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Abstract

We show that contract-intensive industries grow disproportionately faster both in countries with a high initial level of financial development and in the US states which deregulated their banking sector. These industries use a high share of relationship-specific inputs that can be purchased only via specific contracts with the suppliers. Accordingly, both firms in those industries and their suppliers face above-average levels of risk and transaction costs. Our empirical results thus confirm the theoretical claim that finance promotes the real economy via managing risk and decreasing transaction costs. Furthermore, the pro-growth effect of finance seems to come from financial intermediaries like banks rather than from stock markets. This suggests that the intrinsic functions of relationship-banking (long-term commitment, increase in reputation and planning horizon of the borrowers) are especially important for the contract-intensive industries.

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1 Introduction

The incomplete contracts literature shows that a rational agent tends to underinvest in *relationship-specific assets* due to the possibility of an opportunistic behaviour from her contractual partner. 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 thus 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 the 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 made, the buyer can refuse to meet her commitment and trigger an ex post re-negotiation. Due to this holdup problem individually rational sellers will underinvest into relationship-specific assets, hurting the downstream firms with negative ramifications for aggregate growth. In theory, the producer of the final good could agree to sign a detailed and enforceable contract and thereby stimulate the supplier to undertake the optimal level of relationship-specific investment. In reality, even the most comprehensive contract remains incomplete as it cannot incorporate all possible states of world.[1]

Consequently, legally binding contracts only offer an imperfect remedy against the risk of opportunism associated with relationship-specific investment. Furthermore, the transaction costs of production increase due to negotiating of sophisticated contracts, not to mention the costs of possible legal enforcement. At this point financial development comes into play. After all, the management of risk and the decrease of transaction costs both belong to the main functions of finance (Levine 2005). There are also several reasons to expect a preeminent role of banking sector (as opposed to anonymous stock markets) in stimulating relationship-specific investment by the upstream firms.

[1] The seminal papers on incomplete contracts, relationship-specific investments and the associated holdup problem include Klein et al. (1978), Williamson (1979), Grossman and Hart (1986), and Hart and Moore (1990). Hart (1995) provides an intuitive introduction to this literature. Caballero and Hammour (1998) is an early work about macroeconomic consequences of relationship specificity and incomplete contracts.

First, even in countries with a highly effective legal system, the way through courts can involve significant costs with no guarantee of success. Banks routinely provide specialized products alongside the loans. These financial instruments (e.g. letters of credit) often present a convenient alternative to the cumbersome route of complicated contracts and their legal enforcement. Furthermore, the remunerative character of such accompanying products gives the banks the incentive to acquire deep knowledge about the specific industry in order to better fine-tune its services (Boot and Thakor 2000). In this context, one could also 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). Accordingly, 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 incomplete (or discrete) contracts. This makes banks especially qualified to understand the needs of the industries distinguished by the high share of incomplete contracts with their suppliers and offer an appropriate service for them. Tellingly, the seminal work on the macroeconomic implications of relationship-specific assets mentions in the first paragraph the bank credits and investments of the upstream firms as two examples of economic specificity (Caballero and Hammour 1998, p. 725).

Second, there is always a residual risk of a *vis major* holdup due to unexpected economic problems of the buyer. Equipped with detailed written contracts and operating in country with superior legal enforcement, suppliers will still face the risk of buyers unable to meet their financial commitments. Obtaining a bank loan is a particularly suitable way to signal creditworthiness to business partners (Fama 1985). Bank loans have often 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.[2]

Third, the credit lines can overcome the short-term bias in investment and lengthen the firms' planning horizon. 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

[2]The other agents with fixed payoffs (e.g. suppliers) 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).

closely resembling a standard bank-firm lending relationship can help to overcome this myopia problem. This can be decisive in order to induce relationship-specific investment. A firm undertaking such investment needs both to dispose of long-term planning horizon itself and to have business partners that shun myopic behaviour.

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. Even in a country with superior institutions and perfect contract enforcement, suppliers will still value good reputation, long-term planning horizon and financial stability of the purchasers. The current financial crisis made this point painfully clear. The most effective contract enforcement might fail to protect the suppliers 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.

