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Investment in Relationship-Specific Assets: Does Finance Matter?*

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Abstract

An influential strand of literature starting with the Nobel Prize winning work of Oliver Williamson (1971, 1975) argues that a rational agent underinvests in relationship-specific assets due to the possibility of an opportunistic behaviour on the part of her contractual partner. We first combine the insights from this literature with the theoretical work on financial intermediaries and argue that a strong banking sector can alleviate this well-known holdup problem and stimulate relationship-specific investment. Then we empirically confirm this prediction by showing that industries dependent on relationship-specific investment from their suppliers grow disproportionately faster in countries with a high level of financial development and in US states which deregulated their banking sector. Our work establishes a novel channel through which finance affects the real economy. It also complements the literature that has stressed legally binding contracts as a standard solution to the holdup problem.

Keywords: financial development, relationship-specific investment, growth
JEL classification: G21, O16, O40

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1 Introduction

One of the most famous examples of market failure involves a rational agent who underinvests in *relationship-specific assets* due to the possibility of an opportunistic behaviour on the part of her contractual partner.[1] This paper provides evidence that a strong banking sector can alleviate the adverse economic consequences of this well-known holdup problem by stimulating relationship-specific investment. Our work establishes a novel channel through which finance affects the real economy and promotes long-run growth. It also complements the existing literature on economic specificity that has stressed legally binding contracts as a standard solution to the holdup problem.

The distinguishing feature of relationship-specific assets is the fact that their value is greater within a relationship than outside it. A typical example would involve an upstream supplier who makes investments in order to customize her product for the needs of the downstream purchaser. After the investment is sunk, the buyer can refuse to meet her commitment and trigger ex post re-negotiation. The product was already adjusted for the needs of one specific purchaser, so the supplier will not be able to sell the product to a different customer at the original price. This is in the literature known as the holdup problem. As a consequence, the individually rational sellers will underinvest into relationship-specific assets, hurting the downstream firms with negative ramifications for aggregate growth.

The standard way to protect the party undertaking relationship-specific investment is to write a binding contract and to rely on the legal enforcement by the state. We argue that even if a detailed contract makes the original buyer *willing* to pay for a product the agreed price, she might be *not able* to do so due to some economic problems. The current financial crisis made this point painfully clear. The most effective contract enforcement might fail to protect the supplier in tough times when the buyer lacks access to a reliable source of financing. To give a specific example, no level of institutional quality can protect the manufacturers of car parts intended for the big U.S. car companies. Only the financial stabilization of their troubled customers would do the trick.

Banking sector can provide valuable signals to a supplier hesitating to undertake relationship-specific investment. In a seminal paper, Fama (1985) argues that obtain-

[1] This idea goes back to the revolutionary work of Oliver Williamson (1971, 1975, 1979) as well as the seminal paper of Klein et al. (1978). Hart (1995) and Royal Swedish Academy of Science (2009) provide an intuitive introduction to the corresponding literature.

ing a bank loan is a particularly suitable way to signal creditworthiness to business partners. Similarly, von Thadden (1995) theoretically shows how a monitoring contract closely resembling a standard bank-firm lending relationship can lengthen the firms' planning horizon. An upstream firm will be more willing to undertake relationship-specific investment knowing that her business partner is creditworthy and shuns myopic behaviour. Besides positive reputational signals, the banks can reassure the supplier also in more direct ways. Financial products like bank guarantee or letter of credit provide a payment-assurance for the supplier and thus offer a convenient alternative to the cumbersome route of complicated legal contracts and their lengthy enforcement in courts.

Consequently, a well-developed financial (especially banking) system should disproportionately boost industries dependent on the willingness of their business partners to undertake relationship-specific investments. We confirm this theoretical prediction by attesting that industries requiring a high share of relationship-specific inputs grow faster in countries with a well developed financial system. Furthermore, we provide evidence that this effect comes from a more developed banking sector rather than from a deeper stock market.

Consistent with the theoretical arguments of Fama (1985) and von Thadden (1995), our channel works mostly via increased entry of new firms (extensive margin) and higher capital accumulation. New firms especially need to signal their creditworthiness in order to stimulate relationship-specific investment from their business partners. Existing firms have already established a reputation with the suppliers and depend less on the signals from third parties like banks. Similarly, the increased planning horizon should affect sectoral output growth primarily via higher capital accumulation.

For our final test we turn to the process of bank deregulation in the USA. This is a unique natural experiment as it occurred in different U.S. states at different points in time. Jayaratne and Strahan (1996) show that GDP growth, in an average U.S. state, accelerates after relaxing restrictions on intrastate bank entry and expansion. Our results suggest that beyond an overall pro-growth effect the bank deregulation might benefit disproportionately the industries requiring relationship-specific investments from their suppliers.

This paper combines insights from several strands of literature and makes three main contributions. First, it provides evidence for a novel channel through which finance

affects the real economy. Since the seminal work of Rajan and Zingales (1998), the finance-growth literature has placed special emphasis on the role of financial development in relaxing credit constraints. In our story a well-developed banking sector reassures the suppliers that hesitate to undertake irreversible relationship-specific investments.

Second, our paper complements the existing literature on economic specificity that has stressed comprehensive and enforceable contracts as a (partial) solution to the holdup problem. The recent trade literature (Levchenko 2007, Nunn 2007) builds upon this idea and demonstrates a stronger export performance of industries requiring relationship-specific inputs in countries with good institutions, especially in the form of effective contract enforcement. This paper shows that the domestic financial system plays an autonomous and equally important role in stimulating relationship-specific investment by the upstream suppliers, thus promoting the growth of their downstream customers.

Finally, the last part of the paper contributes to the literature documenting the acceleration in growth rates of the U.S. states after they deregulated their banking system. The main argument contesting the positive effects of this process sees the increased competition and resulting consolidation among banks as an obstacle for the firms relying on relationship lending. The theoretical and empirical work on this issue has focused on the effects of U.S. bank deregulation on small and/or new enterprises that traditionally depend on relationship banking.[2] Our paper examines an alternative set of bank-dependent firms and provides some evidence for favourable effects of a competitive banking sector.

The paper is structured as follows. The next section provides theoretical background for our hypothesis. Section 3 explains the methodology and describes the data. Section 4 provides evidence from a broad cross-section of countries. Section 5 reports empirical results from the bank deregulation in a panel of U.S. states. Section 6 concludes.

2 Theoretical Motivation

An influential body of theoretical literature (Klein et al. 1978, Williamson 1979, Grossman and Hart 1986, Hart and Moore 1990, Caballero and Hammour 1998) argues that

[2]Black and Strahan (2002) provide a good overview of the controversy regarding the effects of bank consolidation on relationship lending.

rational agents underinvest in assets whose value is higher inside relationship than outside it. The reason lies in possible opportunistic behaviour of the contractual partner. A supplier investing into adjustment of her product to the specific needs of one particular buyer is creating an appropriable specialized quasi rent. After such relationship-specific investment is sunk, an opportunistic buyer can renege on the original contract and try to appropriate the quasi rent during a renegotiating process. The supplier will not be able to prevent such development unless she can use legal means to enforce the original contract.

The recent literature on trade and incomplete contracts builds upon this insight and identifies a prominent role for institutional quality in reassuring a supplier undertaking relationship-specific investment. Levchenko (2007) develops a theoretical model suggesting institutional quality as a source of comparative advantage in industries requiring relationship-specific investment from their suppliers. Levchenko (2007) and Nunn (2007) empirically confirm this prediction by showing that those industries perform better in the export markets if their home country has superior judicial quality and contract enforcement.

The traditional literature on the holdup problem thus focuses on potential deliberate abuse of power from the buyer after the supplier has made the relationship-specific investment. However, there are two aspects to the holdup problem that in our opinion did not receive an adequate attention. First is the possibility of a *vis major* holdup due to unexpected economic problems of the downstream customer. A detailed written contract will be of little help for the supplier, if the buyer turns out to be unable to pay the bill. The financial consequences for the party undertaking relationship-specific investment might be even more severe in this case. Now the buyer does not just try to re-negotiate the original contract, she is objectively not able to meet her financial commitment. The supplier will thus definitely have to find a new buyer for a product adjusted for the needs of the original customer. Second aspect involves the length of the buyer's planning horizon. A buyer with a long-term perspective will be much less willing to endanger a long-term business relationship in order to achieve a short-term gain from renegotiating the original contract.

A supplier usually cannot observe the true financial situation or planning horizon of the buyer. However, theoretical work on financial intermediaries suggests that a buyer can signal both creditworthiness and a long-term planning horizon via obtaining a loan

or a line of credit from her bank.

Fama and Jensen (1983) noticed that contracts of most agents in organizations specify either fixed promised payoffs or incentive payoffs tied to specific measures of performance. This first group of agents includes both suppliers and outside debtholders like banks. A second group of agents called residual claimants (owners of the company) then receives the difference between stochastic inflows of resources and fixed payments promised to the first group. Fama and Jensen (1985) point out that the conflicts of interest between suppliers and residual claimants are similar to those between debtholders and residual claimants. It would be therefore inefficient if both suppliers and debtholders would independently monitor the actions of residual claimants. According to Fama (1985) bank loans are particularly suitable to avoid duplication of information and monitoring costs. In case of a default, bank loans have usually low priority among the contracts promising fixed payoffs. The renewal process of short-term bank loans thus implies a regular assessment of the borrower's ability to meet such contracts and signals the reliability of the borrower. Suppliers and other agents with fixed payoffs consider those signals to be credible, as the bank backs them with its own resources. The value of such signals can be seen in the fact that many firms pay monitoring fees for lines of credit without effectively taking the offered resources (Fama 1985, p. 37).

There is a closely related strand of literature explaining the existence of financial intermediaries as a natural response to asymmetric information between borrowers and lenders (Leland and Pyle 1977). According to Diamond (1984) the lenders delegate the costly task of monitoring the loan contracts to an intermediary in order to avoid the alternative of either effort duplication or a free-rider problem. Von Thadden (1995) provides a dynamic interpretation of this framework. In his model a firm dependent on external finance may undertake short-term investments which yield lower long-run returns, but minimize the risk of early termination by outside investors. Von Thadden (1995) shows how a monitoring contract closely resembling a standard credit-line agreement can help to overcome this myopia problem. A standard bank-firm lending relationship can thus overcome the short-term bias in investment and lengthen the firms' planning horizon.

