New Firm Formation and Industry Growth: Does Having a Market- or Bank-Based System Matter?

Thorsten Beck and Ross Levine

Abstract: Are market-based or bank-based financial systems better at financing the expansion of industries that depend heavily on external finance? Are market- or bank-based financial systems better at facilitating the formation of new firms? We find evidence for neither the market-based nor the bank-based hypothesis. We find overwhelming evidence that industries that are heavily dependent on external finance grow faster in economies with a higher level of overall financial development and with better legal protection of outside investors. We also find that overall financial development stimulates the establishment of new firms, which is consistent with the Schumpeterian view of creative destruction. While overall financial development matters, having a bank-based or market-based system per se offers little additional information.

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Keywords: Financial Structure; Economic Growth; External Finance

1. Introduction

An intensive debate focuses on the relative merits of bank-based versus market-based financial systems. Many authors stress the advantages that banks have over markets in financing the expansion of existing firms and in promoting the establishment of new firms. Others, however, emphasize the comparative merits of markets.[1] Historically, empirical research on the relative merits of bank-based versus market-based financial systems 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 broad cross-country dataset with measures of the degree to which countries have bank-based or market-based financial systems.

Using this new data, this is the first paper to examine the following questions:

(1) Do industries that depend heavily on external finance grow faster in bank-based or market-based financial systems?

(2) Are new firms more likely to form in a bank-based or market-based financial system?

Thus, this paper concentrates on specific mechanisms through which financial structure influences economic activity and industrial structure.

This paper empirically assesses the validity of four competing theoretical perspectives regarding bank-based and market-based financial systems in the process of economic development. The *bank-based view* highlights the positive role of banks in providing external

finance and funding new firms. First, a large literature explores the positive role of banks without suggesting that banks have a comparative advantage over markets in providing external finance. Banks may reduce the costs of screening and monitoring firms and managers and thereby improve resource allocation and corporate control [Diamond 1984; Ramakrishnan and Thakor 1984; Boyd and Prescott 1986]. Furthermore, banks frequently establish close, long-term relations with firms and ease cash-flow constraints on existing firm expansion with positive ramifications on economic growth [Hoshi, Kashyap, and Scharfstein 1991]. Similarly, banks are effective in providing external resources to new firms that require staged financing. By forming long-run relationships, banks can credibly commit to making additional funding available as the project develops [Stulz, 2000]. Thus, in arising to mitigate information and transaction costs, banks may promote the expansion of existing firms and the creation of new ones.

The bank-based view, however, not only argues that banks are important for easing the flow of external finance. The bank-based view also critiques the role of markets and emphasizes the comparative merits of banks. First, Stiglitz (1985) argues that well-developed markets quickly reveal new information to all investors. This reduces the incentives for individual investors to expend resources researching firms because any new information they uncover is quickly reflected in stock prices. Thus, market-based systems may hinder incentives for acquiring information. Bank-based systems mitigate this problem since banks establish long-run commitments to firms and reveal less information in public markets [Boot, Greenbaum, and Thakor 1993]. Furthermore, greater market liquidity makes it easier for shareholders to sell their shares and cut their ties to firms. This reduces the incentives for shareholders to expend

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[1] See Allen and Gale (1999), Boot and Thakor (1997), Gerschenkron (1962), Goldsmith (1969), Levine (2000b), Rajan and Zingales (1999), Stiglitz (1985), and Stulz (2000) for discussion and additional references regarding the relative merits of bank- and market-based financial systems in fostering economic performance.

substantial resources exerting corporate control [Shleifer and Vishny, 1986].[2] Thus, greater

market development might hinder external financing and economic growth by reducing the

effectiveness of corporate control. Also, incestuous relationships frequently flourish between

management and boards of directors, which may induce directors and management to collude

again other shareholders [Allen and Gale, 1999]. Thus, market-based systems may be less

effective than bank-based systems in assessing information about firms and managers and

therefore at providing external finance to firms.

The *market-based view* stresses the advantages of markets in funding firms and promoting

new, innovative enterprises. Again, there are two parts to the market-based view: the first part

emphasizes the positive role of markets and the second highlights the comparative advantages of

markets relative to banks. A big and liquid market aggregates views on new technologies and

displays this in public prices. Furthermore, in liquid markets, agents that obtain valuable

information can quickly profit by trading in these markets, which in turn stimulates market

participants to acquire information about firms.[3] Stock markets may also stimulate greater

corporate control by facilitating takeovers and making it easier to tie managers' compensation to

firm performance. Thus, market-based proponents argue that well-functioning markets stimulate

information acquisition and corporate control that in turn spur the growth of new and existing

firms.

Proponents of the market-based view also emphasize the advantages of market-based

systems relative to bank-based ones. First, by acquiring inside information about firms, banks

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[2] Atomistic shareholders also have incentives to capture the benefits from a takeover by holding on to their shares instead of tendering them, thus making takeover attempts less profitable and therefore a less useful control device [Grossman and Hart, 1980]. Also, corporate control through outside takeover threats may face similar limitations because insiders have greater information than outsiders.

[3] Allen and Gale (1999) show that riskier, more innovative industries will tend to find it easier to attract external resources in market-based financial systems. These industries might be the more innovative ones. Allen (1993)

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can extract informational rents from firms [Hellwig, 1991]. The banks' market power reduces

the incentives of firms to undertake profitable projects since banks extract a large share of the

profits [Rajan, 1992]. [4] By encouraging competition, market-based systems create greater

incentives for entrepreneurship than bank-based systems. Second, bankers tend to be ineffective

corporate controllers due to their insider status. In bank-based systems, bankers often hold

equity and vote the shares of other shareholders. Thus, bankers might collude with managers

against other outside investors and thereby thwart competition and hinder effective corporate

control [Hellwig, 1998; Wenger and Kaserer, 1998]. Third, banks – as debt issuers – have an

inherent bias toward conservative investments, so that bank-based systems stymie innovation and

growth. Weinstein and Yafeh (1998) and Morck and Nakamura (1999) find evidence of this in

Japan. Also, in the absence of sound, market price signals, banks might continue financing

established firms with low-return projects [Rajan and Zingales, 1999]. Thus, relative to market-

based systems, bank-based systems may be less likely to funnel external finance to the newest,

most profitable endeavors.

The *financial services view* argues that the bank-based versus market-based debate is of

second-order importance. According to this view, both banks and markets arise to ameliorate

information and transactions costs and thereby provide financial services. In comparing

countries, the first-order issue is the quality and availability of financial services, not whether

banks or markets provide these services. Furthermore, banks and markets might act as

complements in providing financial services and promoting economic development [Boyd and

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argues that market-based economies such as the U.S. have been better in developing new and innovative industries
than bank-based economies, such as Germany or Japan.
[4] Petersen and Rajan (1995), however, present evidence that small businesses in the U.S. are less credit-constrained
in more concentrated banking markets. Cetorelli and Gamberra (2000) find that financially more dependent
industries grow faster in economies with more concentrated banking sectors.

Smith 1998; Huybens and Smith 1999].[5] According to the financial services view, it is not bank-based or market-based systems per se, but rather the overall level of financial development that stimulates the flow of external funds to worthy firms.

The *legal-based view* [LaPorta, Lopez-de-Silanes, Shleifer, and Vishny 1999b] rejects the analytical relevance of the bank-based versus market-based debate altogether. This view instead argues that countries with legal codes that protect outside investors and legal systems that enforce those codes will have financial systems that facilitate external finance. Thus, the legal-based view predicts that the component of overall financial development defined by the legal system critically influences the expansion of existing firms and the formation of new ones.

