated for a sample of U.S. firms over the period 1980-89, using UNIDO data.

R&D intensity is the share of R&D expenses in value added for U.S. industries over the period 1980-89, using data from the OECD's Main Industrial Indicators database.

**Table 5: Financial Development, Ownership Structure, and Industry Performance**

<u>A. Cross-country, Cross-Industry</u>						<u>B. Cross-Country</u>				
<u>External dependence</u>			<u>Labor intensity</u>			<u>R&amp;D intensity</u>			<u>Industry Elasticity</u>	
	Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Elasticity <sup>3</sup>
Interaction (external dependence x State Ownership)	0.002 (0.980)	0.030 (0.462)	Interaction (labor intensity x State Ownership)	0.370 (0.233)	-0.093 (0.595)	Interaction (R&D intensity x State Ownership)	0.005 (0.271)	0.004 (0.269)	State Ownership	-0.002 (0.327)
Interaction (external dependence x Finance-Aggregate)	2.375 (0.066)	3.290 (0.001)	Interaction (labor intensity x Finance-Aggregate)	3.532 (0.595)	-0.321 (0.945)	Interaction (R&D intensity x Finance-Aggregate)	0.130 (0.196)	0.130 (0.058)	Finance-Aggregate	0.133 (0.032)
Observations	1222	1082	Observations	990	884	Observations	329	298	Observations	39

The p-values for heteroskedasticity robust standard errors are in parentheses.

1. Dependent variable equals the growth rate in real value added for 1980-90 for each industry in each country. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

2. Dependent variable equals the log difference in the number of establishment between 1990 and 1980. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

3. Dependent variable is the elasticity of industry fixed capital formation to value added, computed over the 1963-95 period. Source: Wurgler (2000)

Finance-Aggregate is the first principal component of Finance-Activity [ $\log(\text{Total value traded as share of GDP times financial intermediary claims on the private sector as share of GDP})$ ] and Finance-Size [ $\log(\text{Market capitalization plus financial intermediary claims on the private sector as share of GDP})$ ]

State Ownership is the percentage of assets of the ten largest banks owned by the government. Source: La Porta, Lopez-de-Silanes and Shleifer (2001).

External dependence is the fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry between 1980-89. Source: Rajan and Zingales (1998)

Labor intensity is wages and salaries paid to employees divided by value added, calculated for a sample of U.S. firms over the period 1980-89, using UNIDO data.

R&D intensity is the share of R&D expenses in value added for U.S. industries over the period 1980-89, using data from the OECD's Main Industrial Indicators database.

**Table 6: Financial Structure, External Dependence, the Legal Environment, and Industry Performance**

A. Cross-country, Cross-Industry						B. Cross-Country								
Structure-Aggregate			Restrict			State Ownership			Industry Elasticity					
Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Elasticity <sup>3</sup>	Industry Elasticity <sup>3</sup>		Industry Elasticity <sup>3</sup>	Industry Elasticity <sup>3</sup>	
Interaction (external dependence x Structure-Aggregate)	-1.173 (0.551)	0.096 (0.929)	Interaction (external dependence x Restrict)	-0.021 (0.965)	0.274 (0.310)	Interaction (external dependence x State Ownership)	-0.042 (0.618)	0.009 (0.832)	Structure -Aggregate	0.031 (0.460)	Restrict	-0.031 (0.081)	State Ownership	-0.002 (0.175)
Interaction (external dependence x Judicial Efficiency)	1.265 (0.012)	1.061 (0.006)	Interaction (external dependence x Judicial Efficiency)	0.873 (0.089)	1.295 (0.001)	Interaction (external dependence x Judicial Efficiency)	0.577 (0.325)	1.157 (0.004)	Judicial Efficiency	0.075 (0.001)	Judicial Efficiency	0.068 (0.001)	Judicial Efficiency	0.064 (0.010)
Observations	1190	1082	Observations	1190	1082	Observations	1190	1082	Observations	37	Observations	36	Observations	37

The p-values for heteroskedasticity robust standard errors are in parentheses.

1. Dependent variable equals the growth rate in real value added for 1980-90 for each industry in each country. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)
2. Dependent variable equals the log difference in the number of establishment between 1990 and 1980. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)
3. Dependent variable is the elasticity of industry fixed capital formation to value added, computed over the 1963-95 period. Source: Wurgler (2000)

Structure-Aggregate is the first principal component of Structure-Activity [ $\log(\text{Total value traded} / \text{commercial banks claims on the private sector})$ ] and Structure-Size [ $\log(\text{Market capitalization} / \text{commercial bank claims on the private sector})$ ]

Restrict measures regulations restricting banks from engaging in securities market activities, insurance, real estate transactions, and owning nonfinancial firms. Higher values indicate more regulatory restrictions. Source: Barth, Caprio, and Levine (2001a,b).

