Trade and Financial Development*

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Abstract

The differences in financial development between advanced and developing countries are pronounced. It has been observed, both theoretically and empirically, that these differences in countries' financial systems are a source of comparative advantage and trade. This paper points out that to the extent a country's financial development is endogenous, it will in turn be influenced by trade. We build a model in which a country's financial development is an equilibrium outcome of the economy's productive structure: in countries with large financially intensive sectors financial systems are more developed. When a wealthy and a poor country open to trade, the financially dependent sectors grow in the wealthy country, and so does the financial system. By contrast, as the financially intensive sectors shrink in the poor country, demand for external finance decreases and the domestic financial system deteriorates. We test our model using data on financial development for a sample of 77 countries. We find that the main predictions of the model are borne out in the data: trade openness is associated with faster financial development in wealthier countries, and with slower financial development in poorer ones.

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1 Introduction

There are significant differences in financial development across countries. In 1995, the average ratio of private credit to GDP was 0.95 in OECD countries, and just 0.3 in developing countries (see Figure 1). At the same time, a significant and growing share of world's GDP is now exported and imported across country borders (Maddison, 2001). Do these two broad features of today's world economy interact in important ways?

When industries differ in their reliance on external finance, in the sense of, for example, Rajan and Zingales (1998), these differences would be expected to interact with cross-country variation in financial development to serve as a source of comparative advantage and trade. The notion of financial comparative advantage has been formalized theoretically by Kletzer and Bardhan (1987) and Baldwin (1989). The key insight is that countries endowed with better financial systems will produce and export financially dependent goods. Indeed, there is some recent empirical evidence that financial comparative advantage is relevant to trade patterns, e.g. Beck (2002, 2003), Becker and Greenberg (2003), Svaleryd and Vlachos (2004).

The framework in which differences in financial development are an exogenous determinant of trade is only appropriate if we believe that a country's financial system is exogenously given. One may take this view, for instance, in light of the strand of literature originated by La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), which provides evidence that financial development is determined in part by the type of legal system an economy adopted at some point in its history. A country's historical experience is clearly important. However, even within each legal system, countries differ a great deal in their degree of financial development. Along these lines, Rajan and Zingales (2003) document considerable variation in financial development over the past century, providing evidence that the historically inherited legal system is only one of many determinants of financial development. To the extent a country's financial system is endogenous, we would expect it to be influenced by the economic conditions a country faces, and that includes trade.

This paper analyzes the effect of international trade on financial development. We build a model with two sectors, one of which is financially intensive. The size of the financial system, that is, the amount of borrowing and lending that occurs in the economy, is naturally a function of total output in the financially intensive sector. Furthermore, the quality of the financial system is a function of its size. In our framework, a larger financial sector leads to the greater ease with which entrepreneurs are able to fulfill the need for external finance. This is because when entrepreneurs start financially intensive projects and engage

the country's financial system, they add liquidity. A deeper financial system makes projects less risky by reducing the number of states in which liquidity is lacking. Entrepreneurs that enter the financially dependent sector thus exert a positive externality on the other entrepreneurs.

We find plausible the positive feedback from the size of the financial system to its quality. Levine and Schmukler (2003) document that when some firms in emerging markets begin raising external finance abroad rather than at home, trading liquidity of the remaining domestic firms actually decreases, providing evidence that financial depth is positively related to market size. Furthermore, this type of effect is implicit is most studies of financial development quoted above. These studies typically use measures of financial system size, such as ratios of private credit to GDP or stock market capitalization to GDP, to proxy for financial system quality.

Opening to trade will affect demand for external finance, and thus financial depth, in the trading countries. In particular, when a wealthy country starts trading with a poor one, it will naturally increase production of the financially dependent good, and its financial system will deepen. In the poor country, on the other hand, the financially dependent sector will shrink, leading to a deterioration in the size of the country's financial system, as well as its quality.