We confirm our theoretical prediction by attesting that industries dependent on relationship-specific investments from their suppliers grow faster in countries with a high initial level of financial development. Furthermore, we provide evidence that this effect comes from a more developed banking sector rather than from a deeper stock market. Consistent with the outlined 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 attenuated short-term investment bias and increased planning horizon should affect the sectoral output growth primarily via the higher capital accumulation of firms. For our final test we turn to the process of bank deregulation in the USA.[3] Conditional on the quality of state court system, the bank deregulation benefits disproportionately the industries requiring relationship-specific investments from their suppliers.

[3]This is a unique natural experiment as it occurred in different states at different points in time. In their seminal paper, Jayaratne and Strahan (1996) show that GDP growth, in an average U.S. state, accelerates after relaxing restrictions on intrastate bank entry and expansion. To the extent that deregulation leads to a more competitive and efficient banking industry, this result provides support for the existence of a causal link between finance and economic growth.

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 the credit constraints in the real economy. 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. Such legal solution to an economic problem implies a prominent role for institutional quality, an idea pursued in the recent literature on trade and incomplete contracts. Levchenko (2007) and Nunn (2007) demonstrate a stronger export performance of the contract-intensive industries 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 reducing the costs associated with incomplete contracts and holdup problem.

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.[4] By looking at the contract-intensive industries our paper examines an alternative set of bank-dependent firms and provides some evidence in favour of a competitive banking sector.

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

2 Methodology and Data

2.1 Empirical Model

Our empirical model is based on the methodology introduced by Rajan and Zingales (1998) and then extensively used in the empirical literature examining the effects of finance on economic growth. In their seminal contribution, Rajan and Zingales handle the endogeneity issue which could not be solved in a satisfactory way by previous cross-country growth studies. 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. One way to establish the direction of causality is to verify a specific theoretical channel through which finance promotes economic growth. Rajan and Zingales (1998) focus on the role of financial development in relaxing the credit constraints of the firms. First they identify industries not generating enough cash-flow and thus dependent on external finance. Then they show that those industries indeed profit from financial development more than the others.

Our channel examines the role of financial development in stimulating the investment into relationship-specific assets. Specifically, we estimate the following equation:

$$G_{ic} = \alpha + \beta FD_{c0} * CI_i + \gamma X_{ic} + \delta_i + \eta_c + \varepsilon_{ic} \tag{1}$$

where the subscript c and i indicates country and industry respectively and the subscript 0 indicates beginning of the period variables. As a dependent variable we use several proxies for industrial growth: average growth of output, average growth of the number of establishments, average growth of output per establishment, average growth of employment, average growth of the capital stock and average growth of TFP. Our variable of interest is $CI_i * FD_{c0}$, where FD_{c0} is the initial 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 variables.

A positive estimated coefficient for our variable of interest, $CI_i * FD_{c0}$, would indicate 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. In order to account for alternative channels that might be correlated with our mechanism, we include several interactions between various country and industry characteristics into our set of control variables. We also put the initial share of the sector in total output into all regressions to control for the convergence effect.

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 are the same across countries, the technological characteristics of the U.S. industries are representative of technologies used in the 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. We use two different approaches to tackle this issue. First, we employ instrumental variable estimation. Second, we leave the cross-country framework and make use of a natural experiment in the form of branch deregulation in the United States.

In the instrumental variable approach we follow the finance-growth literature and use countries' legal origins as instruments. 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.[5]

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 not worse than the IV estimator.[6] However, the

[5] We run also estimation with malaria risk from Sachs and Malaney (2002) as additional instrument. The results are qualitatively the same.