To evaluate the competing predictions of the bank-based, market-based, financial services, and legal-based views, we use a panel of 42 countries and 36 industries over the 1980s. As in Rajan and Zingales (1998) and Cetorelli and Gamberra (2000), we focus on industries and decompose industrial growth into that part due to the creation of new firms and that part due to the expansion of existing firms. 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. Thus, as a first step, we examine whether externally dependent industries grow faster in market- or bank-based financial systems, or whether it is the overall level of financial development that enhances the growth of externally dependent industries. We also assess whether the legal system plays a critical role in producing a financial system that fosters the growth of externally dependent firms. In a second step, we decompose industry growth into the growth of the number of establishments

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[5] Also, see Stulz (2000) who notes that stock markets offer an exit option for entrepreneurs and therefore decreases banks' market power. Stock markets also enable an entrepreneur who has obtained bank financing to realize profits from a successful project by selling it. The existence of markets increases the return for the entrepreneurs and thus the incentives to undertake risky, innovative projects. Together, banks and markets work to promote growth.

and the growth of the average size of establishments. Thus, we assess whether bank-based or market-based financial systems are better at fostering new firm formation or existing firm expansion, or whether it is the overall level of financial development that is critical for the emergence of new firms and the expansion of existing ones. Moreover, we also examine whether the legal system plays the pivotal role in establishing the financial conditions for both new firm formation and the expansion of old firms.

The results give no support to either the market- or bank-based view. Industries that depend heavily on external finance do not grow faster in either bank-based or market-based financial systems. The results are supportive of the financial-services and the legal-based 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 where legal codes protect the rights of outside investors and where the legal system effectively enforces those codes. We then 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 relationship between the degree to which a country has a bank-based or market-based financial system and the rate of new firm formation or existing firm expansion. In contrast, overall financial development explains cross-country variation in the growth in the number of establishments. Similarly, the legal environment governing financial contracting helps explain cross-country variation in the growth in the number of establishments. Neither overall financial development nor the legal environment, however, is significantly associated with the growth in the average size of establishments. Thus, overall financial development and the legal environment are critically

important for new firm creation, which is consistent with Schumpeter's view of the role of the financial system in fostering creative destruction [King and Levine 1993].

This paper is importantly different from two recent papers on financial structure and economic growth. Levine (2000b) 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 firm creation, existing firm expansion, or external financing, 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 firm creation or existing firm expansion, which are two 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) legal-based views to explain industrial expansion and new firm creation. Section 3 presents the data. Section 4 provides and discusses the empirical results. Section 5 presents sensitivity analyses and section 6 concludes.

2. Methodology

Financial intermediaries and markets help overcome market frictions that drive a wedge between the price of external and internal finance. Lower costs of external finance facilitate firm growth and new firm formation. Therefore, 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.

RZ (1998) find evidence consistent with the hypothesis that industries that rely more heavily on external finance grow faster in countries with a better-developed financial system. They use data on a panel of 42 countries and 36 industries over the 1980s. 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. So financial development improves disproportionately the prospects of young firms in industries that rely heavily on external finance.

Besides confirming the RZ findings with alternative measures of financial development and alternative instruments to deal with endogeneity, this paper explores whether industries with a high need of external finance grow faster in economies with bank- or market-based financial systems. Furthermore, we assess the financial services and legal-based views. Specifically, we study whether (1) the overall level of financial development and (2) the legal codes and enforcement mechanisms governing financial transactions importantly determine industrial growth patterns. Following RZ, we then decompose industry growth into the growth in the average size of establishments and the growth in the numbers of establishments to evaluate the importance of the degree to which financial systems are bank-based or market-based, financial development and its legal determinants for the sources of growth. For conciseness, we use the term "financial structure" to refer to the degree to which a country's financial system is bank-based or market based. We define our indicators of financial structure in such a way that higher values imply a more market-based system.

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

$$Growth_{i,k} = \sum_{j} \alpha_j Country_j + \sum_{l} \beta_l Industry_l + \gamma Share_{i,k} + \delta_1 (External_k * FD_i) + \delta_2 (External_k * FS_i) + \varepsilon_{i,k},$$

where $Growth_{i,k}$ is the average annual growth rate of value added, the growth in number of firms

or the growth in average size of firms, in industry k and country i. *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,

i.e., an index of financial structure (*FS*).[6] 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; we expect

industries with a large share to grow more slowly, and therefore a negative sign on γ.[7]

The different hypotheses imply different predictions about the sign and significance of δ_1

and δ_2. The *market-based view* predicts that industries that are dependent on external finance

grow faster in economies with market-oriented financial systems and higher levels of financial

development, thus implying $\delta_1 > 0$ and $\delta_2 > 0$. The *bank-based view* predicts that industries that are

dependent on external finance grow faster in economies with bank-oriented financial systems

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[6] We do not include Financial Development or Financial Structure on their own, since we focus on within-country, across-industry growth rates.

[7] This 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, across-industry growth rates. As in RZ, γ enters significantly negative in most regressions.

and higher levels of financial development, thus implying $\delta_1 > 0$ and $\delta_2 < 0$. The *financial-services view* predicts that industries dependent on external finance grow faster in economies with a higher level of overall financial development, whereas the financial structure should not matter, thus implying $\delta_1 > 0$ and $\delta_2 = 0$. The *legal-based view* predicts that industries dependent on external finance grow faster in economies that protect the rights of outside investors more efficiently, whereas financial structure should not matter. If we replace FD_i with indicators of these legal rights and contract enforcement, this implies $\delta_1 > 0$ and $\delta_2 = 0$.

We run both Ordinary-Least-Squares (OLS) regressions and Two-Stage-Least-Squares (TSLS) regressions. TSLS regressions allow us to address the issue of endogeneity of independent variables. Specifically, we want to control for the possible endogeneity of the level and the structure of financial development. Whereas the above equation suggests that an exogenously given level or structure of financial sector activity might interact with the external dependence of industries to determine industry growth rates, financial markets and institutions might have arisen due to a given industrial structure.

By using appropriate instruments we can 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, LaPorta, 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. LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (1999a) also show that the dominant religion of a country influences institutional development.

3. The Data

This section describes the measure of external dependence, the indicators of financial development and structure and the industrial growth data. The data are for 42 countries and 36 industries. All industries are in manufacturing as in RZ.

3.1. External Dependence

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, 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 discussed 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. Table 1 lists the external dependence for all 36 industries. The drug industry is the

industry most dependent on external finance, whereas the tobacco industry has no demand for

external finance, i.e. our dependence measure is less than zero. Table 1 also lists three

alternative measures of external dependence that we will discuss in the section on robustness

tests.

3.2. Indicators of Financial Development and Structure

3.2.1 Indicators of Financial Development

To test our hypotheses, we need appropriate indicators of the efficiency with which financial intermediaries and markets reveal information and exert corporate control, and therefore channel external resources to industries that need them most. While the perfect indicators certainly do not exist, the recent literature has developed indicators that proxy relatively well for financial intermediary and stock market development across countries. We use newly constructed data in Beck, Demirgüç -Kunt, and Levine (2000) and Levine, Loayza, and Beck (2000) to measure overall financial development. We also construct new measures of financial development, isolating private financial intermediaries, and discuss these results in the sensitivity section below.