The bottom line is that when a poor country no longer needs to produce the financially dependent good, demand for external finance will decrease as a result of trade, and the domestic financial system will suffer. This could induce losses from trade to the poor country, as could be expected given that the financially dependent industry exhibits external effects, and thus economy-wide increasing returns to scale (see Helpman and Krugman, 1985, ch. 3). Furthermore, the deterioration of the domestic financial system could be harmful to the poor country for reasons beyond gains from trade. Indeed, there is a great deal of empirical evidence that financial development is conducive to increasing growth and lowering volatility (Levine, 2003, Kose, Prasad and Terrones, 2003).

In illustrating the effect of trade on the financial system, we make a series of special assumptions. First, in modeling the market for external finance and the positive effect of financial system size on its quality, we abstract from the informational and enforcement frictions that are often invoked in this context. One can clearly adopt this approach as well, and think of the quality of the financial system in terms of how well it can overcome these distortions and achieve the efficient level of lending. A positive link between the size of the financial markets and their ability to resolve such frictions has been modeled, for example,

by Acemoglu and Zilibotti (1999).

On a related point, in our model countries will differ only in their levels of wealth, and wealth levels will determine the direction of financial comparative advantage. Differences in institutional quality, such as enforcement of contracts and property rights, are clearly important in driving the pattern of financial comparative advantage. Adding institutional differences to our framework will leave the main conclusions unchanged, and in fact reinforce the strength of financial comparative advantage as long as wealthier countries are also the ones with better institutions.

It is important to note that the effect of trade opening on financial development we illustrate here is one of many that could be relevant in practice. For instance, trade can increase uncertainty and income variability of agents within the economy (Newbery and Stiglitz, 1984). Financial system could then be expected to grow after trade opening, as agents' demand for insurance increases.[1] This type of mechanism is not inconsistent with the effect we are proposing. One important difference, however, is that our mechanism affects countries differentially, while the alternative one unambiguously implies an improvement of the financial system in all countries.

The model predicts that in wealthy countries, trade should be associated with faster financial development. By contrast, in poor countries, more trade should lead to slower financial development, as these countries import financially intensive goods rather than develop their own financial system. We use data on financial development for a sample of 77 countries compiled by Beck, Demirguc-Kunt, and Levine (2000) to show that the pattern predicted by the model seems to find empirical support. While for developed countries, higher trade openness is associated with faster growth of the financial system, developing countries that traded more experienced slower growth in their financial systems.

The rest of the paper is organized as follows. Section 2 presents the basic model and shows that when the amount of lending and the quality of the financial system are equilibrium outcomes, they will be influenced by trade. Section 3 discusses empirical evidence. Section 4 concludes.

[1] Rodrik (1998) shows that more open countries have larger governments, which helps them deal with increased uncertainty that is associated with openness. Svaleryd and Vlachos (2002) provide empirical evidence that countries with better developed financial systems are more likely to be open to trade, and argue this is because a better financial system allows a country to better cope with increased uncertainty. Tangentially, these authors also provide some evidence that the financial system improves after trade opening.

2 The Model

2.1 The Environment

Consider an economy with 3 goods and 2 factors, labor (entrepreneurs) and wealth. There is a final consumption good, and agents' utility is assumed to be linear this good. The final good will serve as the numeraire, and we normalize its price to 1. The time horizon consists of the interval $t \in [0, 1]$. At $t = 1$, the final good is produced with two intermediate goods 1 and 2 using a Cobb-Douglas production function:

$$\pi(K_1, K_2) = AK_1^{\alpha} K_2^{1-\alpha}. \tag{1}$$

If prices of intermediate goods are denoted by p_1 and p_2, profit maximization in the final goods sector at $t = 1$ requires that:

$$p_1 = \alpha A \left[\frac{K_2}{K_1}\right]^{1-\alpha}$$

and

$$p_2 = (1-\alpha) A \left[\frac{K_1}{K_2}\right]^{\alpha}.$$

Intermediate good 1 is financially intensive, while intermediate good 2 does not rely on external finance. Entrepreneurs make the decision to enter either of the two intermediate goods sectors at $t = 0$. Production in the two sectors then occurs continuously in the interval $t \in [0, 1]$.