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

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. Even though our sample has moderate size, we perform the heteroskedasticity test proposed by Pagan and Hall (1983). In our main specification we reject the null hypothesis of no heteroskedasticity at 1% level. Therefore we rely on GMM estimation for our analysis. [7]

The quasi-experimental approach offers another way to tackle the endogeneity in the finance-growth relationship. Starting with Jayaratne and Strahan (1996), an influential body of literature uses the process of branch deregulation in the United States in order to establish the causality link from finance to the real economy. Before the 1970s, commercial banks in most of the U.S. states were limited in the geographical scope of the operations even within the state borders. In the 1970s the process of deregulation started in many states by removing first the restrictions on intrastate branching via merging and acquisition followed by the elimination of the overall restriction on intrastate branching.[8] The staggered timing of state-level actions to remove branching restrictions creates an ideal framework to test empirically how these regulatory changes affect the banking sector and ultimately the real economy. It also allows to exploit variations across states and time of the growth rates of output to evaluate the effect of the deregulation on the specific industries.

We construct a dummy variable equal to one after a state permits intrastate branching via merging and acquisition and zero otherwise.[9] The growth effects of deregulation on contract-intensive industries are estimated using the following specification:

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

where G_{ist} is output growth for industry i in state s at time t, $Dereg_{st}$ is the dummy for branch 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)

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

[8] For a review of this literature see Strahan (2003).

[9] 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).

output and the growth rate of gross state product. The specification also contains a set of fixed effects $\triangle$. 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 of contract-intensive industries before and after deregulation with the difference in growth rate for a control group of industries before and after deregulation. Analogously to equation 1, a positive coefficient β_2 would imply that bank deregulation disproportionately benefits industries requiring a high share of relationship-specific inputs.

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. On the one hand, suppliers might weight the efficiency of the legal system against the financial stability of their customers when deciding on the level of their relationship-specific exposure. On the other hand, bank products eligible for reassuring those suppliers often require at least some level of legal quality. The relative importance of these effects will vary from country to country, depending on the level of development and other (possibly non-observable) country-specific characteristics. 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.

We augment equation 2 by adding two interaction terms:

$$G_{ist} = \alpha + \beta_1 Dereg_{st} + \beta_2 Dereg_{st} * CI_i + \beta_3 Courts_s * CI_i + \beta_4 Dereg_{st} * Courts_s * CI_i + \gamma X_{ist} + \delta_i + \triangle + \varepsilon_{ist} \quad (3)$$

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. This, assuming that β_2 and β_3 turn out to be positive as well. A negative coefficient for the triple interaction term would indicate substitutability between the two channels maintaining relationship-specific assets. Crucially, any of these results would apply only to countries sharing similar institutional, economic and financial structures with the United States.

2.2 Data

2.2.1 International Sample

The international industry-level data come from the Trade, Production, and Protection Database by Nicita and Olarreaga (2007) that has data on production for up to 100 countries over the period 1976 to 2004. The production data in this database come from the United Nations Industrial Development Organization (UNIDO) and are reported according to the 3-digit ISIC Revision 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. The initial industry share is constructed using the earliest available data for industry share, doing this we expand the sample of the countries since 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 neither can be sold on an organized exchange nor are reference priced in trade publications.[10] The intuition behind this empirical proxy for the severity of the holdup problem is simple. The non-existence of exchange or reference price suggests some non-standard feature of the product. If a producer requires a non-standardized intermediate good for the production, the supplier has to undertake ex ante investment in order to customize it. The value of such specific input is thus higher inside the buyer-seller relationship than outside it, resulting in the holdup problem. Moreover, in the absence of organized exchange or reference price the supplier might have a hard time to sell her product at the original price should the initial buyer

[10] 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.

refuse to pay. Given that the original measure in Nunn (2007) is reported for I-O 1997 industry 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 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) database that contains various indicators of financial development across countries and over time. In our analysis, we use two proxies for financial development: private credit to GDP and stock market capitalization to GDP, the standard proxies for financial development used in the empirical literature.

The data for quality of legal institutions, the "rule of law", is taken from the database constructed by Kaufmann, Kraay, and Mastruzzi (2005). This variable 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 the Appendix 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 explanatory variables used in the cross-country context.

2.2.2 Sample of U.S. States

The dates of branch deregulation in different U.S. states are taken from Strahan (2003). In the majority of states, bank deregulation occurred in two successive stages. The first stage of deregulation happened when the restriction of intrastate branching via merging and acquisition (M&A) was abandoned, the second stage of deregulation 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 the deregulation of M&A branching when constructing the deregulation dummy.