Finance-Activity is a measure of the overall activity of the financial intermediaries and markets. It is defined as 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 is the most comprehensive indicator of the activity of financial intermediaries by including both bank and nonbank intermediaries. Recent work shows that Private Credit exerts a large, positive, robust influence on economic growth [Levine, Loayza, and Beck 2000; and Beck, Levine, and Loayza 2000]. Value Traded measures the activity of the stock market trading volume as a share of national output and thus indicates the degree of liquidity that stock markets provide to economic agents. [8]

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[8] 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 relationship 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, across-industry growth rates. If markets anticipate higher growth in one industry, the resulting larger value of Value Traded

Finance-Size is a measure of the overall size of the financial sector and is defined as the log of the sum of Private Credit and Market Capitalization. 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. While we include this in our analysis, past work suggests that market capitalization is not a very good predictor of economic performance (Levine and Zervos 1998).

Finance-Aggregate combines the previous two measures and is thus a conglomerate indicator of the size and activity of the financial sector. Specifically, it is the first principal component of *Finance-Activity* and *Finance-Size*.

Finance-Dummy isolates countries that have both underdeveloped financial intermediaries and markets. Specifically, it equals zero if both Private Credit and Value Traded are less than the sample mean and one otherwise.

3.2.2 Indicators of Financial Structure

We also construct measures of the degree to which each country has a market- or bank-based financial system. Since there is not a single accepted definition of financial structure, we use an assortment of different measures to test the robustness of our results. We present the results on four measures of financial structure. Each of these measures is constructed so that higher values indicate more market-based financial systems. Table A2 presents the ranking of countries for the financial structure measures. Demirgüç-Kunt and Levine (1999) examine the relationship between financial structure and a variety of economic, legal and regulatory variables. Along with many findings, they note that higher income countries tend to have more market-oriented financial systems.

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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.

Structure-Activity indicates the activity of stock markets relative to the activity of banks and is defined as the log of the ratio of Value Traded and Bank Credit. Bank Credit equals the claims of the banking sector on the private sector as a share of GDP. Compared to Private Credit, we exclude claims of nonbank financial intermediaries to thus focus on the commercial banking sector.

Structure-Size indicates the size of stock markets relative to the size of the banking sector and is defined as the log of the ratio of Market Capitalization and Bank Credit.

Structure-Aggregate combines the previous two measures and is thus a conglomerate indicator of the size and activity of stock markets relative to banks. Specifically, it is the first principal component of *Structure-Activity* and *Structure-Size*.

Structure-Dummy is a simple bivariate classification of market- versus bank-based financial systems. Specifically, it equals one if Structure-Aggregate is greater than the sample median and zero otherwise. An economy can be classified as market-based or bank-based only relative to the other countries in the sample, since there is no absolute measure of market- or bank-based financial systems.

These are the most comprehensive measures of financial structure that have been constructed to date. Although they do not directly measure the degree to which banks influence industrial expansion and new firm formation or the ability of markets to stimulate the flow of external finance, the measures – when taken together – provide a measure of the comparative role of banks and markets in the economy. Furthermore, the underlying measures of bank development and stock market liquidity exert a strong influence on economic growth.[9] Thus, in terms of economic growth, the basic measures of bank development and stock market liquidity

are useful measures. Furthermore, Demirgüç -Kunt and Levine (1999) show that countries with strong shareholder rights and high accounting standards tend to have more market-based financial systems. Thus, key legal and regulatory differences match-up with the measures of financial structure that we use to assess the relationship between industrial performance and degree to which countries are bank-based or market-based.

3.2.3 The Legal Environment

We use three indicators of the rights of outside investors and the degree to which these rights are enforced. These data are from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998).

Creditor is an index of the degree to which the legal codes of the country protect the claims of secured creditors in the case of reorganization or liquidation of a company. It ranges from zero to four and is the sum of four dummy variables that indicate whether (i) the reorganization procedure does not impose an automatic stay on assets, thereby not preventing secured creditors from taking possession of loan collateral, (ii) secured creditors are ranked first in the case of liquidation, (iii) management does not stay in charge of the firm during reorganization, thereby enhancing creditors' power, and (iv) management needs creditors' consent when filing for reorganization. In economies with higher values of Creditor, outside investors have more rights relative to the management and other stakeholders, and should therefore be more willing to provide the external resources that industries need.

Anti-Director is an index of the degree to which the legal codes of the country protect minority shareholder rights. It ranges from zero to six and is the sum of six dummy variables that indicate whether (i) shareholders are allowed to mail their proxy vote to the firm, (ii) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting,

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[9] For evidence on the impact of financial intermediation on growth, see, for example, Levine, Loayza, and Beck (2000). For evidence on the impact of stock markets on growth, see Levine and Zervos (1998) and Rousseau and

(iii) cumulative voting or proportional representation of minorities on the board of directors is allowed, (iv) an oppressed minority mechanism is in place, (v) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent, and (vi) shareholders have preemptive rights that can only be waived by a shareholders' vote. In economies with higher values of Anti-Director, minority shareholder are better protected against expropriation by management and large shareholders and should therefore be more willing to provide the external resources that industries need.[10]

Rule of Law is an assessment of the law and order tradition of a country that ranges from 10, strong law and order tradition, to 1, weak law and order tradition. This measure was constructed by ICRG and is an average over the period 1982-1990. In countries with a higher law and order tradition, outside investors can more easily enforce their claims and rights and should therefore be more willing to provide external finance.

Table 2 provides descriptive statistics and the correlations for our measures of financial development and structure. There is a large variance in the measures of both financial development and structure. Japan shows the highest value for Finance-Activity and Bangladesh the lowest. Structure-Activity classifies Great Britain as the most market-based system and Bangladesh as the most bank-based system. We also note that most indicators of financial development are positively correlated with the indicators of financial structure, i.e. financially more developed economies tend to have market-based systems. Table A1 lists all measures of financial development, structure and the legal indicators for the countries included in our study.

Wachtel (2000).
[10] Instead of using the sum of the different creditor and minority shareholder rights, we also used principal component indicators, and obtained the same results.

3.3. Industry Growth Rates

Our dependent variable is the average annual growth rate of value added. We use the data

obtained by RZ from the *Industrial Statistics Yearbook* database put together by the United

Nations Statistical Division (1993). We also use a decomposition of the industry growth rate.

Specifically, we consider the growth in the number of establishments and the average size of

establishments. [11]

Table 3 lists descriptive statistics and correlations between the three different dependent

variables. We note that the growth rate in the number of establishments is negatively correlated

with the growth rate in the average size of firms. This suggests that industries grow either due to

the entry of new firms or due to the expansion of existing firms, but not both.

4. The Results

4.1 Financial Development and Industry Growth

We first present the results of regressions of industry growth rates on the interaction of

financial development and external dependence. Our regressions differ from those presented by

RZ to the extent that (i) our measures of financial development capture both the effects of

financial intermediary and stock market development, and (ii) we include the indicators of

financial sector development in logs instead of levels to allow for the nonlinearity in the

relationship between financial development and growth illustrated by Levine, Loayza, and Beck

(2000). To make our results comparable to those in RZ, we include the "Differential in real

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[11] There are no cross-country data available on firms. An establishment is defined as a "unit which 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 (average size of establishment) is defined as the log difference of the number of

growth rate". This indicates how much faster the industry at the 75th percentile of external dependence (Machinery) would have grown compared to the industry at the 25th percentile (Beverages), if Machinery had been located in the country at the 75th percentile of the respective measure of financial development instead of the country at the 25th percentile. Since U.S data are used to calculate our measure of external dependence, the U.S. is dropped from all regressions.