In particular, setting up a unit of production of intermediate good 2 requires no wealth and one unit of labor/entrepreneur. The project then produces a constant flow return Rdt, and thus the total output produced by one unit of labor in this sector is

$$\int_0^1 Rdt = R.$$

Setting up a production unit of intermediate good 1 requires one entrepreneur and C units of wealth. Each entrepreneur then manages a flow of projects between dates $t = 0$ and $t = 1$. Between time t and $t + dt$, entrepreneurs face a liquidity shock $\tilde{L}_t dt$. At each date, we assume that $L_t = -L$ with probability $\frac{1}{2}$ and $L_t = L$ with probability $\frac{1}{2}$. Shocks are assumed to be identically and independently distributed, and cannot be saved.

If the liquidity shock is positive, or the liquidity need is fulfilled, then the project yields a flow of returns Rdt; otherwise it returns 0 (see Figure 2). Denoting by $R_t^i dt$ the realized flow of returns at date t for entrepreneur i, the total output produced by entrepreneur i is then given by

$$R^i = \int_0^1 R_t^i dt.$$

Agents with a negative liquidity shock can borrow from those with a positive one at each $t \in [0,1]$. Let r_t denote the gross interest rate which prevails at time t; a debt contracted at time t is a claim on time $t=1$ returns and $r_t \geq 0$, $\forall t \in [0,1]$. How can we determine the total flow of production and the interest rate at each time t? Let there be η entrepreneurs in sector 1 in this economy. Denote aggregate liquidity in the economy by

$$\Lambda_t = \sum_{i \in [0,\eta]} L_t^i.$$

Entrepreneurs with excess liquidity lend to entrepreneurs with liquidity shortages at the instantaneous interest rate r_t. In case of a positive aggregate liquidity shock ($\Lambda_t \geq 0$), interest rate drops to zero and no projects are liquidated. If a negative aggregate shock hits the economy at time t, then a fraction γ_t of projects are liquidated and interest rates rise so that lenders appropriate all surplus: $r_t L dt = p_1 R dt$. The aggregate production flow is then given by

$$K_{1t} = \eta R \left(1 - \gamma_t\right) dt,$$

and the aggregate production realized at $t=1$ is:

$$K_1 = \eta R \left[1 - \gamma\left(\eta\right)\right],$$

where $\gamma\left(\eta\right) \equiv \int_0^1 \gamma_t dt$.

We can think of the equilibrium value of $\gamma(\eta)$ as capturing the quality of the financial system. It reflects the fraction of time an agent is unable to fulfill the need for external finance. In this setting, $\gamma(\eta)$ is a function of the number of entrepreneurs that access the financial system. The financial system benefits from having more entrepreneurs.

We now see that production in this sector is characterized by a positive externality. Each agent's decision to enter provides a benefit to the other agents, by reducing the number of states in which aggregate liquidity is lacking. But since in states with positive aggregate liquidity each agent borrows or lends at rate $r_t = 0$, the agent does not internalize the positive effect she has on everyone else when making the entry decision. It is helpful to state the following Lemma.

Lemma 1: The structure of liquidity externalities

With η entrepreneurs in sector 1, aggregate supply of intermediate good 1 is given by

$$K_1 = \eta R \left[1 - \gamma\left(\eta\right)\right], \tag{2}$$

where $\gamma\left(\eta\right)$ is a decreasing and convex function of η such that $\lim_{\eta \to 0} \gamma\left(\eta\right) = \frac{1}{2}$ and $\lim_{\eta \to \infty} \gamma\left(\eta\right) = 0$.

Proof: see Appendix.

2.2 Closed Economy Equilibrium

We can now analyze the equilibrium in the closed economy. Suppose that a country's endowment of entrepreneurs is normalized to 1, and the total wealth in the economy is W. We assume that the opportunity cost of wealth outside of production of intermediate good 1 is zero.[2] Thus, there are two possibilities: if production in sector 1 requires the entire wealth in the economy, $r > 0$. If, on the other hand, sector 1 production uses less than the total wealth in equilibrium, $r = 0$.