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. We restrict our sample to the period from 1978 till 1992 in accordance with the empirical literature on the bank deregulation in the USA.[11]

Nunn (2007) computes his contract intensity measure for NAICS1997 industries, while the manufacturing data from BEA are reported according to the 2digit SIC1972 classification. We aggregate contract intensity from Nunn (2007) over ranges of industries belonging to the same 2digit SIC1972 category using the concordance tables from NAICS1997 to SIC1987 and from SIC1987 to SIC1972.[12]

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 Intercative Inc. To our knowledge this annual survey (2001-2008) is the only U.S.-wide study of state courts' quality.[13] Kahan (2006) argues that the overall ranking of state courts is reasonable 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.

3 International Evidence

3.1 OLS Estimation: Banks versus 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. In all regressions we include

[11] The data on quantity index that is used to calculate price deflator is available starting from 1977. Jayaratne and Strahan (1996) use data for Gross State Product from 1978-1992.

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

[13] 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.

country and industry dummies, so the overall effect of initial financial development is absorbed by country dummies. 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 contract intensity and initial level of 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 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 relationship between financial development and output growth is not only statistically significant but also economically relevant. According to the estimate from the first column of Table 1, if Mexico's bank credit to GDP ratio reached the average OECD level, then the growth in manufacturing of "professional & scientific equipment" would increase by 5%. [14]

The subsequent columns present the regression results with an augmented set of explanatory variables. Columns 2 and 3 control for alternative country-industry economic channels which already found considerable empirical support and might be correlated with our mechanism. In the second column we include an interaction term of the contract intensity measure with institutional quality proxied by the rule of law. Financial development might be correlated with legal and contracting institutions. In such case our variable of interest would also capture the effect of superior institutions on the contract-intensive industries. Here we explicitly account for the channel examined in the recent trade literature (Nunn 2007, Levchenko 2007): the industries with a high share of relationship-specific inputs benefit disproportionately from a good contracting environment. In the third column we add the interaction term of industry's dependence on external finance and country's financial development. Contract-intensive industries might as well be the industries that require larger external funds to support their op-

[14] 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 "professional and scientific equipment" industry would increase by: $\beta * \triangle pcrdGDP * CI = 0.169. * (0.532 - 0.169) * 0.785 \approx 5\%$

erations. If so, then our variable of interest would also capture the beneficial effect of financial development on the industries dependent on external finance (Rajan and Zingales 1998). In both augmented specifications our variable of interest 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 industry characteristics into the set of explanatory variables. The coefficient for the interaction term of private credit to GDP remains positive and statistically significant at 1% level. The interaction term of the stock market capitalization to GDP with the contract intensity measure is never significant and even enters the regressions with a negative sign.[15] The results confirm the dominance of banks over anonymous stock markets in fostering the industries requiring relationship-specific investment from their suppliers. Given the clear outcome of this horse-race we focus on the banking sector in the rest of the paper.

3.2 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 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 as our instrumental variables, following the existing literature.[16] Specifically, we instrument

[15] 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.

[16] 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

the interaction terms of country characteristics (financial development, rule of law) and industry characteristics (importance of relationship-specific inputs, dependence on external finance) by the interaction terms of latter variables with legal origin dummies.

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 private 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 financial development 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.[17] 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 presence of several endogenous regressors.[18] 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 coun-

and contract enforcement.

[17] Notice that we instrument every endogenous interaction term by appropriate interactions of industry characteristics and legal origins dummies. In this way we want to properly control for theoretical mechanisms different from ours. This cautious approach increases the number of instruments from four to eight when controlling for the Rajan and Zingales (1998) channel: multiplicative terms of legal dummies with external finance dependence add to the interactions of contract intensity and legal origins.

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

try which might pose problems when using it as instrument. In our case the financial and institutional development are highly correlated with the overall economic progress. For example, the 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. We could 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. 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. 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 our variable of interest 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 becomes insignificant and the external finance dependence interaction 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 17).

[19]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.