The results in Table 4 indicate a significantly positive interaction of external dependence and overall financial development on industry growth. The coefficients on the interaction terms of all our indicators of financial sector development and external dependence are significantly positive at the five- percent level. We start with the top panel and *Finance-Activity*. The results of the OLS regressions indicate that, for a given industry with a positive external dependence ratio, a higher level of *Finance-Activity* results in a higher growth rate of this industry. To illustrate the significance of this result, consider the growth differential of 2.3 percent. The coefficient estimate thus predicts that Machinery would grow 2.3 percentage points faster than Beverages, if it were located in Malaysia rather than to Greece.[12] The results in columns 2 through 4 indicate that this result is robust to the use of other measures of financial sector development.

The results of the instrumental variable regressions confirm that the link between external dependence, financial development and industry growth is not due to simultaneity bias or reverse causality (Table 4, bottom panel). We report the regression results using TSLS and the legal origin dummies as instruments for financial sector development. The interaction terms with all

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establishments (value added in the industry divided by number of establishments) at the beginning and the end of the period.
[12] The growth differential is calculated as follows: 1.553*0.368 (External dependence of machinery minus external dependence of beverages)*3.962(Finance-Activity in Malaysia minus Finance-Activity in Greece).

three indicators of financial development show coefficients that are significant at the ten percent level. The coefficients, however, are of smaller size than in the OLS regressions.[13] The growth differentials of the TSLS regressions are also more in line with the results obtained by RZ. These results therefore indicate that better-developed financial intermediaries and markets ameliorate market frictions and thereby promote the growth of industries that rely more heavily on external finance.

4.2 Financial Structure and Industry Growth

Thus far, the results confirm those in RZ. Industries that depend heavily on external finance grow faster in economies with higher levels of financial development. We will now turn to the question of whether a specific structure of the financial system – bank-based or market-based -- enhances growth of these industries.

The results in Table 5 indicate that the financial structure does not have an independent impact on industrial growth patterns across countries. Although the interaction terms with all measures of financial structure show coefficients that are significant at the five- percent level in the OLS regressions, these results are not confirmed by the instrumental variable regressions.

The results in Table 6 support the financial services view and reject the bank-based and market-based views. Specifically, we find that when controlling for the level of financial development, the interaction of external dependence and financial structure does not have a significant impact on industrial growth patterns across countries.[14] Whereas the interaction terms with all indicators of financial development are significant at the five- percent level, none of the interaction terms with our financial structure measure is significant. These results indicate

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[13] Since *Finance-Dummy* is a binary variable and because of the findings reported below, we do not attempt to instrument for *Finance-Dummy* using a probit regression in the first stage.
[14] In the following we will only present the TSLS results. The OLS regressions yield similar results.

strong evidence in favor of the financial services view and against both the bank-based and market-based view.[15]

The results in Table 7 provide support for the legal-based approach. To evaluate the legal-based approach we replace our indicators of financial development with *Creditor*, *Anti-director* and *Rule of Law*.[16] To test for the joint significance of these legal variables, we include an F-test of the three interaction terms. While none of the interaction terms of our financial structure variables is significant, the interaction terms of the three legal variables are jointly significant. The p-values for the individual interaction terms indicate that it is especially the enforcement of investor rights that explains industrial growth patterns across countries.

4.3 Financial Structure and the Sources of Industry Growth

We now decompose the industry growth rates into two components: the growth in the number of establishments and the growth in the average size of establishments. The creation of new establishments is more likely to depend on external funds than the expansion of existing establishments, which can be financed with internal resources. The decomposition of industry growth therefore provides both a robustness test of the previous results and a more detailed exploration of the mechanisms through which financial development and financial structure influence industrial growth patterns across countries.

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[15] While Levine and Zervos (1998) find evidence that stock markets and banks enhance economic growth through different channels, Levine (2000b) and this paper test the hypothesis that the composition of the financial sector matters for economic growth. These two questions are complementary and not conflicting. For instance, if we had found a statistically significant parameter on financial structure, δ_2 (significantly positive or negative), this would not have invalidated the results obtained by Levine and Zervos (1998). This results would have indicated that market-based systems (or bank-based systems) are more conducive to the growth of financially dependent industries and the emergence of new firms. This result, however, would not necessarily imply that banks (or markets) do not have a positive impact on economic growth.

Again, the results in Table 8 support the financial services view and contradict both the bank-based and market-based views. The results indicate that overall financial development increases the growth in the number of establishments in industries that are dependent on external finance. However, distinguishing by whether a country is bank-based or market-based does not help explain the emergence of new establishments. The results in Table 9 indicate that neither financial development nor structure helps explain the growth rate of the average size of establishments across countries.[17] This is consistent with findings by RZ that firms depend on external finance during their early years and less during later years.

Table 10 provides evidence consistent with the legal-based view. The legal determinants of financial development can explain industry patterns in the growth in the number of establishments, but not in the growth in the average size of establishments across countries. The interaction terms with financial structure are again insignificant.

In sum, these results indicate that the overall level of financial development and its legal determinants help externally dependent industries grow faster by enabling the start-up of new firms and not through the expansion of existing ones. This is consistent with the Schumpeterian view that financial development enhances economic growth by allowing new firms and projects to develop. These results are also consistent with previous studies that show that financial development enhances economic growth through a better resource allocation and not through capital accumulation [Beck, Levine, and Loayza, 2000].

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[16] Alternatively, we could use these legal indicators as instruments to thus extract the exogenous component of financial development explained by these legal rights and their enforcement. The results are similar to the ones reported here.

[17] The results concerning financial development are consistent with the results obtained by Rajan and Zingales (1998).

5. Robustness Tests[18]

This section assesses the robustness of the results to alternative measures of financial structure, financial development, and external dependence. First, recognizing that there is not a universally accepted definition of bank-based versus market-based, we decided to isolate those countries with extremely bank-based or market-based systems. Perhaps, very "unbalanced" financial systems are robustly linked with industrial performance, even though continuous measures used thus far are not. We construct three additional variables. *Unbalanced-Bank* equals one if Bank Credit is greater than the sample median and Value Traded is less than the sample median, and zero otherwise.[19] *Unbalanced-Market* equals one if Value Traded is greater than the sample median and Bank Credit less than the sample median, and zero otherwise.[20] Finally, *Unbalanced* equals one if either *Unbalanced Bank* or *Unbalanced Market* equals one, and zero otherwise. The results indicate that classifying countries as having unbalanced financial systems does not help explain industrial growth patterns across countries.

To assess further the robustness of our results, we also constructed measures of financial development and structure that only include the assets privately-owned banks and therefore exclude the assets of state-owned banks. Our findings are robust to the use of credit to the private sector by *privately-owned* financial institutions. Using recently compiled data by La Porta, Lopez-de-Silanes and Shleifer (2000) on the public share in the commercial 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

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[18] These results are available on request in Appendix B.
[19] Austria, Chile, Denmark, Finland, and Portugal are classified as having unbalanced bank-based systems.
[20] Australia, Brazil, India, New Zealand and Sweden are classified as having unbalanced market-based systems.

intermediaries.[21] We then recalculate all our indicators of overall financial development and financial structure using these measures to check the robustness of our previous findings.[22] These new measures confirm our earlier findings: Neither bank- nor market-based systems have a robust link with the growth patterns of externally dependent industries, new firm creation, or existing firm expansion. The results strongly support the legal-based view. In sum, these additional measures of financial development and structure do not alter the paper's findings.