State Ownership is the percentage of assets of the 10 largest banks owned by the government. Source: La Porta, Lopez-de-Silanes and Shleifer (2001).

Judicial Efficiency is a measure of the efficiency of the legal system. Source: La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998)

External dependence is the fraction of capital expenditures not financed with internal funds for U.S. firms in the same industry between 1980-89. Source: Rajan and Zingales (1998)

**Table A1: Country Ranking According to Indicators of Financial Intermediary and Stock Market Developm**

Country	Value Traded	Country	Market Capitalization	Country	Private Credit	Country	Bank Credit
Japan	44.23	Singapore	116.59	Japan	150.28	Japan	95.63
USA	27.70	South Africa	116.28	USA	120.63	Germany	82.33
Singapore	26.39	Japan	67.23	Netherlands	115.63	Singapore	78.93
Great Britain	24.28	Great Britain	60.52	Singapore	93.97	Austria	77.95
Germany	15.91	Malaysia	57.99	Sweden	93.83	France	76.28
Korea	14.97	USA	51.43	France	90.69	Portugal	69.76
Netherlands	12.94	Jordan	46.09	Germany	89.84	Netherlands	67.23
Israel	12.51	Canada	41.96	Norway	84.93	USA	65.69
Canada	11.61	New Zealand	40.98	Austria	83.91	Spain	64.21
Australia	10.62	Australia	36.61	Australia	81.23	Finland	57.17
Malaysia	9.71	Netherlands	31.80	Canada	74.75	Jordan	52.87
Sweden	8.46	Sweden	31.10	Malaysia	71.94	Malaysia	52.12
South Africa	5.96	Israel	26.75	Spain	70.40	Great Britain	51.86
Jordan	5.83	Chile	21.62	South Africa	69.85	Italy	49.29
New Zealand	5.49	Belgium	20.69	Portugal	69.76	South Africa	48.12
Brazil	4.75	Denmark	17.31	Korea	66.33	Israel	46.90
France	4.51	Germany	16.73	Jordan	59.31	Chile	45.88
Spain	4.28	Finland	15.13	Finland	57.17	Canada	44.63
Norway	3.70	Korea	15.13	Great Britain	51.86	Denmark	42.52
India	3.13	Spain	13.64	Venezuela	50.34	Norway	42.51
Italy	3.04	France	13.52	Italy	49.29	Korea	42.27
Belgium	2.81	Norway	10.65	Chile	47.81	Sweden	41.84
Mexico	2.71	Italy	10.29	Israel	46.90	Australia	34.85
Denmark	2.57	Brazil	9.36	Greece	45.39	Belgium	27.14
Finland	2.57	Philippines	7.24	Denmark	42.52	Greece	25.68
Austria	2.23	Zimbabwe	7.12	New Zealand	37.92	Venezuela	25.58
Philippines	1.92	Sri Lanka	6.98	Philippines	30.98	Egypt	24.09
Chile	1.44	India	5.21	India	28.30	India	24.01
Portugal	0.99	Venezuela	5.10	Egypt	28.18	Pakistan	23.79
Zimbabwe	0.85	Greece	5.09	Belgium	27.14	Philippines	23.25
Pakistan	0.56	Portugal	4.89	Colombia	25.14	New Zealand	22.10
Peru	0.37	Austria	4.73	Pakistan	23.79	Sri Lanka	18.41
Greece	0.29	Costa Rica	4.41	Brazil	23.57	Costa Rica	16.77
Colombia	0.28	Pakistan	4.36	Morocco	21.01	Morocco	16.29
Venezuela	0.25	Mexico	4.32	Zimbabwe	20.62	Nigeria	14.88
Egypt	0.20	Peru	3.96	Costa Rica	18.58	Turkey	14.19
Turkey	0.17	Egypt	3.77	Sri Lanka	18.41	Bangladesh	13.96
Sri Lanka	0.11	Nigeria	3.63	Nigeria	17.45	Colombia	13.29
Morocco	0.09	Colombia	3.05	Turkey	15.22	Brazil	12.67
Costa Rica	0.02	Morocco	1.89	Bangladesh	13.96	Zimbabwe	11.37
Nigeria	0.02	Turkey	1.74	Mexico	12.21	Mexico	9.66
Bangladesh	0.02	Bangladesh	0.98	Peru	10.97	Peru	6.30

Value Traded is the total value of stocks traded divided by GDP

Market Capitalization is the value of stocks outstanding divided by GDP

Private Credit is claims on private sector by financial intermediaries divided by GDP

Bank Credit is claims on private sector by commercial banks divided by GDP

All data are averages over 1980-89.