3.3 Decomposing Banks' Pro-Growth Effect

So far we 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 rather 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 the overall growth affect 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 for the extensive margin to be 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, our variable of interest is always positive and statistically significant. In the case of the intensive margin (Table 4), the disproportionate positive impact of private 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 (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 firm with no existing record of fulfilling its commitment will face more wariness from the suppliers of relationship-specific inputs. Consequently, it will be heavily dependent on credible signals about its financial stability that arise from a successfully obtained bank loan. In contrast, an existing firm has usually already established a stable network of suppliers. It can thus rely more on its own reputation and familiarity with its business partners 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 standard methodology employed by 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 industry dummies interactions.

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 endogeneity of financial development in columns (4) to (9) of Table 5, the positive effect of private credit on capital growth in the contract-intensive industries becomes highly statistically significant. This result 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 our main variable of interest 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 private 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 enters with the negative sign.

Overall, the two decompositions performed in this section suggest that a strong

banking system promotes the industries with a high share of relationship-specific inputs mainly via increased entry of new firms and higher capital accumulation. Those 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).

4 Evidence from U.S. Branch Deregulation

The analysis based on international data suggests that financial development 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. 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. These changes in the banking sector became the source of an improved efficiency of the banking sector. The consolidation and the entry of new banks provided an important selection mechanism to replace less efficient banks. The formation of larger bank organizations allowed to explore economies of scale and to gain a better diversification via an expansion of the branch network. The average costs of intermediation decreased via better loan monitoring and screening. All these changes translated into overall higher growth of the real sectors of the economy (see e.g. Jayaratne and Strahan 1996, Kroszner and Strahan 1999, Black and Strahan 2002, Strahan 2003).

As the branch deregulation led not only to a more efficient but also to a more consolidated banking sector, its impact on contract-intensive industries is theoretically ambiguous. The increased quality of surviving banks should benefit industries that heavily depend on the quality of bank services.[20] The direct effects of bank competition

[20] Jayaratne and Strahan (1996) analyze the quality of bank loans before and after deregulation. They show that intrastate deregulation improves the quality of bank loan portfolios. In addition, they show that the quantity of loans granted to "insiders" (corporate executive, principal shareholders) decreases significantly after the branching reform. The improvement in bank loans after deregulation and the lack of a consistent increase in lending after the branch reform suggest that bank monitoring and screening improvement are the key to the observed growth increases.

and consolidation are not that clear-cut. On the one hand, contract-intensive industries may rely on specific long-term relationships with regional banks. The knowledge of the industries should allow local banks to provide fine-tuned banking services to their customers. Branch 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 branch 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 in contract-intensive industries also disproportionately depend on a committed long-term relationship with their bank. In this context a pro-growth effect of branch deregulation on contract-intensive industries 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 branch 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 the convergence effect. 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 branch 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 contract-intensive industries. Furthermore, the significantly negative coefficient for the triple interaction term suggests substitutability between strong banks and legal quality in reassuring the firms undertaking relationship-specific investment.

A possible concern within the Rajan-Zingales framework is the omission of alternative growth channels working through various country and industry characteristics that are correlated with included interaction terms. In our international sample we controlled for this possibility by interacting the industry dummies with the log of real income per worker. The three-dimensional panel of the U.S. states allows for a more stringent specification by adding a full set of state-industry fixed effects into the regression. This controls for possible interactions between different state and industry characteristics that might be correlated with our channel. Column (3) reports the results. Both 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.

5 Conclusion

Several prominent papers (Klein et al. 1978, Williamson 1979, 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.[21] A well-developed banking sector seems especially important in this regard.

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. The letter 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 a 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 possible nonlinearities 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

[21] 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 important as our channel seems to work mostly via the extensive margin (increased entry of new firms). Arguably, the export performace of an industry relies mostly on older established firms.

economic growth like culture or human capital can drive both financial and institutional development. We leave those issues for further research.

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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,[22] this will allow us to avoid unduly reduction in our sample to the countries that have available data for value added and wage payment.