We also use two 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 *Anti-Director*.[23] 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 *Creditor*. 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 with both residual series in our regressions. A positive coefficient on either interaction term would indicate that externally dependent industries grow faster in countries in which the stock market or banks are larger than predicted by the legal or macroeconomic environment. These alternative measures of financial structure do enter significantly and therefore provide additional support for the legal-based view.

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[21] Specifically, we multiply the measures discussed above by one minus the share of publicly owned commercial banks. We use the average of the government ownership in 1995 and pre-privatization. Both measures are constructed as the percentage of assets of the 10 largest banks in each country owned by the government divided by the total assets of the banking sector. See La Porta, Lopez-de-Silanes, and Shleifer (2000) for details. The correlations between our two new measures and the original ones are 88% and 92%, respectively.

[22] Although the public share refers only to commercial banks, we assume that the nonbank financial sector presents a similar ownership structure for each country.

[23] Boyd, Levine, and Smith (2000) show that inflation tends to reduce stock market liquidity and banking sector activity.

The RZ data set contains three alternative measures of external dependence that allow us to test the sensitivity of our results. The three alternative measures of external dependence are significantly correlated with our principal measure of external dependence at the one-percent level, with correlation coefficients being at least 60%. We first use the dependence on external finance of firms that went public during the previous ten years. 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. Using the external dependence of young firms does not alter our main result: financial structure does not robustly explain industrial growth patterns, new firm formation, or old firm expansion. When using young firms to define external dependence, there are some specifications in which overall financial development enters insignificantly. However, using the external dependence of young firms lends particularly strong support to the legal-based view of finance and growth.

Our results are also robust to using a measure of external dependence that is calculated for the period 1970-79. RZ suggest that if countries other than the U.S. use older technologies, the external dependence as measured over the 80s might not reflect well the needs for external finance in other countries, especially developing countries. We therefore rerun the regressions using the external dependence measured over the 70s. Since the U.S. was also "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. There is not a robust link between financial

structure and industrial growth patterns, but overall financial development and the component of overall financial development explained by the legal environment help explain industrial growth patterns, especially the formation of new firms.

Finally, our previous results concerning financial development and financial structure are not due to peculiar characteristics of industries in the U.S. We use the external dependence as 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, we cannot confirm the results concerning the legal-based view and the results on 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 702. 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 project the legal rights of outside investors, and (3) overall financial development and the legal protection of investors stimulates industry growth primarily by facilitating new firm formation.

6. Conclusions

This paper examined the following questions: Do industries that depend heavily on external finance grow faster in bank-based or market-based systems? Are new firms more likely to form in a bank-based or market-based financial system? Alternatively, is it the overall level of

financial development or the legal system that explains industrial growth patterns and the emergence of new firms across countries?

The results do not provide support for either the bank-based or the market-based view. Measuring whether a country is bank-based or market-based does not help explain industrial growth patterns. The results do indicate, however, that industries that are heavy users of external finance grow faster in countries with higher overall levels of financial development and in countries that rigorously protect the rights of outside investors. Moreover, the findings show that the overall level of financial development along with strong creditor rights, shareholder rights, and contract enforcement mechanisms foster new firm formation. Together, these findings provide support for the financial-services and legal-based views.

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Table 1: Measures of External Dependence Across Industries

ISIC code	Industrial Sector	All U.S. companies, 80s	Young U.S. companies, 80s	All U.S. companies, 70s	Canadian companies, 80s
314	Tobacco	-0.45		-0.13	-0.59
361	Pottery	-0.15	-0.41	-0.45	
323	Leather	-0.14	-1.53	-0.04	
3211	Spinning	-0.09		0.05	
324	Footwear	-0.08	0.65	-0.26	
372	Nonferrous metal	0.01	0.46	0.19	-0.09
322	Apparel	0.03	0.27	0.03	
353	Petroleum refineries	0.04	0.85	0.06	-0.01
369	Nonmetal mineral products	0.06	-0.03	0.09	-0.12
313	Beverages	0.08	0.63	-0.06	0.59
371	Iron and steel	0.09	0.26	-0.01	0.22
311	Food products	0.14	0.66	0.06	0.11
3411	Pulp, paper	0.15	0.22	0.08	0.15
3513	Synthetic resins	0.16	0.79	0.03	-0.24
341	Paper and paper products	0.18	0.57	-0.01	-0.15
342	Printing and publishing	0.20	0.60	-0.01	0.38
352	Other chemicals	0.22	1.35	-0.07	-0.80
355	Rubber products	0.23	0.50	0.07	
332	Furniture	0.24	0.68	0.16	
381	Metal products	0.24	0.87	0.17	0.61
3511	Basic industrial goods excl. fertilizers	0.25	0.79	0.21	0.38
331	Wood products	0.28	0.34	0.28	0.30
384	Transportation equipment	0.31	0.58	0.23	0.79
354	Petroleum and coal products	0.33	-0.26	-0.21	
3843	Motor vehicles	0.39	0.76	0.13	0.29
321	Textile	0.40	0.66	-0.04	0.57
382	Machinery	0.45	0.75	0.16	0.34
3841	Ships	0.46	1.05	0.15	
390	Other industries	0.47	0.80	0.12	0.69
362	Glass	0.53	1.52	0.07	0.56
383	Electric machinery	0.77	1.22	0.26	0.75
385	Professional and scientific goods	0.96	1.63	0.40	0.51
3832	Radios	1.04	1.35	0.41	1.09
3825	Office and computing products	1.06	1.16	0.54	1.19
356	Plastic products	1.14	1.14		0.48
3522	Drugs	1.49	2.06	0.09	3.51

External dependence is defined as capital expenditures (Compustat # 128) minus cash flow
from operations divided by capital expenditures. Cash flow from operations is broadly defined
as the sum of Compustat funds from operations(items # 110), decreases in inventories,
decreases in receivables, and increases in payables.

Source: Rajan and Zingales (1998)

Table 2: Financial Development and Structure Across Countries

Summary Statistics

	Finance-Activity	Finance-Size	Finance-Aggregate	Finance-Dummy	Structure-Activity	Structure-Size	Structure-Aggregate	Structure-Dummy
Mean	4.41	4.07	0.00	0.40	-2.84	-0.99	0.00	0.50
Median	4.85	4.26	0.13	0.00	-2.55	-1.00	0.01	0.50
Standard Deviation	2.62	0.77	1.00	0.50	1.67	0.89	1.00	0.51
Maximum	8.80	5.38	1.73	1.00	-0.76	0.88	1.46	1.00
Minimum	-1.45	2.70	-2.06	0.00	-6.73	-2.80	-2.30	0.00
Observations	42	42	42	42	42	42	42	42

Correlations

	Finance-Activity	Finance-Size	Finance-Aggregate	Finance-Dummy	Structure-Activity	Structure-Size	Structure-Aggregate	Structure-Dummy
Finance-Activity	1							
Finance-Size	0.90	1						
	(0.001)							
Finance-Aggregate	0.97	0.97	1					
	(0.001)	(0.001)						
Finance-Dummy	0.71	0.70	0.72	1				
	(0.001)	(0.001)	(0.001)					
Structure-Activity	0.89	0.65	0.79	0.50	1			
	(0.001)	(0.001)	(0.001)	(0.001)				
Structure-Size	0.52	0.48	0.51	0.14	0.67	1		
	(0.001)	(0.001)	(0.001)	(0.386)	(0.001)			
Structure-Aggregate	0.77	0.61	0.71	0.35	0.91	0.91	1	
	(0.001)	(0.001)	(0.001)	(0.024)	(0.001)	(0.001)		
Structure-Dummy	0.60	0.45	0.54	0.34	0.76	0.79	0.85	1
	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	

p-values are reported in parentheses

Finance-Activity = log(Total value traded as share of GDP * Claims on private sector by financial institutions as share of GDP)