**Table A2: Financial Structure, Labor Intensity, the Legal Environment, and Industry Performance**

<u>Cross-country, Cross-Industry</u>								
	<u>Structure-Aggregate</u>			<u>Restrict</u>			<u>State Ownership</u>	
	Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>
Interaction (labor intensity x Structure-Aggregate)	-3.352 (0.579)	6.471 (0.150)	Interaction (labor intensity x Restrict)	1.256 (0.487)	-1.550 (0.186)	Interaction (labor intensity x State Ownership)	0.262 (0.366)	-0.280 (0.141)
Interaction (labor intensity x Judicial Efficiency)	-1.227 (0.556)	-2.827 (0.089)	Interaction (labor intensity x Judicial Efficiency)	-1.499 (0.436)	-1.883 (0.207)	Interaction (labor intensity x Judicial Efficiency)	-0.183 (0.944)	-2.782 (0.138)
Observations	964	884	Observations	964	884	Observations	964	884

The p-values for heteroskedasticity robust standard errors are in parentheses.

1. Dependent variable equals the growth rate in real value added for 1980-90 for each industry in each country. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

2. Dependent variable equals the log difference in the number of establishment between 1990 and 1980. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

Structure-Aggregate is the first principal component of Structure-Activity [ $\log(\text{Total value traded divided by claims on private sector by commercials banks})$ ] and

Structure-Size [ $\log(\text{Market capitalization divided by claims on private sector by commercials banks})$ ]

Restrict measures the degree to which regulations restrict banks from engaging in securities market activities, insurance, real estate transactions, and owning nonfinancial firms. Higher values indicate more regulatory restrictions. Source: Barth, Caprio, and Levine (2001a,b).

State Ownership is the percentage of assets of the 10 largest banks in each country owned by the government. Source: La Porta, Lopez-de-Silanes and Shleifer (2001).

Judicial Efficiency is a measure of the efficiency of the legal system. Source: La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998)

Labor intensity is wages and salaries paid to employees divided by value added, calculated for a sample of U.S. firms over the period 1980-89, using UNIDO data.

**Table A3: Financial Structure, R&D Intensity, the Legal Environment, and Industry Performance**

<u>Cross-country, Cross-Industry</u>								
	<u>Structure-Aggregate</u>			<u>Restrict</u>			<u>State Ownership</u>	
	Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>		Industry Growth <sup>1</sup>	Establishment Growth <sup>2</sup>
Interaction (R&D intensity x Structure-Aggregate)	-0.076 (0.419)	0.061 (0.369)	Interaction (R&D intensity x Restrict)	0.013 (0.615)	0.018 (0.355)	Interaction (R&D intensity x State Ownership)	0.002 (0.484)	0.001 (0.810)
Interaction (R&D intensity x Judicial Efficiency)	0.038 (0.220)	-0.005 (0.826)	Interaction (R&D intensity x Judicial Efficiency)	0.021 (0.468)	0.029 (0.175)	Interaction (R&D intensity x Judicial Efficiency)	0.030 (0.365)	0.020 (0.366)
Observations	322	298	Observations	322	298	Observations	322	298

The p-values for heteroskedasticity robust standard errors are in parentheses.

1. Dependent variable equals the growth rate in real value added for 1980-90 for each industry in each country. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

2. Dependent variable equals the log difference in the number of establishment between 1990 and 1980. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. All regressions are TSLS. We use the British, French and German legal origin dummies and the share of Catholic, Muslim and Protestant population in total population as instruments for financial development and financial structure. Source: Rajan and Zingales (1998)

Structure-Aggregate is the first principal component of Structure-Activity [ $\log(\text{Total value traded divided by claims on private sector by commercials banks})$ ] and

Structure-Size [ $\log(\text{Market capitalization divided by claims on private sector by commercials banks})$ ]

Restrict measures the degree to which regulations restrict banks from engaging in securities market activities, insurance, real estate transactions, and owning nonfinancial firms. Higher values indicate more regulatory restrictions. Source: Barth, Caprio, and Levine (2001a,b).

State Ownership is the percentage of assets of the 10 largest banks in each country owned by the government. Source: La Porta, Lopez-de-Silanes and Shleifer (2001).

Judicial Efficiency is a measure of the efficiency of the legal system. Source: La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998)

R&D intensity is the share of R&D expenses in value added for U.S. industries over the period 1980-89, using data from the OECD's Main Industrial Indicators database.