[22] 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	2341	0.493959	0.199193	0.058	0.859
RZ_fin_dep	Dependence on external finance	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 establishment	2212	0.036042	0.102419	-0.65645	0.873138
growth_output_etsablishment	Growth 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 Rea GDP per Worker	2341	9.539266	0.991762	7.001464	11.6478
initial_pcrdbgdp	Initial Private Credit of the Banks to GDP	2341	0.308972	0.245056	0.013926	1.429799
initial_stmktcap	Initial Stock Market Capitalisation to GDP	2164	0.192104	0.285135	0.000504	1.417954
legor_fr	Dummy for French legal origin	2341	0.474584	0.49946	0	1
legor_ge	Dummy for German legal origin	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	2341	0.057241	0.232351	0	1
legor_so	Dummy for Socialistic legal origin	2341	0.155916	0.362854	0	1
legor_uk	Dummy for Common Law	2341	0.274242	0.446227	0	1
malfal	% of population at risk of malaria	2292	0.186172	0.340683	0	1
pcrdbgdp_fin_dep	Private Credit of the Bank to GDP multiplied by Dependence on external finance	2341	0.08456	0.155903	-0.64341	1.629971
pcrdbgdp_intensity	Private Credit of the Bank to GDP multiplied by Contract Intensity	2341	0.153016	0.145351	0.000808	1.228197
stmktcap_fin_dep	Stock Market Capitalisation to GDP multiplied by Dependence on external finance	2164	0.052581	0.144908	-0.63808	1.616467
stmktcap_intensity	Stock Market Capitalisation to GDP multiplied by Contract Intensity	2164	0.094799	0.156793	2.92E-05	1.218022
Law_intensity_96	Rule of Law interacted with Contract Intensity	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
deregulationdummy	Deregulation dummy	21560	0.6428571	0.4791685	0	1
contract_intensity_deregulation	Contract intenisty measure multiplied by Deregulation dummy	21560	0.351336	0.3066127	0	0.859
RZ_fin_deregulation	Extrenal finance dependence measure multiplied by Deregulation dummy	14700	0.231	0.3502002	-0.45	0.96
contract_intensity	Contract intenisty measure	21560	0.5465227	0.1988994	0.201	0.859
RZ_fin_dep	Extrenal 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
Bank credit x Contract intensity	0.168622***	0.140288***	0.153830***	0.166036***	0.157208***	0.164891***
	0.051010	0.049353	0.051150	0.059935	0.059140	0.061695
Rule of law x Contract intensity		0.077823			0.040964	
		0.081810			0.090876	
Bank credit x External finance dependence			0.022888			0.001477
			0.021029			0.025216
Stock Market x Contract intensity				-0.016778	-0.026171	-0.027906
				0.041026	0.042170	0.041559
Stock Market x External finance dependence						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
Bank credit x Contract intensity	0.170650***	0.139658**	0.142058**	0.145903**	0.127298**	0.134117**
	0.065013	0.063551	0.067147	0.065306	0.064518	0.065346
Rule of law x Contract intensity		0.144030**			0.161830	
		0.068355			0.103474	
Bank credit x External finance dependence			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
Bank credit x Contract intensity	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
Rule of law x Contract intensity		0.058494			-0.007903			-0.005256	
		0.068142			0.059561			0.083217	
Bank credit x External finance dependence			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
Bank credit x Contract intensity	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
Rule of law x Contract intensity		-0.054197			0.019933			-0.040865	
		0.083478			0.075551			0.111443	
Bank credit x External finance dependence			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
Bank credit x Contract intensity	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
Rule of law x Contract intensity		0.095626*			0.018706			0.040702	
		0.050568			0.057486			0.072989	
Bank credit x External finance dependence			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
Bank credit x Contract intensity	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
Rule of law x Contract intensity		0.011494			-0.016936			-0.070734	
		0.059962			0.058815			0.077712	
Bank credit x External finance dependence			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
Bank credit x Contract intensity	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
Rule of law x Contract intensity		-0.039307			0.052740			0.009792	
		0.072918			0.066877			0.097246	
Bank credit x External finance dependence			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	
Deregulation x Courts Quality x Contract intensity		-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

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