The presence of relationship-specific assets is in our opinion an important factor determining the economic value of signals associated with the bank loans. A supplier of standardized products can always find another buyer if the original customer is either

not able or not willing to fulfil the original contract. A supplier of relationship-specific products has much more to lose if her customer lacks financial robustness or long-term planning horizon. Consequently, a buyer dependent on the willingness of her supplier to undertake a sufficient level of relationship-specific investment will disproportionately benefit from positive signals a bank loan can provide. Combining the theoretical insights from the literature on relationship-specific investment and the literature about monitoring and signalling role of financial intermediaries thus yields a testable empirical implication. A strong banking sector benefits disproportionately those industries that rely on the relationship-specific investment from their suppliers.

Beyond sending signals about buyer's true financial situation a bank can reassure the supplier of relationship-specific products also in more direct ways. Banks offer specialized services like guarantee or letter of credit to assure the supplier that she gets paid. One could even argue that a supplier would often prefer such assurance backed by renowned bank to the legal path of writing waterproof contracts with the buyer. Even in countries with a highly effective legal system, the way through courts can involve significant costs with no guarantee of success. An example from international trade reinforces this argument. According to Berkowitz et al. (2006) it is mainly importers who rely on formal institutions such as courts when seeking compensation, because commercial devices like letter of credit are unavailable to them.

A more general reason why a buyer of relationship-specific products particularly benefits from the presence of a bank lies in a striking similarity between the business environments of the two. Tellingly, Caballero and Hammour (1998) mention in the first paragraph bank credits and investments of the upstream firms as two examples of economic specificity. A large literature on relationship lending underlines this point. According to Boot and Thakor (2000) a remunerative character of various banking products gives the banks the incentive to acquire deep knowledge about the specific industry in order to better fine-tune its services. One can then view bank loans as contracts that explicitly or implicitly include relationship-specific investment and long-term commitment between the bank and the client (Boot 2000, Ongena and Smith 1998). Several authors (Boot et al. 1993, Rajan 1998, Rajan 2005) argued that the main comparative advantage of banks over public markets or even the very reason for their existence lies in the ability to offer discrete contracts based rather on mutual trust and reputation than formal legal enforcement. All this makes a bank especially

qualified to offer tailor-made services for a buyer of relationship-specific products who also disproportionately depends on trust and reputation with her suppliers.

3 Methodology and Data

3.1 Empirical Model

The question whether financial development promotes growth or merely follows the real economy goes back at least to Schumpeter (1912) and Robinson (1952) and might be the crucial one in the whole finance-growth literature. This endogeneity issue is the main reason why the research focus in the field gradually shifted towards differences-in-differences estimations. These econometric techniques compare the difference in outcome for treated and control groups before and after a treatment and are more suitable to address the endogeneity and omitted variables biases often present in traditional growth regressions. We also rely on this approach in order to establish a causal link from finance to relationship-specific investment and then to economic growth. Specifically, we apply two differences-in-differences methodologies (Rajan and Zingales 1998, Jayaratne and Strahan 1996) that have become the cornerstone of recent empirical work on finance and growth.[3]

In the next section we apply the methodology of Rajan and Zingales (1998) and estimate the following equation:

$$G_{ic} = \alpha + \beta CI_i * FD_c + \gamma X_{ic} + \delta_i + \eta_c + \varepsilon_{ic}, \tag{1}$$

where the subscripts i and c indicate industry and country, respectively. As a dependent variable we use several proxies for industrial growth: growth of output, growth of the number of establishments, growth of output per establishment, growth of employment, growth of the capital stock and growth of total factor productivity (TFP). Our variable of interest is $CI_i * FD_c$, where FD_c is the financial development in country c and CI_i is the contract intensity measure introduced by Nunn (2007), which quantifies the importance of relationship-specific inputs for different industries. X_{ic} is a vector of controls and δ_i and η_c are industry and country dummies that take care of a wide range of omitted

[3]Beck (2008) and Levine (2005) discuss in more detail the application of difference-in-difference estimations in finance-growth literature.

variables. These fixed effects also absorb the direct effects of contract intensity CI_i and financial development FD_c.

A positive estimated coefficient for our variable of interest, $CI_i * FD_c$, indicates that financial development benefits especially the industries dependent on the relationship-specific investment of their suppliers. This would be consistent with the notion that a financial system can reassure those suppliers by providing the buyers with good reputation, long-term planning horizon and financial stability. Our theoretical motivation stresses the decisive role of financial intermediaries in this regard. In our paper the term financial development therefore applies to the strength of banking sector unless specified otherwise.

In order to account for alternative channels that might be correlated with our mechanism, we include several interaction terms between various country and industry characteristics into our set of control variables X_{ic}. Specifically, we interact financial development with dependence on external finance ($ExF_i * FD_c$) to confirm that our results are not driven by the fact that finance helps industries dependent on external finance (Rajan and Zingales 1998). Similarly, we include into vector X_{ic} an interaction between rule of law and contract intensity measure ($CI_i * RL_c$). This controls for the traditional argument from the hold-up literature that efficient legal enforcement stimulates relationship-specific investment. Similarly to $CI_i * FD_c$, we expect a positive coefficient sign for the interaction terms controlling for these two alternative theories. We also put the initial share of the sector in total output into all regressions. We expect a negative coefficient for this control variable, as more mature industries have usually less scope for future growth.

It is important to emphasize that the industry characteristic CI_i is computed solely from U.S. industrial data. This approach is based on two assumptions. First, assuming that U.S. markets are well functioning and (relatively) frictionless, equilibrium variables in the United States can be taken as good proxies for exogenous technological characteristics of the production process in a given industry. Second, as long as the relative ranking of industry characteristics is the same across countries, the technological characteristics of the U.S. industries are representative of technologies used in other countries. Under these assumptions we can interpret the estimated coefficients for the interactions of country and industry characteristics in a causal way.

Another crucial point in this econometric approach is the potential endogeneity of

country characteristics like financial development. Here we follow the finance-growth literature and use countries' legal origins to address this issue. La Porta et al. (1998, 1999) show that the origin of a legal system is a strong predictor of the financial development in a given country. We instrument the interaction terms of financial development and industry characteristics (importance of relationship-specific inputs and dependence on external finance) by the interaction terms of the latter variables with legal origin dummies.

Our database has a complex structure with both country and industry dimensions where heteroskedasticity might be present. If this is the case, the GMM estimator is more efficient than the simple IV estimator. In the absence of heteroskedasticity the GMM estimator is asymptotically equivalent to the IV estimator.[4] However, the optimal weighting matrix that is used in the efficient GMM procedure is a function of fourth moments. Obtaining reasonable estimate of fourth moments requires large sample size. As a result, the efficient GMM estimator can have poor small sample properties. If in fact the error is homoskedastic, IV would be preferable to efficient GMM in small sample. In our main specification we perform the heteroskedasticity test proposed by Pagan and Hall (1983) and reject the null hypothesis of no heteroskedasticity at 1% level. Therefore we rely on GMM estimation for our analysis.[5]

In section 5 we use differences-in-differences estimation based on the removal of restrictions on bank entry and expansion which occurred in different U.S. states at different points of time. Jayaratne and Strahan (1996) testify a higher growth for states that deregulated their banking sector (treated group) as opposed to states that have not deregulated yet (control group). To the extent that relaxing entry and expansion barriers leads to a more competitive and efficient banking industry, this result provides support for a causal link from finance to economic growth. The identifying assumption is the randomness in timing of bank deregulation with respect to economic growth. Jayaratne and Strahan (1996) show that states did not deregulate their banks in anticipation of improved growth prospects. Deregulation usually did not occur in the boom phase of business cycle. Moreover, deregulation driven by anticipated economic boom should result in higher amount of lending. There is only weak evidence for increased bank lending and no evidence for increased investment rate after the reform. The pro-growth

[4] Baum et al. (2003) discuss the advantages of using GMM over 2SLS in the presence of heteroskedasticity in the error term.

[5] We get very similar results using 2SLS estimation.

effects come from better quality of banks' loan portfolios, not from their bigger size.

We construct a dummy variable equal to one after a state permits intrastate branching via merging and acquisition and zero otherwise.[6] To see whether bank deregulation disproportionately benefits industries dependent on relationship-specific investment from their suppliers, we estimate the following specification:

$$G_{ist} = \alpha + \beta_1 Dereg_{st} + \beta_2 CI_i * Dereg_{st} + \gamma X_{ist} + \delta_i + \triangle + \varepsilon_{ist}, \tag{2}$$

where G_{ist} is output growth for industry i in state s at time t, $Dereg_{st}$ is the dummy for bank deregulation in state s at time t, CI_i is the contract intensity measure, X_{ist} is a vector of controls that includes initial industry share in total state (manufacturing) output and the growth rate of gross state product. The specification also contains a set of fixed effects $\triangle$ - either time, state and industry fixed effects or time effects and interacted state-industry effects.

Traditionally, the literature examines the pro-growth effects of bank deregulation on the level of U.S. states (Jayaratne and Strahan 1996, Black and Strahan 2002, Strahan 2003). Here we extend this framework and focus on the differential effect of deregulation across industries. Equation (2) is a generalization of the difference in difference approach where the effect of deregulation is estimated as the difference between the change in growth rate of contract-intensive industries before and after deregulation and the change in growth rate of a control group of industries before and after deregulation. Analogously to equation (1), a positive coefficient β_2 implies that bank deregulation disproportionately benefits industries requiring a high share of relationship-specific inputs. Coefficient β_1 captures the direct effect of deregulation on industrial growth.

The U.S. framework also allows for a deeper examination of the possible interactions between our channel and the institutional mechanism implied by the incomplete contracts literature. Financial development and the quality of the legal system can act as substitutes or complements in stimulating relationship-specific investments. To give an example, bank guarantees or letters of credit present a direct substitute for detailed contracts and their legal enforcement. At the same time, such bank products can reassure suppliers only if at least some level of legal quality is present. Similar ambiguity prevails with respect to signals a bank can send about creditworthiness and long-term planning

[6] Following the literature we drop the year of deregulation from our estimation and observations for South Dakota and Delaware. Those states have a unique history related to credit card business which could lead to biased estimates (see e.g. Strahan 2003).

horizon of the buyer. On the one hand, supplier receiving credible signals about buyer's reliability can be more relaxed about the quality of legal system. A creditworthy and long-term oriented buyer could will not easily jeopardize her reputation and default on her commitments even if she would be able to do it. On the other hand, credibility of bank signals increases in the credibility of the buyer's bank which in turn increases in country's overall legal and institutional standards.