Finance-Size = log(Market capitalization and claims on private sector by financial institutions as share of GDP)

Finance-Aggregate = First principal component of Finance-Activity and Finance-Size

Finance-Dummy = Dummy variable that takes the value 0 if total value traded as share of GDP and claims on private sector by financial intermediaries as share of GDP are less than the respective

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)

Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)

Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Structure-Dummy = Dummy variable that takes the value 1 if Structure-Aggregate is above the median, 0 otherwise

Table 3: Industry Growth Across Countries

Summary Statistics

	Industry's real growth	Industry's growth in number of firms	Industry's growth in average size of firms
Mean	3.34	1.41	2.16
Median	2.89	0.83	2.57
Standard Deviation	9.84	8.02	9.88
Maximum	100.00	94.37	41.03
Minimum	-44.74	-41.42	-93.06
Observations	1258	1111	1051

Correlations

	Industry's real growth	Industry's growth in number of firms	Industry's growth in average size of firms
Industry's real growth	1		
Industry's growth in number of firms	0.38 (0.001)	1	
Industry's growth in average size of firms	0.71 (0.001)	-0.42 (0.001)	1

Industry's real growth = annual compounded growth rate in real value added for 1980-90.

Industry's growth in number of firms = log-difference between number of establishments in 1990 and 1980

Industry's growth in average size of firms = log-difference between industry's value added divided by number of establishments in 1990 and 1980

Table 4: Financial Development and Industry Growth

OLS Regressions

	Finance-Activity	Finance-Size	Finance-Aggregate	Finance-Dummy
Interaction (external dependence x Finance-Activity)	1.553 (0.001)			
Interaction (external dependence x Finance-Size)		4.431 (0.001)		
Interaction (external dependence x Finance-Aggregate)			3.866 (0.001)	
Interaction (external dependence x Finance-Dummy)				4.499 (0.001)
R^2	0.281	0.275	0.279	0.266
Number of observations	1222	1222	1222	1222
Differential in real growth rate	2.265	2.169	2.506	1.656

TSLS Regressions

	Finance-Activity	Finance-Size	Finance-Aggregate
Interaction (external dependence x Finance-Activity)	0.790 (0.048)		
Interaction (external dependence x Finance-Size)		2.816 (0.057)	
Interaction (external dependence x Finance-Aggregate)			2.075 (0.052)
Number of observations	1222	1222	1222
Differential in real growth rate	1.152	1.378	1.345

The dependent variable is the annual compounded growth rate in real value added for 1980-90 for each industry in each country. The p-values for heteroskedasticity robust standard errors are reported in parentheses. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. The differential in real growth rate indicates how much faster an industry at the 75th percentile of external dependence grows with respect to an industry at the 25th percentile level in a country at the 75th percentile of the respective measure of financial development compared to a country at the 25th percentile. We use the British, French and German legal origin dummies as instruments for financial development in the TSLS regressions.

Finance-Activity = log(Total value traded as share of GDP * Claims on private sector by financial institutions as share of GDP)
Finance-Size = log(Market capitalization and claims on private sector by financial institutions as share of GDP)
Finance-Aggregate = First principal component of Finance-Activity and Finance-Size
Finance-Dummy = Dummy variable that takes the value 0 if total value traded as share of GDP and claims on private sector by financial intermediaries as share of GDP are less than the respective sample mean, 1 otherwise

Table 5: Financial Structure and Industry Growth

OLS Regressions

	Structure-Activity	Structure-Size	Structure-Aggregate	Structure-Dummy
Interaction (external dependence x Structure-Activity)	2.251 (0.001)			
Interaction (external dependence x Structure-Size)		2.618 (0.008)		
Interaction (external dependence x Structure-Aggregate)			3.365 (0.001)	
Interaction (external dependence x Structure-Dummy)				4.842 (0.001)
R^2	0.278	0.266	0.274	0.267
Number of observations	1222	1222	1222	1222

TSLS Regressions

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	0.987 (0.284)		
Interaction (external dependence x Structure-Size)		-2.167 (0.325)	
Interaction (external dependence x Structure-Aggregate)			-0.380 (0.855)
Number of observations	1222	1222	1222

The dependent variable is the annual compounded growth rate in real value added for 1980-90 for each industry in each country. The p-values for heteroskedasticity robust standard errors are reported in parentheses. All regressions also include the industry's share of total value added in manufacturing in 1980 and country and industry dummies. We use the British, French and German legal origin dummies as instruments for financial structure in the TSLS regressions.

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)
Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)
Structure-Aggregate = First principal components of Structure-Activity and Structure-Size
Structure-Dummy = Dummy variable that takes the value 1 if Structure-Aggregate is above the median, 0 otherwise

Table 6: Financial Development, Financial Structure, and Industry Growth

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-4.599 (0.105)		
Interaction (external dependence x Structure-Size)		-1.376 (0.210)	
Interaction (external dependence x Structure-Aggregate)			-2.113 (0.167)
Interaction (external dependence x Finance-Activity)	3.375 (0.008)	1.114 (0.032)	1.476 (0.005)
Number of observations	1222	1222	1222

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-4.437 (0.163)		
Interaction (external dependence x Structure-Size)		-1.758 (0.129)	
Interaction (external dependence x Structure-Aggregate)			-2.792 (0.113)
Interaction (external dependence x Finance-Size)	11.842 (0.021)	4.438 (0.015)	6.172 (0.001)
Number of observations	1222	1222	1222

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-4.841 (0.118)		
Interaction (external dependence x Structure-Size)		-1.562 (0.163)	
Interaction (external dependence x Structure-Aggregate)			-2.460 (0.131)
Interaction (external dependence x Finance-Aggregate)	9.254 (0.012)	3.090 (0.022)	4.213 (0.002)
Number of observations	1222	1222	1222

The dependent variable is the annual compounded growth rate in real value added for 1980-90 for each industry in each country. The p-values for heteroskedasticity robust standard errors are reported in parentheses. 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.

Finance-Activity = log(Total value traded as share of GDP * Claims on private sector by financial institutions as share of GDP)
Finance-Size = log(Market capitalization and claims on private sector by financial institutions as share of GDP)
Finance-Aggregate = First principal component of Finance-Activity and Finance-Size

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)
Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)
Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Table 7: Financial Structure, the Legal Environment, and Industry Growth

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-0.153 (0.866)		
Interaction (external dependence x Structure-Size)		0.356 (0.803)	
Interaction (external dependence x Structure-Aggregate)			0.051 (0.974)
Interaction (external dependence x Creditor)	0.177 (0.749)	0.205 (0.715)	0.185 (0.736)
Interaction (external dependence x Anti-Director)	0.014 (0.986)	-0.300 (0.801)	-0.100 (0.928)
Interaction (external dependence x Rule of Law)	0.959 (0.001)	0.875 (0.001)	0.900 (0.001)
F-test Creditor, Anti-Director and Rule of Law	4.37 (0.005)	5.70 (0.001)	5.66 (0.001)
Number of observations	1104	1104	1104

The dependent variable is the annual compounded growth rate in real value added for 1980-90 for each industry in each country. The p-values for heteroskedasticity robust standard errors are reported in parentheses. 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 structure and the legal determinants.