At $t = 0$, agents make entry choices. The return earned by an entrepreneur in sector 2 is $V_2 = p_2 R$. To enter sector 1, the entrepreneur must borrow C units of wealth at the prevailing interest rate r. Then, the value of the project is:

$$V_1(\eta) = p_1 R[1 - \gamma(\eta)] - rC.$$

In equilibrium, the entrepreneur project choice arbitrage condition must be satisfied: $V_1(\eta) = V_2$.

When η entrepreneurs enter sector 1 in equilibrium, total production in sector 1 is given by (2), and in sector 2 by

$$K_2 = (1 - \eta)R. \tag{3}$$

We can now state the equilibrium conditions in this economy:

Proposition 1 : Equilibrium in the closed economy

The equilibrium of the economy is characterized by a vector of prices (p_1, p_2, r) and a fraction η of entrepreneurs in sector 1, such that the following conditions hold:

1. Intermediate good market clearing conditions:

$$p_1 = \alpha A \left[\frac{1 - \eta}{\eta[1 - \gamma(\eta)]}\right]^{1-\alpha}, \tag{4}$$

$$p_2 = (1 - \alpha) A \left[\frac{\eta[1 - \gamma(\eta)]}{1 - \eta}\right]^{\alpha}; \tag{5}$$

2. Project choice arbitrage condition:

$$p_1 R[1 - \gamma(\eta)] - rC = p_2 R; \tag{6}$$

[2] Alternatively, we could assume a lower bound on r that is higher than zero, which we could think of as a storage technology. None of the results would change, and the analysis would be identical as long as we did not allow stored wealth to fulfill a liquidity need at $t \in (0, 1)$.

3. Time $t = 0$ credit market clearing conditions:

$$\eta C \leq W,$$

and

$$\eta C < W \Rightarrow r = 0.$$

Corollary 1: In autarky, it must be that:

$$r = 0 \Rightarrow \eta = \alpha.$$

Proof: see Appendix.

We can then determine the equilibrium industrial structure of the country, which fully characterizes the economy.

Corollary 2: In a closed economy, the equilibrium number of entrepreneurs who undertake the risky project is given by

$$\eta = \min \left[\alpha, \frac{W}{C} \right].$$

Thus, in this economy there are two kinds of equilibria, depending on the value of the parameters and wealth endowment W. Either the economy is not wealth constrained, and the share of entrepreneurs going to sector 1 is α, the value that would be unchanged even if wealth was infinite. Or the economy produces the highest quantity of intermediate 1 that its wealth would allow.

2.2.1 The Social Planner Solution

It may be instructive to set up the social planner's problem, and show that in the decentralized equilibrium the size of sector 1 is too low. A social planner would maximize aggregate output. She would choose the number of entrepreneurs η^{SP} to work in sector 1 to maximize:

$$\eta^{SP} = \arg \max_{\eta \in (0,1)} AR \left\{ \eta \left[1 - \gamma \left(\eta \right) \right] \right\}^{\alpha} \left(1 - \eta \right)^{1-\alpha},$$

subject to

$$\eta C \leq W.$$

When the economy is not wealth-constrained, the first-order condition can be written as

$$\frac{\alpha}{\eta^{SP}} - \alpha \frac{\gamma' \left(\eta^{SP} \right)}{1 - \gamma \left(\eta^{SP} \right)} = \frac{1 - \alpha}{1 - \eta^{SP}}. \tag{7}$$

Given that in the decentralized equilibrium, $\eta^{DC} = \alpha$, and thus $\frac{\alpha}{\eta^{DC}} = \frac{1-\alpha}{1-\eta^{DC}}$, the social planner's solution is not the same as that occurring in the decentralized equilibrium. In particular, since a larger financial sector implies that fewer projects are liquidated, the term $-\alpha\frac{\gamma'(\eta^{SP})}{1-\gamma(\eta^{SP})} > 0$. This in turn implies that $\eta^{SP} > \alpha = \eta^{DC}$: the social planner solution has a larger financially intensive sector. This is because when entrepreneurs enter sector 1, they do not internalize the benefit they provide to all the other entrepreneurs through the improved financial system.