The relative importance of these substitution and complementarity effects will vary from country to country, depending on the level of development and other (possibly non-observable) country-specific characteristics.[7] It is therefore more appropriate to test this issue within the sample of the U.S. states rather than in a broad cross-country context. All U.S. states are subject to uniform federal law and the overall institutional quality is very similar. We can thus hold the general legal framework constant, while examining differences alongside one specific dimension - quality of state courts. In particular, we augment equation (2) by adding two interaction terms:

$$\begin{aligned} G_{ist} &= \alpha + \beta_1 Dereg_{st} + \beta_2 CI_i * Dereg_{st} + \beta_3 CI_i * Courts_s \\ &\quad + \beta_4 CI_i * Dereg_{st} * Courts_s + \gamma X_{ist} + \delta_i + \triangle + \varepsilon_{ist}, \end{aligned} \tag{3}$$

where $Courts_s$ is a measure for the quality of state courts whose direct effect is captured by the state fixed effects. A positive estimated coefficient β_4 would suggest that the legal system and bank deregulation act as complements in promoting relationship-specific investment. A negative coefficient for the triple interaction term would indicate substitutability between the two channels maintaining relationship-specific assets.

3.2 Data

3.2.1 International Sample

The international industry-level data come from the Trade, Production, and Protection Database by Nicita and Olarreaga (2007) that has data for up to 100 countries over the period 1976 to 2004. It uses production data from the United Nations Industrial Development Organization (UNIDO) that are reported according to the 3-digit ISIC Revision

[7] For some countries the links between law, institutions, finance and growth can be very peculiar. Allen et al. (2005) show that in China alternative mechanisms based on relationship and reputation act as successful substitutes for underdeveloped legal and financial system.

2 classification. We transform data in current U.S. dollars into constant international dollars using capital and GDP deflator from Penn World Table (Heston, Summers, and Aten, 2002). The resulting sample includes data for 28 manufacturing industries in 91 countries for the period between 1980 and 2004. The list of the countries used in our sample is reported in Appendix A.

We construct a cross-sectional panel by averaging variables over the period 1980-2004. We use the earliest available data for industry share to construct the initial industry share. In this way we avoid losing too many observations, as not all countries report the data for 1980.

In order to test our main hypothesis on the differentiated impact of financial development across industries, we borrow the notion of contract-intensive (institutionally intensive) sectors from the recent trade literature on incomplete contracts and comparative advantage (Nunn 2007, Levchenko 2007). Following Nunn (2007), we rely on the variable contract intensity that measures for every industry the proportion of intermediate inputs requiring relationship-specific investment. Based on the classification by Rauch (1999), these inputs can be not sold on an organized exchange, nor are they reference-priced in trade publications.[8] The intuition behind this empirical proxy for the severity of the holdup problem is simple. The non-existence of an organized exchange or reference price suggests some non-standard feature of the product. If a producer requires a non-standardized intermediate good for production, the supplier has to undertake ex ante investment in order to customize it. The value of such specific input is higher inside a buyer-seller relationship than outside it, resulting in a holdup problem. Moreover, in the absence of organized exchange or reference price the supplier might have a hard time selling her product at the original price should the initial buyer refuse to pay. Given that the original measure in Nunn (2007) is reported in the US input-otput classification, we use the measure of contract intensity from Levchenko (2008) who recomputes it for the 3-digit ISIC Revision 2 classification.

The second industry characteristics we use is the measure of external finance dependence introduced by Rajan and Zingales (1998). It is defined as capital expenditure minus cash flow divided by capital expenditure. The original variable from Rajan and Zingales (1998) is calculated for a mix of three-digit and four-digit ISIC industries. The

[8] Rauch (1999) classifies SITC Rev. 2 industries according to three possible types of its final good: differentiated, reference-priced, and homogeneous. Naturally, the final good of an industry can serve as intermediate input for other industries.

version of the measure used in our paper comes from Laeven et al. (2002) and follows the 3-digit ISIC Revision 2 classification.

The data for financial development is taken from Beck, Demirguc-Kunt, and Levine (2000), and contains various indicators of financial development across countries and over time. In our analysis, we use two proxies for financial development: private credit by banks to GDP and stock market capitalization to GDP, the standard proxies for financial development in the empirical literature. Due to possible endogeneity concerns we use the initial level of financial development, measured in 1980 or earliest year available.

The data for quality of legal institutions, the "rule of law", is taken from the database constructed by Kaufmann, Kraay, and Mastruzzi (2005). This is the weighted average of several variables that measure perceived effectiveness and predictability of the judicial system and contract enforcement in each country. For our analysis we use data for 1996 which is the earliest available estimate for this variable.

For instrumental variable regressions, we rely on the data of legal origin from Glaeser et al. (2004). Legal origins are essentially indicator variables. For example, the common law variable equals one for countries whose legal origin is the British common law and zero otherwise. The remaining legal origins include French civil law, German civil law and Socialist law. The omitted variable is Scandinavian civil law.

In Appendices C and D we present data sources as well as summary statistics for the international data we use in our analysis. Appendix E presents the correlation matrix for the interaction terms used in the cross-country context.

3.2.2 Sample of U.S. States

The dates of bank branch deregulation in different U.S. states are taken from Strahan (2003). In the majority of states, this deregulation occurred in two successive stages. The first stage happened when the restriction of intrastate branching via merging and acquisition (M&A) was abandoned, the second stage occurred when overall restrictions on intrastate branching were removed. Since the time span between these dates is relatively short it is difficult to disentangle their effects. Following the literature, we focus on dates of the first stage when constructing the bank deregulation dummy.[9]

[9]Besides the *intrastate* bank branch deregulation there was another deregulation process concerning removal of barriers to bank expansion across state borders. Jayaratne and Strahan (1996) find some positive effects of this *interstate* bank deregulation on growth. However, these effects are neither statistically significant nor robust to model specification and are not reported in their paper.

The data on the Gross State Product for the U.S. states are taken from the Bureau of Economic Analysis (BEA) and are reported according to US SIC industry classification, in current dollars. We transform these data into real dollars using states price deflator. Following the seminal paper of Jayaratne and Strahan (1996), we focus on the period from 1978 till 1992.[10]

Nunn (2007) computes his contract intensity measure for input-output classification, while the manufacturing data from BEA are reported according to the 2digit SIC1972 classification. First we transform input-output data into NAICS1997 classification (these two classification are very similar). Then we aggregate contract intensity measure over ranges of industries belonging to the same 2digit SIC1972 category using the concordance tables from NAICS1997 to SIC1987 and from SIC1987 to SIC1972.[11]

As a measure for state courts' quality we use data from the State Liabilities Ranking Study conducted for the U.S. Chamber of Commerce by Harris Interactive Inc. To our knowledge this annual survey (2001-2008) is the only U.S.-wide study of state courts' quality.[12] Kahan (2006) argues that the overall ranking of state courts is reasonably constant over time. When estimating specification (3), we address the issue of possible significant shifts in ranking and use the "overall state grade" from both the study's first and last year.

4 International Evidence

4.1 OLS Estimation: Banks, Law and Stock Markets

Table 1 reports the results of estimating equation (1) using OLS. The dependent variable is the average output growth for each industry and country. The first column of Table 1 reports the estimation results of our baseline specification which includes the industry's share of total GDP at the beginning of the sample period and the interaction term of

[10] Jayaratne and Strahan (1996) use real per capita personal income (1972-1992) and gross state product (1978-1992) as their dependent variables. Only the latter variable is relevant to us, as we want to extend their original framework and exploit production data both across states and across industries.

[11] The concordance tables are from Jon Haveman's webpage: http://www.macalester.edu/research/economics/page/haveman/Trade.Resources/tradeconcordances.html

[12] The ranking is based on interviews with senior litigators about timeliness of summary judgment/dismissal, judges' impartiality and competence, juries' predictability and fairness etc. For details see Kahan (2006) or http://www.instituteforlegalreform.com.

contract intensity and financial development. Following our theoretical motivation we use the ratio of private credit by banks to GDP as proxy for financial development. The estimated coefficient for the interaction term $CI_i * FD_c$ is positive and statistically significant at a one percent level. This corroborates the hypothesis that a strong banking sector promotes especially industries dependent on the relationship-specific investment of their suppliers. The initial industry share has the expected negative sign, confirming the idea that more mature industries with a high share in country's GDP have less scope for further growth.

The estimated relation between financial development and output growth is not only statistically significant but also economically relevant. The industrial sector most dependent on relationship-specific inputs is "transport equipment". According to the estimate from the first column of Table 1, a catch-up in Mexico's financial development with the average OECD level would give the growth rate of this sector an additional boost of 5.4%.[13]

The subsequent columns present the regression results with an augmented set of explanatory variables. Columns 2 and 3 control for alternative economic channels which already found considerable empirical support and might be correlated with our mechanism. Recent trade literature (Nunn 2007, Levchenko 2007) has shown that the industries with a high share of relationship-specific inputs benefit disproportionately from a good contracting environment. Financial development FD_c might be correlated with legal and contracting institutions in country c. In such case the variable of interest $CI_i * FD_c$ would also capture the effect of superior institutions on the contract-intensive industries. We control for this possibility by adding an interaction term of the contract intensity measure with institutional quality proxied by the rule of law ($CI_i * RL_c$) in the second column of Table 1. Another omitted variable bias can arise from the industry characteristic CI_i. Contract-intensive industries might well be the industries that require larger external funds to support their operations. If so, then our main interaction $CI_i * FD_c$ would also capture the beneficial effect of financial development on the industries dependent on external finance (Rajan and Zingales 1998). In the third column we therefore include an interaction term of industry's dependence on external finance

[13] This is calculated as follows. Mexico's ratio of private credit to GDP is 0.16 and OECD average is 0.532. The coefficient of the interaction term is 0.169. If Mexico's financial development reached the level of OECD average, then the growth rate in the "transport equipment" industry would increase by: $\beta * CI * \triangle FD = 0.169 * 0.859 * (0.532 - 0.16) \approx 5.4\%$

and country's financial development ($ExF_i * FD_c$). In both augmented specifications the variable of interest $CI_i * FD_c$ maintains a positive and statistically significant coefficient. The coefficients for the two other interactions, while positive, fail to have statistically significant effect.