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)
Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)
Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Creditor = index of secured creditor rights
Anti-director = index of minority shareholder rights
Rule of Law = Measure of the law and order tradition of a country.

Table 8: Financial Development, Financial Structure, and the Growth in Number of Firms

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-0.765 (0.604)		
Interaction (external dependence x Structure-Size)		0.260 (0.760)	
Interaction (external dependence x Structure-Aggregate)			0.140 (0.897)
Interaction (external dependence x Finance-Activity)	1.448 (0.084)	0.982 (0.001)	0.987 (0.013)
Number of observations	1082	1082	1082

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-0.907 (0.505)		
Interaction (external dependence x Structure-Size)		0.107 (0.903)	
Interaction (external dependence x Structure-Aggregate)			-0.094 (0.932)
Interaction (external dependence x Finance-Size)	5.631 (0.041)	3.775 (0.001)	3.945 (0.007)
Number of observations	1082	1082	1082

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-0.929 (0.513)		
Interaction (external dependence x Structure-Size)		0.181 (0.833)	
Interaction (external dependence x Structure-Aggregate)			0.011 (0.992)
Interaction (external dependence x Finance-Aggregate)	4.105 (0.052)	2.676 (0.001)	2.753 (0.009)
Number of observations	1082	1082	1082

The dependent variable is the log difference between the number of establishments in 1990 and 1980 for each industry in each country. The p-values for heteroskedasticity robust standard errors are reported in parentheses. 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.

Finance-Activity = log(Total value traded as share of GDP * Claims on private sector by financial institutions as share of GDP)
Finance-Size = log(Market capitalization and claims on private sector by financial institutions as share of GDP)
Finance-Aggregate = First principal component of Finance-Activity and Finance-Size

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)
Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)
Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Table 9: Financial Development, Financial Structure, and the Growth in Average Size of Firms

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-2.514 *(0.191)*		
Interaction (external dependence x Structure-Size)		-1.638 *(0.067)*	
Interaction (external dependence x Structure-Aggregate)			-2.106 *(0.075)*
Interaction (external dependence x Finance-Activity)	1.714 *(0.066)*	0.636 *(0.068)*	0.949 *(0.016)*
Number of observations	1051	1051	1051

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-1.556 *(0.399)*		
Interaction (external dependence x Structure-Size)		-1.682 *(0.064)*	
Interaction (external dependence x Structure-Aggregate)			-2.063 *(0.096)*
Interaction (external dependence x Finance-Size)	4.257 *(0.182)*	2.329 *(0.058)*	3.366 *(0.017)*
Number of observations	1051	1051	1051

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-2.048 *(0.285)*		
Interaction (external dependence x Structure-Size)		-1.663 *(0.065)*	
Interaction (external dependence x Structure-Aggregate)			-2.104 *(0.081)*
Interaction (external dependence x Finance-Aggregate)	3.833 *(0.115)*	1.693 *(0.062)*	2.499 *(0.016)*
Number of observations	1051	1051	1051

The dependent variable is the log difference between the average size of establishments in 1990 and 1980 for each industry in each country.
The p-values for heteroskedasticity robust standard errors are reported in parentheses. 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.

Finance-Activity = log(Total value traded as share of GDP * Claims on private sector by financial institutions as share of GDP)
Finance-Size = log(Market capitalization and claims on private sector by financial institutions as share of GDP)
Finance-Aggregate = First principal component of Finance-Activity and Finance-Size

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)
Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)
Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Table 10: Financial Structure, the Legal Environment, and the Sources of Industry Growth

Growth of the Number of Firms

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	0.547 (0.489)		
Interaction (external dependence x Structure-Size)		0.505 (0.661)	
Interaction (external dependence x Structure-Aggregate)			0.888 (0.498)
Interaction (external dependence x Creditor)	0.750 (0.136)	0.750 (0.137)	0.755 (0.133)
Interaction (external dependence x Anti-Director)	-0.268 (0.726)	-0.279 (0.760)	-0.467 (0.630)
Interaction (external dependence x Rule of Law)	0.429 (0.117)	0.552 (0.003)	0.452 (0.059)
F-test Creditor, Anti-Director and Rule of Law	1.81 (0.144)	4.04 (0.007)	2.83 (0.038)
Number of observations	997	997	997

Growth of the Average Size of Firms

	Structure-Activity	Structure-Size	Structure-Aggregate
Interaction (external dependence x Structure-Activity)	-0.164 (0.854)		
Interaction (external dependence x Structure-Size)		-0.584 (0.651)	
Interaction (external dependence x Structure-Aggregate)			-0.520 (0.725)
Interaction (external dependence x Creditor)	-0.575 (0.275)	-0.584 (0.271)	-0.581 (0.270)
Interaction (external dependence x Anti-Director)	-0.532 (0.471)	-0.278 (0.787)	-0.338 (0.728)
Interaction (external dependence x Rule of Law)	0.372 (0.253)	0.377 (0.106)	0.406 (0.164)
F-test Creditor, Anti-Director and Rule of Law	2.06 (0.104)	1.84 (0.139)	2.16 (0.091)
Number of observations	970	970	970

The dependent variable is the log difference in the number of establishment (average size of establishments) between 1990 and 1980
in the top panel (bottom panel) for each industry in each country. The p-values for heteroskedasticity robust standard errors are reported
in parentheses. 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 structure and the legal determinants.

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)
Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)
Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Creditor = index of secured creditor rights
Anti-director = index of minority shareholder rights
Rule of Law = Measure of the law and order tradition of a country.

Table A1: Financial Development, Financial Structure and the Legal Environment Across Countries