In the last three columns we test the hypothesis about the singular role of banks as promoters of industries requiring relationship-specific investment from their suppliers. Country level studies document a positive effect of both bank and stock market development on long run economic growth (Levine and Zervos 1998). Our mechanism, however, depends crucially on the unique capacity of relationship lending - via specialized bank products, reputation signalling or increase in the borrowers' planning horizon - to reassure the sellers of relationship-specific inputs. The regressions in columns 4 to 6 mirror the estimation of the previous three columns, but add the interaction terms of stock market capitalization over GDP with contract intensity ($CI_i * StM_c$) and with dependence on external finance ($ExF_i * StM_c$) into the set of explanatory variables. The main interaction capturing the strength of banking sector $CI_i * FD_c$ remains positive and statistically significant at 1% level. The interaction term of the stock market capitalization to GDP with the contract intensity measure $CI_i * StM_c$ is never significant and even enters the regressions with a negative sign.[14] The results confirm the dominance of banks over anonymous stock markets in fostering the industries requiring relationship-specific investment from their suppliers. The econometric horse-race thus clearly confirms our theoretical motivation and we focus on the banking sector (FD_c) in the rest of the paper.

4.2 Instrumental Variables Estimation

The results of the OLS estimation cannot be taken as conclusive evidence for our main hypothesis due to the possibility of reverse causality affecting both country characteristics (financial development FD_c and rule of law RL_c) used in previous regressions. If industries requiring a high share of relationship-specific inputs contribute disproportionately to overall economic growth, the country might have stronger incentives to invest into financial and institutional development. To take care of this potential endogeneity problem, we use countries' legal origins to construct our instrumental variables, follow-

[14] We also run estimations with other proxies for financial development such as stock market turnover or stock value traded. The results are qualitatively similar and are available upon request.

ing the existing literature.[15] Specifically, we interact the contract intensity CI_i with four variables: $BRIT_c$, FR_c, GER_c, and SOC_c. These are dummy variables equal to one if country c has British, French, German, or Socialist legal origin, respectively. The omitted category is the Scandinavian legal origin $SCAN_c$. We use the resulting interaction terms $CI_i * BRIT_c$, $CI_i * FR_c$, $CI_i * GER_c$, and $CI_i * SOC_c$ as instruments for the endogenous interaction terms $CI_i * FD_c$ and $CI_i * RL_c$. We also multiply the dependence on external finance ExF_i with legal origins variables. This yields four more interactions ($ExF_i * BRIT_c$, $ExF_i * FR_c$, $ExF_i * GER_c$, and $ExF_i * SOC_c$) which we use as *additional* instruments in estimations containing the endogenous variable $ExF_i * FD_c$. In this way we instrument every endogenous interaction term by appropriate interactions of industry characteristics and legal origins dummies. Such approach enables to combine the instrumentation with a proper control for theoretical mechanisms different from ours.

Table 2 presents results of the instrumental variable (GMM) estimation of equation (1). The first three columns are the GMM analogue for the first three columns from Table 1. The coefficient for the interaction term of the contract intensity measure and bank credit to GDP remains positive and significant at least at 5% level in all three specifications. The coefficient for the rule of law interaction becomes significant at 5% level as well, suggesting that contract-intensive industries benefits from both legal and financial development. The interaction term of external finance dependence and bank credit remains positive but insignificant after instrumentation.

At the bottom of Table 2, we report the weak instrument test suggested by Stock and Yogo (2002), the partial R-squared measure suggested by Shea (1997) and the Sargan/Hansen test of overindentifying restrictions. The first stage statistics confirm that our excluded instruments are highly correlated with the endogenous variables. The F statistics from the first stage regressions are mostly above 26. The somewhat lower value for the third specification is probably due to the higher number of instruments.[16] However, it is still above the rule of thumb value of 10 proposed by Yogo and Stock. We also report the Cragg-Donald statistic suggested by Stock and Yogo in the pres-

[15] La Porta et al. (1997, 1998) show that the origin of the legal system affects investor protection and financial development. Djankov et al. (2003) find that legal origin has an impact on judicial quality and contract enforcement.

[16] Four interaction terms of external finance dependence related to the Rajan and Zingales (1998) channel ($ExF_i * BRIT_c$, $ExF_i * FR_c$, $ExF_i * GER_c$, and $ExF_i * SOC_c$) add up to four instruments ($CI_i * BRIT_c$, $CI_i * FR_c$, $CI_i * GER_c$, and $CI_i * SOC_c$) affiliated to our main endogenous term $CI_i * FD_c$.

ence of several endogenous regressors.[17] Both tests reject the null hypothesis of weak instruments. The Sargan/Hansen test of overidentifying restrictions checks the validity of the instruments: the instruments are uncorrelated with the error term under the null hypothesis. The test rejects this null hypothesis at 10% level of significance in two out of three specifications, implying that our set of instruments does not satisfy the required orthogonality condition. Some of the instruments might be either not truly exogenous or incorrectly excluded from the regression.

Legal origin can influence different spheres of economic and political life of the country which might pose problems when using it as instrument. In our case the financial and institutional development are highly correlated with overall economic progress. For example, sectors with a high share of relationship-specific inputs might also require a disproportionate share of skilled labour or modern technologies. The contract-intensive sectors might then grow faster in developed countries that happen to be rich in human capital and operate on the technological frontier. To take care of this problem, we add the interaction terms of the industry dummies with the log of real income per worker into regression equation.[18] The overall economic development can now affect each sector in an unrestricted way via those interactions. We thus explicitly control for the possibility that developed countries have some (possibly unobservable) features that facilitate growth in contract-intensive industries.[19]

We report the results of the GMM estimation with industry dummies interactions in columns (4), (5) and (6) of Table 2. Comparing these last three columns with columns (1)-(3) documents the robustness of our mechanism to this more stringent specification. The coefficient for the variable of interest $CI_i * FD_c$ slightly decreases in the presence of industry dummies interactions, but remains positive and significant. In contrast, the coefficient for the interaction term of rule of law and contract intensity $CI_i * RL_c$

[17] The critical values of the Cragg-Donald statistics are tabulated in Stock and Yogo (2002).

[18] Levchenko (2007) uses the interaction terms of industry dummies and economic development while refraining from the use of instrumental variables. Nunn (2007) relies on legal origins as instruments for institutional quality, but does not include the industry dummies interactions in the IV regressions. Here we combine both approaches.

[19] An alternative way would be to include additional interactions in our instrumental variable estimation, but it would be extremely difficult to control for all possible channels. There might always be some other unobserved characteristic of developed countries generating a higher growth in the sectors relying on relationship-specific investments from their suppliers. Interaction terms of real income per worker with industry dummies control for all such unobservables.

becomes insignificant and the external finance dependence interaction $ExF_i * FD_c$ has now a negative sign. The Sargan/Hansen statistics clearly improves: now we cannot reject the null hypothesis of instruments validity at a 10 % level of significance in two out of three specifications. The negative result for Sargan/Hansen test in the last column suggests problems with the set of additional instruments controlling for the channel of dependence on external finance (see footnote 16).

4.3 Decomposing Banks' Pro-Growth Effect

So far we have provided evidence that a well-developed banking system plays an important role in promoting the sectors requiring relationship-specific investments from their suppliers. In this section we study in more detail the specific channels through which this link between banks and the real economy operates. We implement two decompositions of the overall output growth. First, we examine whether our mechanism works on the extensive margin (via increased entry of new firms) or on the intensive margin (via accelerated growth of existing firms). Then we carry out a standard growth accounting exercise testing whether overall growth comes from higher capital accumulation, increased employment or faster technological progress (TFP growth).

Tables 3 and 4 isolate the extensive and the intensive margin of output growth. The dependent variables are average growth in number of establishments (Table 3) and average growth per establishment (Table 4). The first three columns correspond to the OLS regressions from the first three columns of Table 1, the following six columns mirror the instrumental variable (GMM) estimation of Table 2. Columns (4) to (6) present the baseline GMM estimation and the last three columns include the interaction terms of industry dummies with GDP per worker. The results provide clear evidence that the extensive margin is the driving force behind the positive effect of a strong bank system on the sectors with a high share of relationship-specific inputs. In Table 3, the variable of interest $CI_i * FD_c$ is always positive and statistically significant. In the case of the intensive margin (Table 4), the disproportionate positive impact of bank credit over GDP on the growth of contract-intensive industries is statistically significant only in two out of nine specifications. Especially, there is no significant effect once we control for the endogeneity of financial development and rule of law (columns three to nine).

These results suggest that banks facilitate the creation of new firms in contract-intensive industries rather than helping the existing companies to expand. This is in

line with the signalling channel by Fama (1985). A new buyer with no existing record of fulfilling her commitment will face more wariness from the suppliers of relationship-specific inputs. Consequently, she will be heavily dependent on credible signals about her financial stability that arise from a successfully obtained bank loan. In contrast, an existing firm has usually already built up a stable network of business partners. An established buyer can thus rely more on her own reputation and familiarity with suppliers and less on reputational signals from third parties like banks.

Next, we analyze the effect of financial development on sectors with a high share of relationship-specific inputs within the growth accounting framework. In order to do so, we reconstruct capital stock using the methodology of Hall and Jones (1999) and TFP using the methodology of Solow (1957). Appendix B provides details of the procedure. Tables 5 to 7 summarize the outcome of this second channel decomposition. The dependent variables are average growth of capital (Table 5), average growth in employment (Table 6) and average TFP growth (Table 7). Again, the first three columns report the OLS estimations, the following three present the results of the baseline GMM estimation and the last three columns report the results of the GMM estimation augmented with the interactions of industry dummies and GDP per worker.

The growth accounting suggests a higher capital accumulation as the most important source of the banking sector's beneficial impact on the industries relying on relationship-specific investment from their suppliers. After correcting for the endogeneity of financial and institutional development in columns (4) to (9) of Table 5, the variable of interest $CI_i * FD_c$ becomes highly statistically significant. This positive effect of bank credit on capital growth in the contract-intensive industries provides empirical support for the theoretical channel proposed by von Thadden (1995). A higher capital accumulation would be a first-order implication of a theoretical mechanism working through bank loans attenuating the short-term investment bias and increasing the firms' planning horizon.

We have less clear-cut evidence for a positive role of the banking system in boosting employment in industries with a high share of relationship-specific inputs. In Table 6 the estimated coefficient for the main interaction $CI_i * FD_c$ is always positive and mostly significant. Still, the relationship between financial development and employment growth in the contract-intensive industries appears less robust than in the case of capital accumulation.

There is no evidence that the banking system promotes economic growth via productivity growth in the sectors dependent on relationship-specific investment from their suppliers. Table 7 presents the estimation results with TFP growth as a dependent variable. The results in the first three columns show the interaction term of bank credit and contract intensity entering the OLS regressions at the 10% level of significance. Once we control for endogeneity (last six columns), this significance disappears and sometimes the main variable $CI_i * FD_c$ enters with a negative sign.

Overall, the two decompositions performed in this section suggest that a strong banking system promotes industries with a high share of relationship-specific inputs mainly via increased entry of new firms and higher capital accumulation. These results confirm the empirical relevance of the theoretical channels emphasizing bank loans as a signalling device (Fama 1985) and as a source of long-term investment planning horizon for the firms (von Thadden 1995).

5 Evidence from U.S. Bank Branch Deregulation

The analysis based on international data suggests that a strong banking sector particularly promotes industries dependent on relationship-specific investments from their suppliers. In order to further investigate this issue we check our prediction using data from the U.S. bank branch deregulation. The banking industry experienced significant changes after the states removed the restrictions governing the geographical scope of banking operations. The banking sector consolidated as large bank holding companies acquired banks and converted existing bank subsidiaries into branches. Small banks lost market share and regional bank markets experienced significant entry of new banks. The consolidation and the entry of new banks provided an important selection mechanism to replace less efficient banks. The average costs of intermediation decreased via better loan monitoring and screening. All these changes translated into a higher economic growth in states that deregulated the banking sector (see e.g. Jayaratne and Strahan 1996, Kroszner and Strahan 1999, Black and Strahan 2002, Strahan 2003).

Looking beyond aggregate outcomes, bank deregulation could have a particularly big impact on firms trying to stimulate relationship-specific investment from their suppliers. A buyer in a stable long-term relationship with a strong bank has better chances to reassure a business partner about her own reliability and financial stability. However, the

overall effect of bank deregulation on established bank-firm relationships is theoretically and empirically ambiguous.

The increased quality of surviving banks should benefit firms depending on reputational signals connected with an approved loan. Jayaratne and Strahan (1996) show that intrastate branch deregulation leads to a decrease in shares of total loans corresponding to nonperforming loans, loans written off during the year and loans to the bank insiders (executive officers and principal shareholders). Such improvements in the quality of bank loan portfolios and the lack of a consistent increase in lending volume suggest a better loan screening and monitoring after the bank deregulation. Superior bank monitoring and screening in turn increase the ability of a bank loan to signal the buyer's creditworthiness towards a supplier contemplating to undertake a relationship-specific investment.

The direct effects of bank competition and consolidation on relationship banking are less clear-cut. On the one hand, deregulation decreases the monopoly power of local banks and may therefore destroy their incentive to forge long term relationships with local businesses. Petersen and Rajan (1995) develop a model in which the market power of banks helps new businesses. Monopolistic banks can subsidize borrowers during some periods because they can extract rents during other times. In competitive markets, however, firms have access to alternative sources of credit. Here banks cannot offer low prices early on as they lack the market power to recover those investments later. On the other hand, Boot and Thakor (2000) argue that bank competition may raise the rewards for activities that allow to differentiate themselves from other lenders, which raise the incentive to invest in relationships with borrowers.

The empirical results are mixed as well. Black and Strahan (2002) show that U.S. bank deregulation benefits new firms that traditionally depend on relationship lending. They find that the rate of new incorporations in an average state increased significantly after deregulation. Cetorelli and Gambera (2001) find that industries dependent on external finance grow faster in countries with a more concentrated banking system than they do in countries with a more open and competitive banking sector. The papers examining the effect of banking consolidation on the lending to small businesses have also come to contradictory conclusions (see Black and Strahan 2002 and references therein).

Similarly to small and new enterprises, the firms requiring relationship-specific investments from their suppliers also disproportionately depend on a committed long-term

relationship with their bank. In this context a pro-growth effect of bank deregulation on industries with a high share of relationship-specific inputs would suggest an overall positive effect of increased bank competition on relationship lending.

Table 8 presents the estimation results for the sample of U.S. states. Our variable of interest is the interaction term of the deregulation dummy with the contract intensity measure. In all specifications we include the initial share of the industry in the state manufacturing output to capture an expected slower growth of bigger and more mature industries. We also control for overall economic growth in a given state and year. The standard errors are clustered by state. The first column reports the results of estimating equation (2) with the full set of state, industry and time fixed effects. The coefficient for the main variable is positive but significant only at 15% level. This lower level of significance is not surprising given the mixed theoretical and empirical results about the impact of bank deregulation on firms reliant upon relationship lending.

The next four columns report the estimation results for equation (3). This specification allows to examine whether bank deregulation and the quality of state courts act as substitutes or complements in stimulating relationship-specific investment. The second column adds two interaction terms containing the state courts' quality from the year 2001, while adopting the set of fixed effects from column (1). Both bank deregulation and superior state courts have a positive and significant effect on the growth of industries using a high share of relationship-specific inputs. Furthermore, the significantly negative coefficient for the triple interaction term suggests substitutability between strong banks and outstanding state courts in reassuring the firms undertaking relationship-specific investment. Strong and efficient banks emerging from bank deregulation seem to matter especially in U.S. states with a lower court quality. Intuitively, a buyer of relationship-specific inputs needs a reputational signal from a strong bank to reassure her supplier who cannot fully trust in smooth court enforcement of a written contract. The quality of the bank that signals the buyer's trustworthiness matters less if the supplier can confide in superior local courts.

A possible concern within this framework is the omission of alternative growth channels working through various state and industry characteristics that are correlated with included interaction terms. In our international sample we controlled for this possibility by interacting the industry fixed effects with the log of real income per worker. The additional time dimension in the panel of U.S. states allows for a more stringent spec-

ification by adding a full set of state-industry fixed effects into the regression. Column (3) reports the results. The positive effect of bank deregulation on contract-intensive industries and the substitutability between banking and legal channel are still present. The state-industry fixed effects now capture the impact of state courts' quality on the industries with a high share of relationship-specific inputs.

Another concern relates to possible changes of legal quality over time. Columns (4) and (5) repeat the estimation of the previous two columns using the most recent data for the quality of state courts from the year 2008. The results are qualitatively the same.

One caveat deserves a mention at this place. The overall legal and institutional standards in the United States are rather high, despite the differences in the quality of state courts. The substitutability between legal quality and strong banks in reassuring the suppliers of relationship-specific inputs can be the consequence of this fact. In countries at a lower development stage the complementarity forces might prevail as the credibility of the buyer's bank might require at least some degree of legal and institutional quality. An interesting topic for further research could be to explore the substitutability versus complementarity between legal and financial system in stimulating relationship-specific investment by exploiting legal differences across provinces of a big developing country.

6 Conclusion

Several prominent papers (Williamson 1971, 1979, Klein et al. 1978, Grossman and Hart 1986, Hart and Moore 1990) argue that a rational agent (e.g. upstream supplier) tends to underinvest in relationship-specific assets as she will eventually face opportunistic actions from her contractual partner (downstream purchaser). A legally binding contract between the two parties is the standard proposal to alleviate the adverse economic consequences of this holdup problem. The recent trade literature (Nunn 2007, Levchenko 2007) builds upon this insight and demonstrates the beneficial impact of contract-enforcing institutions on sectors with a high share of relationship-specific inputs. The empirical results in this paper suggest that financial development might be at least equally important for the economic performance of such contract-intensive industries.[20] A well-developed banking sector seems especially important in this regard.

[20] To be precise, the results of this paper are not directly comparable with those in the trade literature. Our dependent variable is the growth of industrial output, while Nunn (2007) and Levchenko (2007) focus on the export performance of industries. This is an important distinction as our channel works

This is not to say that institutions do not play a potentially important role in the development of industries requiring relationship-specific investments from their suppliers. First, bank products suitable for reassuring the producers of relationship-specific inputs often require a functioning legal system. Letters of credit would be a primary example. One might thus view institutional quality and strong banking sector as complements, rather than substitutes. Our results from the sample of U.S. states suggest the prevalence of substitution forces in the case of one highly developed country. However, one could suspect a stronger complementarity between a vigorous banking sector and a functioning legal system in countries at lower stages of development.

Second, an influential strand of literature (e.g. Levine et al. 2000) argues that good institutions including contract enforcement can boost financial development. Thus, one possible interpretation of our results would be that superior institutions promote investments into relationship-specific assets indirectly via their positive impact on the level of financial development.

Needless to say, much more work is needed to disentangle the effects of finance and institutions on industries using relationship-specific inputs. For one thing, there is an issue of a possible non-monotonicity between contract enforcement and finance, briefly raised by Levine et al. (2000). The theoretical literature explains the very existence of financial intermediaries as the consequence of market imperfections (e.g. Boyd and Prescott 1985). In a world with perfect contract enforcement, there would be less reasons to have financial intermediaries in the first place. Moreover, various deep determinants of economic growth like culture or human capital can drive both financial and institutional development. We leave those issues for further research.

References

[1] Allen, Franklin, Jun Qian, and Meijun Qian, 2005, "Law, Finance, nad Economic Growth in China," Journal of Financial Economics, vol. 77, pp. 57-116.

mostly via the extensive margin (increased entry of new firms). Arguably, the export performace of an industry relies mostly on older established firms.

[2] Baum, Christopher F., Mark E. Schaffer, and Steven Stillman, 2003 "Instrumental variables and GMM: Estimation and testing," Stata Journal, Stata Corp LP, vol. 3(1), pp 1-31.

[3] Beck Thorsten, 2008, "The Econometrics of Finance and Growth," World Bank Policy Research Working Paper No. 4608

[4] Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine, 2000, "A New Database on Financial Development and Structure," World Bank Economic Review 14, pp. 597-605.

[5] Berkowitz, Daniel, Johannes Moenius, and Katharina Pistor, 2006, "Trade, Law, and Product Complexity," Review of Economics and Statistics, 88(2), pp. 363-373.

[6] Black, Sandra E., and Philip E. Strahan, 2002, "Entrepreneurship and Bank Credit Availability," Journal of Finance, American Finance Association, vol. 57(6), pp. 2807-2833.

[7] Boot, Arnoud W. A., 2000, "Relationship Banking: What do we know?", Journal of Financial Intermediation, 9, pp. 7-25.

[8] Boot, Arnoud W. A., Stuart I. Greenbaum, and Anjan V. Thakor, 1993, "Reputation and Discretion in Financial Contracting," American Economic Review, vol. 83(5), pp. 1165-1183.

[9] Boot, Arnoud W. A., and Anjan V. Thakor, 2000, "Can Relationship Banking Survive Competition?," Journal of Finance, vol. 55(2), pp. 679-713.

[10] Boyd, John H., and Edward C. Prescott, 1985, "Financial Intermediary-Coalitions," Research Department Staff Report 87, Federal Reserve Bank of Minneapolis

[11] Caballero, Ricardo J., and Mohamad L. Hammour, 1998, "The Macroeconomics of Specifity," Journal of Political Economy, vol. 106(4), pp. 724-767.