Country	Finance-Activity	Finance-Size	Finance-Aggregate	Finance-Dummy	Structure-Activity	Structure-Size	Structure-Aggregate	Structure-Dummy	Creditor	Anti-director	Rule of Law
Australia	6.76	4.77	0.92	1	-1.19	0.05	1.18	1	1	4	10
Austria	5.23	4.48	0.43	1	-3.55	-2.80	-1.35	0	3	2	10
Bangladesh	-1.45	2.70	-2.06	0	-6.73	-2.66	-2.30	0			
Belgium	4.34	3.87	-0.15	0	-2.27	-0.27	0.63	1	2	0	10
Brazil	4.72	3.49	-0.32	0	-0.98	-0.30	1.03	1	1	3	6.32
Canada	6.77	4.76	0.92	1	-1.35	-0.06	1.06	1	1	5	10
Chile	4.23	4.24	0.08	0	-3.46	-0.75	-0.06	0	2	5	7.02
Colombia	1.95	3.34	-0.97	0	-3.86	-1.47	-0.63	0	0	3	2.08
Costa Rica	-0.91	3.13	-1.66	0	-6.65	-1.34	-1.46	0			
Denmark	4.70	4.09	0.07	0	-2.80	-0.90	0.07	1	3	2	10
Egypt	1.70	3.46	-0.93	0	-4.82	-1.85	-1.18	0	4	2	4.17
Finland	4.99	4.28	0.25	1	-3.10	-1.33	-0.30	0	1	3	10
France	6.01	4.65	0.69	1	-2.83	-1.73	-0.45	0	0	3	8.98
Germany	7.26	4.67	0.95	1	-1.64	-1.59	0.02	1	3	1	9.23
Greece	2.59	3.92	-0.46	0	-4.47	-1.62	-0.92	0	1	2	6.18
India	4.48	3.51	-0.36	0	-2.04	-1.53	-0.07	0	4	5	4.17
Israel	6.37	4.30	0.53	1	-1.32	-0.56	0.76	1	4	3	4.82
Italy	5.01	4.09	0.13	0	-2.79	-1.57	-0.34	0	2	1	8.33
Japan	8.80	5.38	1.73	1	-0.77	-0.35	1.07	1	2	4	8.98
Jordan	5.85	4.66	0.67	0	-2.21	-0.14	0.73	1		1	4.35
Korea	6.90	4.40	0.70	1	-1.04	-1.03	0.57	1	3	2	10
Malaysia	6.55	4.87	0.95	1	-1.68	0.11	1.05	1	4	4	6.78
Mexico	3.50	2.81	-1.02	0	-1.27	-0.81	0.62	1	0	1	5.35
Morocco	0.65	3.13	-1.36	0	-5.19	-2.15	-1.49	0			
Netherlands	7.31	4.99	1.18	1	-1.65	-0.75	0.54	1	2	2	10
New Zealand	5.34	4.37	0.38	0	-1.39	0.62	1.46	1	3	4	10
Nigeria	-1.12	3.05	-1.76	0	-6.68	-1.41	-1.52	0	4	3	2.73
Norway	5.75	4.56	0.59	0	-2.44	-1.38	-0.11	0	2	4	10
Pakistan	2.59	3.34	-0.84	0	-3.75	-1.70	-0.73	0	4	5	3.03
Peru	1.40	2.70	-1.50	0	-2.84	-0.46	0.32	1	0	3	2.5
Philippines	4.09	3.64	-0.35	0	-2.49	-1.17	0.00	0	0	3	2.73
Portugal	4.23	4.31	0.12	1	-4.26	-2.66	-1.49	0	1	3	8.68
Singapore	7.82	5.35	1.51	1	-1.10	0.39	1.42	1	4	4	8.57
South Africa	6.03	5.23	1.08	0	-2.09	0.88	1.39	1	3	5	4.42
Spain	5.71	4.43	0.49	1	-2.71	-1.55	-0.30	0	2	4	7.8
Sri Lanka	0.74	3.23	-1.28	0	-5.09	-0.97	-0.73	0	3	3	6.25
Sweden	6.68	4.83	0.94	1	-1.60	-0.30	0.83	1	2	3	10
Turkey	0.98	2.83	-1.50	0	-4.40	-2.10	-1.19	0	2	2	5
UK	7.14	4.72	0.96	1	-0.76	0.15	1.38	1	4	5	8.57
US	8.11	5.15	1.44	1	-0.86	-0.24	1.10	1	1	5	10
Venezuela	2.51	4.02	-0.41	0	-4.65	-1.61	-0.98	0		1	6.37
Zimbabwe	2.86	3.32	-0.80	0	-2.60	-0.47	0.40	1	4	3	3.68

Finance-Activity = log(Total value traded as share of GDP * Claims on private sector by financial institutions as share of GDP)

Finance-Size = log(Market capitalization and claims on private sector by financial institutions as share of GDP)

Finance-Aggregate = First principal component of Finance-Activity and Finance-Size

Finance-Dummy = Dummy variable that takes the value 0 if total value traded as share of GDP and claims on private sector by financial intermediaries as share of GDP are less then the respective sample mean, 0 otherwise

Structure-Activity = log(Total value traded divided by claims on private sector by commercials banks)

Structure-Size = log(Market capitalization divided by claims on private sector by commercials bank)

Structure-Aggregate = First principal components of Structure-Activity and Structure-Size

Structure-Dummy = Dummy variable that takes the value 1 if Structure-Aggregate is above the median, 0 otherwise

Creditor = index of secured creditor rights

Anti-director = index of minority shareholder rights

Rule of Law = Measure of the law and order tradition of a country.

Table A2: Country Classification of Financial Structure

Country	Structure-Activity	Country	Structure-Size	Country	Structure-Aggregate	Country	Structure-Dummy
UK	-0.76	South Africa	0.88	New Zealand	1.46	Australia	1
Japan	-0.77	New Zealand	0.62	Singapore	1.42	Belgium	1
US	-0.86	Singapore	0.39	South Africa	1.39	Brazil	1
Brazil	-0.98	UK	0.15	UK	1.38	Canada	1
Korea	-1.04	Malaysia	0.11	Australia	1.18	Denmark	1
Singapore	-1.10	Australia	0.05	US	1.10	Germany	1
Australia	-1.19	Canada	-0.06	Japan	1.07	Israel	1
Mexico	-1.27	Jordan	-0.14	Canada	1.06	Japan	1
Israel	-1.32	US	-0.24	Malaysia	1.05	Jordan	1
Canada	-1.35	Belgium	-0.27	Brazil	1.03	Korea	1
New Zealand	-1.39	Sweden	-0.30	Sweden	0.83	Malaysia	1
Sweden	-1.60	Brazil	-0.30	Israel	0.76	Mexico	1
Germany	-1.64	Japan	-0.35	Jordan	0.73	Netherlands	1
Netherlands	-1.65	Peru	-0.46	Belgium	0.63	New Zealand	1
Malaysia	-1.68	Zimbabwe	-0.47	Mexico	0.62	Peru	1
India	-2.04	Israel	-0.56	Korea	0.57	Singapore	1
South Africa	-2.09	Netherlands	-0.75	Netherlands	0.54	South Africa	1
Jordan	-2.21	Chile	-0.75	Zimbabwe	0.40	Sweden	1
Belgium	-2.27	Mexico	-0.81	Peru	0.32	UK	1
Norway	-2.44	Denmark	-0.90	Denmark	0.07	US	1
Philippines	-2.49	Sri Lanka	-0.97	Germany	0.02	Zimbabwe	1
Zimbabwe	-2.60	Korea	-1.03	Philippines	0.00	Austria	0
Spain	-2.71	Philippines	-1.17	Chile	-0.06	Banglades	0
Italy	-2.79	Finland	-1.33	India	-0.07	Chile	0
Denmark	-2.80	Costa Rica	-1.34	Norway	-0.11	Colombia	0
France	-2.83	Norway	-1.38	Finland	-0.30	Costa Rica	0
Peru	-2.84	Nigeria	-1.41	Spain	-0.30	Egypt	0
Finland	-3.10	Colombia	-1.47	Italy	-0.34	Finland	0
Chile	-3.46	India	-1.53	France	-0.45	France	0
Austria	-3.55	Spain	-1.55	Colombia	-0.63	Greece	0
Pakistan	-3.75	Italy	-1.57	Sri Lanka	-0.73	India	0
Colombia	-3.86	Germany	-1.59	Pakistan	-0.73	Italy	0
Portugal	-4.26	Venezuela	-1.61	Greece	-0.92	Morocco	0
Turkey	-4.40	Greece	-1.62	Venezuela	-0.98	Nigeria	0
Greece	-4.47	Pakistan	-1.70	Egypt	-1.18	Norway	0
Venezuela	-4.65	France	-1.73	Turkey	-1.19	Pakistan	0
Egypt	-4.82	Egypt	-1.85	Austria	-1.35	Philippines	0
Sri Lanka	-5.09	Turkey	-2.10	Costa Rica	-1.46	Portugal	0
Morocco	-5.19	Morocco	-2.15	Morocco	-1.49	Spain	0
Costa Rica	-6.65	Portugal	-2.66	Portugal	-1.49	Sri Lanka	0
Nigeria	-6.68	Banglades	-2.66	Nigeria	-1.52	Turkey	0
Banglades	-6.73	Austria	-2.80	Banglades	-2.30	Venezuela	0