[12] Cetorelli, Nicola, and Michele Gambera, 2001, "Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data," Journal of Finance, vol. 56(2), pp 617-648.

[13] Diamond, Douglas W., 1984, "Financial Intermediation and Delegated Monitoring," Review of Economic Studies, 51, pp. 393-414.

[14] Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2003, "Courts," Quarterly Journal of Economics 118, pp. 453-517.

[15] Fama, F.,Eugene, 1985, "What's Different About Banks?", Journal of Monetary Economics, 15(1), pp. 29-39.

[16] Fama, F.,Eugene, and Michael C. Jensen, 1983, "Separation of Ownership and Control," Journal of Law and Economics, 26, pp. 301-325.

[17] Fama, F.,Eugene, and Michael C. Jensen, 1985, "Organizational Forms and Investment Decisions," Journal of Financial Economics, 14, pp. 101-119.

[18] Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2004, "Do Institutions Cause Growth?", Journal of Economic Growth, pp. 271-303.

[19] Grossman, Sanford, and Oliver Hart, 1986, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", Journal of Political Economy 94, pp. 691-719.

[20] Hart, Oliver, 1995, "Firms, Contracts, and Financial Structure," Oxford University Press

[21] Hart, Oliver, and John Moore, 1990, "Property Rights and the Nature of the Firm", Journal of Political Economy 98, pp. 1119-1158.

[22] Hall, Robert, and Chad Jones, 1999, "Why Do Some Countries Produce So Much More Output per Worker then Others," Quarterly Journal of Economics, 114, pp. 83-116.

[23] Heston, Alan, Robert Summers, and Bettina Aten, 2002, "Penn World Table Version 6.1", Center for International Comparisons at the University of Pennsylvania (CICUP).

[24] Jayaratne, Jith, and Philip E. Strahan, 1996, "The Finance-Growth Nexus: Evidence from Bank Branch Deregulation," The Quarterly Journal of Economics, Vol.111, pp 639-670.

[25] Kahan, Marcel, 2006, "The Demand for Corporate Law: Statutory Flexibility, Judicial Quality, or Takeover Protection?" The Journal of Law, Economics and Organization, Vol. 22 (2), pp. 340-365.

[26] Kaufmann,Daniel, Aart Kraay, and Massimo Mastruzzi, 2008, "Governance Matters VII: Governance Indicators for 1996-2007". World Bank Policy Research June 2008.

[27] Klein, Benjamin, Robert G. Crawford, and Armen A. Alchian, 1978, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," Journal of Law and Economics, vol. 21, pp. 297-326.

[28] Kroszner, Randall S., and Philip Strahan, 1999, "What Drives Deregulation? Economics and Politics of the Relaxation of Bank Branching Restrictions," Quarterly Journal of Economics, pp.1437-67.

[29] Laeven, Luc, Daniela Klingebiel, and Randall S. Kroszner, 2002, "Financial Crises, Financial Dependence, and Industry Growth," World Bank Policy Research Working Paper No. 2855

[30] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, 1997, "Legal Determinants of External Finance," Journal of Finance, LII, pp. 1131–1150.

[31] ——, 1998, "Law and Finance," Journal of Political Economy, CVI, pp.1113–1155.

[32] ——, 1999, "The Quality of Government," Journal of Law, Economics, and Organization, XV, pp.222–279.

[33] Leland, Hayne E., and David H. Pyle, 1977, "Informational Asymmetries, Financial Structure, and Financial Intermediation," Journal of Finace, 32, pp. 371-387.

[34] Levchenko, Andrei, 2007, "Institutional Quality and International Trade", Review of Economic Studies, 74(3), pp.791-819.

[35] Levchenko, Andrei, Romain Ranciere, and Mathias Thoenig "Growth and Risk at the Industry Level: the Real Effects of Financial Liberalization", Forthcoming, Journal of Development Economics.

[36] Levchenko, Andrei, 2008, "International Trade and Institutional Change", mimeo, University of Michigan.

[37] Levine, Ross, 2005, "Finance and Growth: Theory and Evidence," Handbook of Economic Growth, Eds:Philippe Aghion and Steven Durlauf, The Netherlands: Elsevier Science.

[38] Levine, Ross, Norman Loayza, and Thorsten Beck, 2000, "Financial intermediation and growth: Causality and causes," Journal of Monetary Economics, vol. 46(1), pp. 31-77.

[39] Levine, Ross, and Sara Zervos, 1998, "Stock Markets, Banks, and Economic Growth," American Economic Review, vol. 88(3), pp. 537-58.

[40] Nicita, Alessandro, and Marcelo Olarreaga, 2007, "Trade, Production, and Protection Database, 1976-2004," World Bank Economic Review, Vol. 21 (1), pp. 165-171.

[41] Nunn, Nathan, 2007, "Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade," The Quarterly Journal of Economics, MIT Press, 122(2), pp 569-600.

[42] Ongena, Steven R.G., and David C. Smith, 1998, "Bank Relationships: A Review," in Zenios, S. A. and P. Harker (eds.), Performance of Financial Institutions (Cambridge University Press), pp. 221-258.

[43] Pagan Adrian R., and Anthony D. Hall, 1983, "Diagnostic tests as residual analysis," Econometric Reviews, Taylor and Francis Journals, vol. 2(2), pp. 159-218.

[44] Petersen, Mitchell A., and Raghuram G. Rajan, 1995, "The Effect of Credit Market Competition on Lending Relationships," The Quarterly Journal of Economics, vol. 110(2), pp.407-43.

[45] Rajan, Raghuram G., 2005, "Has Financial Development Made the World Riskier?" Proceedings of the Jackson Hole Conference organized by the Federal Reserve Bank of Kansas City

[46] Rajan, Raghuram G., 1998, "The Past and Future of Commercial Banking Viewed through an Incomplete Contract Lens," Journal of Money, Credit, and Banking, vol. 30(3), pp. 524-550.

[47] Rajan, Raghuram G., and Luigi Zingales, 1998, "Financial Dependence and Growth",American Economic Review, 88(3), pp. 559-86.

[48] Rauch, James E., 1999, "Networks Versus Markets in International Trade," Journal of International Economics 48(1)), pp 7-35.

[49] Robinson, Joan, 1952, "The Rate of Interest and other essays", London: Macmillan

[50] Royal Swedish Academy of Science, 2009, "Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009," http://nobelprize.org/nobel_prizes/economics/laureates/2009/ecoadv09.pdf

[51] Schumpeter Joseph A., 1912, "Theorie der wirtschaftlichen Entwicklung", Lepzig, Germany: Dunker & Humblot

[52] Shea, John S., 1997, "Instrument Relevance in Multivariate Linear Models: A Simple Measure", Review of Economics and Statistics, Vol. 79, no. 2, pp. 348-352.

[53] Solow, Robert M., 1957, "Technical Change and the Aggregate Production Function." Review of Economics and Statistics, vol. 39(3), pp. 312-320.

[54] Stock, James H., and Motohiro Yogo, 2002, "Testing for Weak Instruments in Linear IV Regression," NBER Technical Working Papers 0284, National Bureau of Economic Research, Inc.

[55] Strahan, Philip, "The real effects of US banking deregulation", 2003, Federal Reserve Bank of St.Louis Review.

[56] von Thadden, Ernst-Ludwig, 1995, "Long-Term Contracts, Short-Term Investment and Monitoring," Review of Economic Studies, vol. 62(4), pp 557-75.

[57] Williamson, Oliver E., 1971, "Vertical Integration of Production: Market Failure Considerations," American Economic Review, papers and Proceedings, 61, pp. 112-123.

[58] Williamson, Oliver E., 1975, "Markets and Hierarchies," New York: Free Press

[59] Williamson, Oliver E., 1979, "Transaction Cost Economics: The Governance of Contractual Relations," Journal of Law and Economics, vol. 22, pp. 233-261.

Appendix A: Countries in the International Sample

Argentina; Armenia; Australia; Austria; Bangladesh; Benin; Bolivia; Botswana; Brazil; Bulgaria; Cameroon; Canada; Chile; Colombia; Costa Rica; Cote d'Ivoire; Cyprus; Czech Republic; Denmark; Ecuador; Egypt; El Salvador; Ethiopia; Finland; France; Gabon; Ghana; Greece; Guatemala; Honduras; Hong Kong; Hungary; Iceland; India; Indonesia; Iran; Ireland; Israel; Italy; Japan; Jordan; Kenya; Korea (Republic of); Kuwait; Kyrgyzstan; Latvia; Lithuania; Macao; Malawi; Malaysia; Malta; Mauritius; Mexico; Moldova; Mongolia; Morocco; Mozambique; Nepal; Netherlands; New Zealand; Nigeria; Norway; Oman; Pakistan; Panama; Peru; Philippines; Poland; Portugal; Qatar; Romania; Russia; Senegal; Singapore; Slovak Republic; Slovenia; South Africa; Spain; Sri Lanka; Sweden; Switzerland; Tanzania; Thailand; Trinidad &Tobago; Tunisia; Turkey; United Kingdom; United States; Uruguay; Venezuela; Yemen

Appendix B: Reconstructing Capital Stock and Total Factor Productivity

The capital stock in each year t is given by:

$$K_{ict} = (1 - \delta)K_{ict-1} + I_{ict}$$

We use a depreciation rate $\delta = 0.08$, and use the standard assumption that initial level of capital stock is equal to:

$$K_{ic0} = \frac{I_{ic0}}{\delta}$$

We compute total factor productivity at the industry level using the following formula:

$$\ln TFP_{ict} = \ln Y_{ict} - (1 - \alpha_{ic}) \ln K_{ict} - \alpha_{ic} \ln L_{ict}$$

where Y_{ict} is the total output, K_{ict} is the capital stock and L_{ict} is the total employment in the sector.

The α_{ic} is computed as the average of the total wage bill divided by value added for sector i for the US data,[21] this will allow us to avoid unduly reduction in our sample to the countries that have available data for value added and wage payment.

[21] Levchenko, Ranciere and Thoening (2008) who use similiar database to analyze the effect of finacial liberization on industry growth show that results do not change if a country' average labor share of sector i is used instead.

Appendix C: Data Sources

Variables	Sources
Financial Development Variables/ stock market capitalisation, private credit of the banks	Beck,Thorsten, Asli Demirgüç-Kunt and Ross Levine, (2000)
Capital, GDP deflator, Real GDP per Worker	Heston, Alan, Robert Summers, and Bettina Aten, (2002), "Penn World Table Version 6.1"
Contract intensity	Levchenko, Andrei, (2008)
Dependence on external finance	Laeven, Luc, Daniela Klingebiel, and Randall S. Kroszner, (2002)
Rule of Law	Kaufmann,Daniel, Aart Kraay and Massimo Mastruzzi (2008).
Legal origin and other instruments	Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, (2004)
Industry data, international sample	Trade, Production and Protection Database (UNIDO data)
Gross domestic product by states, sample of US states	Bureau of Economic Analysis
Branch deregulations dates	Strahan, Philip (2003)
Input-Output table 1972	Bureau of Economic Analysis

Appendix D: Summary Statistics for the International Sample

Variable		Obs	Mean	Std. Dev.	Min	Max
contract_intensity	Contract intensity (CI_i)	2341	0.493959	0.199193	0.058	0.859
RZ_fin_dep	Dependence on external finance (ExF_i)	2341	0.270577	0.351703	-0.45	1.14
growth	Growth of output	2341	0.012296	0.134721	-1.68474	1.592252
growth_TFP	Growth of TFP	1841	-0.0072	0.13059	-1.81938	1.526246
growth_capital	Growth of capital	1455	0.035673	0.131008	-0.63703	2.931202
growth_employees	Growth of employment	2325	0.002165	0.096035	-0.97985	1.609438
growth_establishment	Growth of number of establishments	2212	0.036042	0.102419	-0.65645	0.873138
growth_output_establishment	Growth of output per establishment	2196	-0.02775	0.158816	-1.17367	1.042946
initial_industry_share	Initial Industry Share	2341	0.040625	0.065368	8.43E-06	1
initial_ln_rgdpwok	Initial Log of Real GDP per Worker	2341	9.539266	0.991762	7.001464	11.6478
initial_pcrdbgdp	Initial Private Credit of the Banks to GDP (FD_c)	2341	0.308972	0.245056	0.013926	1.429799
initial_stmktcap	Initial Stock Market Capitalisation to GDP (StM_c)	2164	0.192104	0.285135	0.000504	1.417954
legor_fr	Dummy for French legal origin (FR_c)	2341	0.474584	0.49946	0	1
legor_ge	Dummy for German legal origin (GER_c)	2341	0.038018	0.19128	0	1

Appendix D: Summary Statistics for the International Sample (cont.)

Variable		Obs	Mean	Std. Dev.	Min	Max
legor_sc	Dummy for Scandinavian legal origin ($SCAN_c$)	2341	0.057241	0.232351	0	1
legor_so	Dummy for Socialistic legal origin (SOC_c)	2341	0.155916	0.362854	0	1
legor_uk	Dummy for Common Law ($BRIT_c$)	2341	0.274242	0.446227	0	1
pcrdbgdp_fin_dep	Private Credit of Banks to GDP multiplied by Dependence on external finance (ExF_i*FD_c)	2341	0.08456	0.155903	-0.64341	1.629971
pcrdbgdp_intensity	Private Credit of Banks to GDP multiplied by Contract Intensity (CI_i*FD_c)	2341	0.153016	0.145351	0.000808	1.228197
stmktcap_fin_dep	Stock Market Capitalisation to GDP multiplied by Dependence on external finance (ExF_i*StM_c)	2164	0.052581	0.144908	-0.63808	1.616467
stmktcap_intensity	Stock Market Capitalisation to GDP multiplied by Contract Intensity (CI_i*StM_c)	2164	0.094799	0.156793	2.92E-05	1.218022
Law_intensity_96	Rule of Law interacted with Contract Intensity (CI_i*RL_c)	2130	0.294926	0.159616	0.013948	0.814145

Appendix D: Summary Statistics for the US Sample

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
growth	Growth of output	19584	0.0199444	0.1991991	-2.114777	3.07245
initial_total_gsp	Gross state product in 1972	21560	99860.44	114022.5	8263.771	576793.7
initial_industry_share	Initial industry share	20560	0.0106398	0.014165	0	0.1675902
deregulation_dummy	Deregulation dummy	21560	0.6428571	0.4791685	0	1
contract_intensity_deregulation	Contract intensity measure multiplied by Deregulation dummy	21560	0.351336	0.3066127	0	0.859
RZ_fin_deregulation	External finance dependence measure multiplied by Deregulation dummy	14700	0.231	0.3502002	-0.45	0.96
contract_intensity	Contract intensity measure	21560	0.5465227	0.1988994	0.201	0.859
RZ_fin_dep	External finance dependence measure	14700	0.3593333	0.3803368	-0.45	0.96
total_gsp	Gross State Product	21560	129552.7	155335.5	8263.771	1065591
gsp	Gross Industry Output	20740	1312.225	2558.308	0	45402.2
growth_total_gsp	Growth of Gross State Product	20482	0.0279165	0.0328054	-0.2002096	0.155611

Appendix E: Correlation Matrix

Variable	pcrdbgdp_intensity	pcrdbgdp_fin_dep	legor_uk_fin_dep	legor_fr_fin_dep	legor_ge_fin_dep	legor_sc_fin_dep
pcrdbgdp_intensity	1					
pcrdbgdp_fin_dep	0.5466	1				
legor_uk_fin_dep	0.0737	0.3113	1			
legor_fr_fin_dep	0.0473	0.3599	-0.1516	1		
legor_ge_fin_dep	0.3078	0.4565	-0.047	-0.0637	1	
legor_sc_fin_dep	0.0304	0.1301	-0.047	-0.0637	-0.0197	1
legor_so_fin_dep	-0.0464	0.1121	-0.0831	-0.1125	-0.0349	-0.0349
legor_uk_intensity	0.1049	0.0632	0.6259	-0.2501	-0.0775	-0.0775
legor_fr_intensity	0.0622	0.0439	-0.2704	0.5838	-0.1136	-0.1136
legor_ge_intensity	0.458	0.247	-0.0725	-0.0982	0.6649	-0.0305
legor_sc_intensity	0.0404	0.0244	-0.0725	-0.0982	-0.0305	0.6649
legor_so_intensity	-0.0817	-0.0383	-0.132	-0.1788	-0.0554	-0.0554

Appendix E: Correlation Matrix (cont.)

Variable	legor_so_fin_dep	legor_uk_intensity	llegor_fr_intensity	legor_ge_intensity	legor_sc_intensity	legor_so_intensity
pcrdbgdp_intensity						
pcrdbgdp_fin_dep						
legor_uk_fin_dep						
legor_fr_fin_dep						
legor_ge_fin_dep						
legor_sc_fin_dep						
legor_so_fin_dep	1					
legor_uk_intensity	-0.137	1				
legor_fr_intensity	-0.2007	-0.4461	1			
legor_ge_intensity	-0.0538	-0.1197	-0.1753	1		
legor_sc_intensity	-0.0538	-0.1197	-0.1753	-0.047	1	
legor_so_intensity	0.6475	-0.2178	-0.3189	-0.0856	-0.0856	1

Table 1: Industry Growth - OLS

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Initial industry share	-0.427163*	-0.460688**	-0.429104*	-0.180169**	-0.181217**	-0.183024**
	(0.222520)	(0.233692)	(0.222907)	(0.072928)	(0.073780)	(0.073150)
Contract intensity x Bank credit (CI_i*FD_c)	0.168622***	0.140288***	0.153830***	0.166036***	0.157208***	0.164891***
	(0.051010)	(0.049353)	(0.051150)	(0.059935)	(0.059140)	(0.061695)
Contract intensity x Rule of law (CI_i*RL_c)		0.077823			0.040964	
		(0.081810)			(0.090876)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.022888			0.001477
			(0.021029)			(0.025216)
Contract intensity x Stock market (CI_i*StM_c)				-0.016778	-0.026171	-0.027906
				(0.041026)	(0.042170)	(0.041559)
External finance dependence x Stock market (ExF_i*StM_c)						0.017635
						(0.018114)
Constant	0.082217*	0.078562*	0.083147*	0.030840**	0.024652	0.031715**
	(0.044886)	(0.045507)	(0.045122)	(0.014685)	(0.018362)	(0.014811)
Observations	2341	2318	2341	2164	2164	2164
R^2	0.259	0.262	0.259	0.260	0.260	0.260

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Industry Growth - IV

	(1)	(2)	(3)	(4)	(5)	(6)
	GMM	GMM	GMM	GMM	GMM	GMM
VARIABLES						
Initial industry share	-0.377477*	-0.569208***	-0.212145	-0.466718**	-0.599841***	-0.310757*
	(0.195828)	(0.219374)	(0.186856)	(0.197717)	(0.215415)	(0.187858)
Contract intensity x Bank credit (CI_i*FD_c)	0.170650***	0.139658**	0.142058**	0.145903**	0.127298**	0.134117**
	(0.065013)	(0.063551)	(0.067147)	(0.065306)	(0.064518)	(0.065346)
Contract intensity x Rule of law (CI_i*RL_c)		0.144030**			0.161830	
		(0.068355)			(0.103474)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.011845			-0.012591
			(0.033936)			(0.034155)
Constant	0.005809	0.063716	-0.037297	0.220929*	0.272501**	0.148464
	(0.092316)	(0.097387)	(0.091017)	(0.133823)	(0.138852)	(0.130621)
Real GDP per worker x Industry dummies				Yes	Yes	Yes
Observations	2341	2318	2341	2341	2318	2341
R^2	0.253	0.257	0.247	0.272	0.276	0.269
F stat of excl instr	26.69	27.16	13.38	36.88	36.81	18.43
Cragg-Donald F statistic	104.7	93.36	47.20	122.3	100.3	58.17
Partial R2 Shea	0.159	0.148	0.153	0.183	0.156	0.179
p value of Hansen test	0.053521	0.160306	0.004721	0.120656	0.173590	0.034750

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Pagan-Hall general test statistic : 286.733 Chi-sq(124) P-value = 0.0000

Table 3: Decomposition of Growth, dependent variable growth of number of establishments

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	GMM	GMM	GMM	GMM	GMM	GMM
VARIABLES									
Initial industry share	-0.197946*	-0.212214*	-0.199160*	-0.212961**	-0.221677**	-0.193840**	-0.223257**	-0.237089**	-0.200478**
	(0.103941)	(0.108682)	(0.103937)	(0.100611)	(0.106184)	(0.094494)	(0.105054)	(0.110956)	(0.098416)
Contract intensity x Bank credit (CI_i*FD_c)	0.107322***	0.087360*	0.097294**	0.175959***	0.180838***	0.137834**	0.138937**	0.139297**	0.111086**
	(0.039274)	(0.051284)	(0.041107)	(0.059498)	(0.065757)	(0.059522)	(0.054783)	(0.055825)	(0.055162)
Contract intensity x Rule of law (CI_i*RL_c)		0.058494			-0.007903			-0.005256	
		(0.068142)			(0.059561)			(0.083217)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.015769			0.064136*			0.055781
			(0.018663)			(0.037680)			(0.041159)
Constant	0.053204***	0.048130**	0.053806***	0.113183**	0.118414**	0.108474*	1.011853***	1.023722***	0.982848***
	(0.017189)	(0.019134)	(0.017235)	(0.056344)	(0.059146)	(0.056323)	(0.215234)	(0.220718)	(0.212311)
Real GDP per worker x Industry dummies							Yes	Yes	Yes
Observations	2291	2268	2291	2291	2268	2291	2243	2220	2243
R^2	0.407	0.407	0.407	0.404	0.404	0.404	0.418	0.418	0.415
Partial R2 Shea				0.191	0.168	0.190	0.170	0.147	0.169
Cragg-Donald F statistic				127.8	107.9	60.40	107.0	89.38	52.65
F stat of excl instr				37.70	38.12	18.86	30.94	30.75	15.46
p value of Hansen test				0.228720	0.123042	0.315349	0.144656	0.067501	0.299569

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Decomposition of Growth, dependent variable growth of output per establishment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	GMM	GMM	GMM	GMM	GMM	GMM
VARIABLES									
Initial industry share	-0.201495	-0.214146	-0.202535	-0.219937*	-0.247939*	-0.188124	-0.235753**	-0.247004**	-0.207736*
	(0.129893)	(0.138153)	(0.130006)	(0.121886)	(0.132614)	(0.120722)	(0.114575)	(0.123936)	(0.112617)
Contract intensity x Bank credit (CI_i*FD_c)	0.105794*	0.131356**	0.095952	0.063178	0.057188	0.065624	0.053524	0.060523	0.063445
	(0.057488)	(0.063425)	(0.059858)	(0.053595)	(0.058932)	(0.063065)	(0.059075)	(0.064002)	(0.063996)
Contract intensity x Rule of law (CI_i*RL_c)		-0.054197			0.019933			-0.040865	
		(0.083478)			(0.075551)			(0.111443)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.015506			-0.007091			-0.019748
			(0.025737)			(0.037152)			(0.036605)
Constant	0.006918	0.017439	0.007469	-0.055501	-0.046433	-0.060872	-0.326692*	-0.317752*	-0.345655**
	(0.026883)	(0.029535)	(0.026977)	(0.086618)	(0.087796)	(0.087040)	(0.166687)	(0.168437)	(0.164597)
Real GDP per worker x Industry dummies							Yes	Yes	Yes
Observations	2196	2173	2196	2196	2173	2196	2196	2173	2196
R^2	0.359	0.359	0.359	0.357	0.357	0.357	0.377	0.377	0.376
Cragg-Donald F statistic				91.38	82.15	42.03	109.8	89.97	52.87
F stat of excl instr				23.30	23.74	11.67	31.41	31.29	15.69
Partial R2 Shea				0.150	0.141	0.147	0.176	0.151	0.175
p value of Hansen test				0.214	0.108	0.087	0.276	0.151	0.117

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Decomposition of Growth, dependent variable growth of capital

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	GMM	GMM	GMM	GMM	GMM	GMM
VARIABLES									
Initial industry share	-0.146491***	-0.152434***	-0.146861***	-0.145721***	-0.149677***	-0.140422***	-0.148025***	-0.159128***	-0.144397***
	(0.041040)	(0.044371)	(0.041057)	(0.039749)	(0.042981)	(0.039963)	(0.037593)	(0.042016)	(0.037652)
Contract intensity x Bank credit (CI_i*FD_c)	0.052756	0.029748	0.048862	0.140101***	0.128564***	0.106587**	0.142905***	0.134081***	0.119095***
	(0.036535)	(0.040118)	(0.036687)	(0.044917)	(0.047306)	(0.044013)	(0.046957)	(0.046279)	(0.045462)
Contract intensity x Rule of law (CI_i*RL_c)		0.095626*			0.018706			0.040702	
		(0.050568)			(0.057486)			(0.072989)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.006179			0.040846			0.022131
			(0.017390)			(0.026859)			(0.026184)
Constant	0.054229***	0.040625***	0.054442***	-0.028219**	-0.028709**	-0.028803**	0.259873***	0.240824***	0.243897***
	(0.009346)	(0.011093)	(0.009326)	(0.012643)	(0.014515)	(0.012609)	(0.089282)	(0.091095)	(0.089291)
Real GDP per worker x Industry dummies							Yes	Yes	Yes
Observations	1883	1861	1883	1883	1861	1883	1883	1861	1883
R^2	0.336	0.343	0.336	0.332	0.340	0.328	0.349	0.357	0.344
Partial R2 Shea				0.135	0.132	0.133	0.169	0.144	0.167
F stat of excl instr				16.81	17.36	8.421	29.81	29.80	14.88
Cragg-Donald F statistic				69.13	64.28	31.61	88.80	72.32	42.32
p value of Hansen test				0.786644	0.760398	0.031309	0.758388	0.836386	0.065818

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Decomposition of Growth, dependent variable growth of employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	GMM	GMM	GMM	GMM	GMM	GMM
VARIABLES									
Initial industry share	-0.230415*	-0.245140*	-0.233498*	-0.286295**	-0.296793**	-0.221833*	-0.342885***	-0.331658**	-0.296563**
	(0.130955)	(0.138330)	(0.131002)	(0.121787)	(0.133504)	(0.117037)	(0.123189)	(0.135212)	(0.119214)
Contract intensity x Bank credit (CI_i*FD_c)	0.062631*	0.059110*	0.041577	0.105409**	0.113016**	0.050555	0.085293*	0.094783*	0.062164
	(0.034028)	(0.034105)	(0.034034)	(0.045976)	(0.049677)	(0.047126)	(0.047055)	(0.049000)	(0.051874)
Contract intensity x Rule of law (CI_i*RL_c)		0.011494			-0.016936			-0.070734	
		(0.059962)			(0.058815)			(0.077712)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.032877*			0.050631**			0.010009
			(0.017422)			(0.025318)			(0.028589)
Constant	0.056661**	0.058411**	0.058061**	0.163916***	0.172525***	0.133103**	0.264133	0.262415	0.145436
	(0.026560)	(0.027786)	(0.026654)	(0.060468)	(0.063428)	(0.058274)	(0.160816)	(0.163527)	(0.156287)
Real GDP per worker x Industry dummies							Yes	Yes	Yes
Observations	2397	2374	2397	2397	2374	2397	2349	2326	2349
R^2	0.237	0.239	0.237	0.231	0.233	0.231	0.253	0.257	0.247
Cragg-Donald F statistic				139.4	116.3	65.34	120.0	98.19	57.78
p value of Hansen test				0.099528	0.047890	0.000104	0.214153	0.179159	0.003455
F stat of excl instr				40.83	41.37	20.39	36.15	36.14	18.06
Partial R2 Shea				0.197	0.172	0.193	0.179	0.153	0.177
p value of Hansen test				0.099528	0.047890	0.000104	0.214153	0.179159	0.003455

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Decomposition of Growth, dependent variable TFP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	GMM	GMM	GMM	GMM	GMM	GMM
VARIABLES									
Initial industry share	-0.218403	-0.246000	-0.218740	-0.135688	-0.224633	-0.139855	-0.211098	-0.228750	-0.209261
	(0.212291)	(0.227553)	(0.212563)	(0.177942)	(0.221340)	(0.176203)	(0.185902)	(0.210803)	(0.182760)
Contract intensity x Bank credit (CI_i*FD_c)	0.089042*	0.096470*	0.085523*	-0.015173	-0.010759	0.007866	-0.003632	0.001125	0.018299
	(0.051629)	(0.049578)	(0.050359)	(0.043991)	(0.043455)	(0.043963)	(0.044687)	(0.045021)	(0.044056)
Contract intensity x Rule of law (CI_i*RL_c)		-0.039307			0.052740			0.009792	
		(0.072918)			(0.066877)			(0.097246)	
External finance dependence x Bank credit (ExF_i*FD_c)			0.005591			-0.036266			-0.038277
			(0.019016)			(0.028320)			(0.029603)
Constant	0.021558	0.033936	0.021754	0.070629	0.102054	0.072699	-0.145263	-0.135535	0.071040
	(0.039491)	(0.040545)	(0.039633)	(0.106925)	(0.119164)	(0.105318)	(0.149988)	(0.152899)	(0.124026)
Real GDP per worker x Industry dummies							Yes	Yes	Yes
Observations	1841	1819	1841	1841	1819	1841	1841	1819	1841
R^2	0.159	0.161	0.159	0.155	0.157	0.152	0.182	0.184	0.181
Cragg-Donald F statistic				67.52	61.50	29.90	85.01	69.34	40.00
F stat of excl instr				16.58	17.20	8.347	29.57	29.58	14.78
Partial R2 Shea				0.135	0.129	0.132	0.166	0.141	0.164
p value of Hansen test				0.801564	0.674279	0.653574	0.801140	0.592076	0.535007

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Intrastate Branching Deregulation and Growth

	(1)	(2)	(3)	(4)	(5)
VARIABLES					
Initial industry share	-0.102394***	-0.105373***	-0.578159***	-0.142074***	-0.690125***
	(0.028806)	(0.029407)	(0.115396)	(0.015592)	(0.079438)
Deregulation	-0.001865	-0.001259	-0.014734	-0.001582	-0.018618
	(0.011527)	(0.011502)	(0.014181)	(0.011940)	(0.013976)
Contract intensity x Deregulation	0.027821	0.088338***	0.129080***	0.127016**	0.176098***
	(0.018883)	(0.026509)	(0.029103)	(0.048732)	(0.043323)
Contract Intensity x Courts quality		0.059840***		0.002591*	
		(0.022120)		(0.001485)	
Contract intensity x Deregulation x Courts quality		-0.027829***	-0.033301***	-0.001733**	-0.001980**
		(0.010022)	(0.009216)	(0.000777)	(0.000819)
State Growth	0.314610*	0.312857*	0.318522*	0.324738*	0.334136*
	(0.168214)	(0.167520)	(0.173351)	(0.169721)	(0.175403)
Industry x State FE	No	No	Yes	No	Yes
Industry FE	Yes	Yes	No	Yes	No
State FE	Yes	Yes	No	Yes	No
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	14074	14074	14074	13806	13806
R^2	0.062	0.062	0.109	0.065	0.115

Standard errors clustered by state in parentheses

*** p<0.01, ** p<0.05, * p<0.1