What about when the economy is wealth-constrained? Since the economy reaches the maximum attainable level of the financially intensive sector production, the social planner cannot improve upon the decentralized allocation, and thus the social planner solution coincides with the market equilibrium. We can calculate the marginal welfare gain from giving a wealth-constrained country one extra unit of wealth. In such a situation, an additional dollar given to the economy has a marginal impact on occupation choices equal to:

$$d\eta = \frac{1}{C}dw.$$

Then, the welfare impact of an extra dollar can be measured by:

$$\frac{d\ln\pi}{dw} \sim \frac{1}{C}\left[\frac{\alpha}{\eta} - \frac{1-\alpha}{1-\eta} - \alpha\frac{\gamma'(\eta)}{1-\gamma(\eta)}\right],$$

which can be decomposed into an allocative effect, $\frac{1}{C}\left(\frac{\alpha}{\eta} - \frac{1-\alpha}{1-\eta}\right)$, and a liquidity effect $\frac{\alpha}{C}\frac{-\gamma'(\eta)}{1-\gamma(\eta)}$. A wealth-constrained country is not only subject to misallocation of tasks because it cannot implement the optimal number of projects of type 1, but is also subject to larger aggregate liquidity shocks that lower the return on each financially intensive project undertaken.

2.3 Trade Equilibrium

Suppose that there are two countries, North (N) and South (S). While the final consumption good is non-tradeable, intermediates 1 and 2 can be traded at no cost. Suppose for simplicity that both countries are endowed with one unit of labor, but that their wealth levels differ. I particular, suppose that $W_N > W_S$. To fix ideas, we will also assume that $W_N \geq \alpha C \geq W_S$: in autarky, the North is wealthy, while the South is wealth-constrained.

The difference in wealth endowments will drive the pattern of comparative advantage. While both countries possess the same technology, the North will specialize in the production of the financially intensive intermediate.[3] This is intuitive: to serve the world market of

[3] We could introduce the North's financial comparative advantage in other ways. For instance, we could

intermediate 1 would require a country to expand its production of that good vis-a-vis autarky. Since the South is wealth-constrained, it cannot do so, while the North can. We now state the equilibrium conditions under trade.

Proposition 2: Equilibrium with Trade

The trade equilibrium is characterized by a vector of prices (p_1, p_2, r_N, r_S), where (r_N, r_S) are time $t = 0$ interest rates in the North and the South, and (η_N, η_S), the number of entrepreneurs undertaking risky projects in each country, that satisfy the following conditions:

1. Intermediate good market clearing conditions:

$$p_1 = \alpha A \left[\frac{(1-\eta_N) + (1-\eta_S)}{\eta_N \left[1 - \gamma\left(\eta_N\right)\right] + \eta_S \left[1 - \gamma\left(\eta_S\right)\right]} \right]^{1-\alpha}, \tag{8}$$

$$p_2 = (1-\alpha) A \left[\frac{\eta_N \left[1 - \gamma\left(\eta_N\right)\right] + \eta_S \left[1 - \gamma\left(\eta_S\right)\right]}{(1-\eta_N) + (1-\eta_S)} \right]^{\alpha}; \tag{9}$$

2. Project choice arbitrage condition for $j = N, S$:

i) if in country j both sectors are open, then:

$$p_1 R \left[1 - \gamma\left(\eta_j\right)\right] - r_j C = p_2 R; \tag{10}$$

ii) if in the North only sector 1 is open:

$$p_1 R \left[1 - \gamma\left(1\right)\right] - r_N C \geq p_2 R; \tag{11}$$

iii) if in the South only sector 2 is open:

$$p_1 R \left[1 - \gamma\left(0\right)\right] \leq p_2 R; \tag{12}$$

3. Time $t = 0$ credit markets clearing condition for $j = N, S$:

$$\eta_j C \leq W_j,$$

and

$$\eta_j C < W_j \Rightarrow r_j = 0.$$

The pattern of production and trade can be determined from the equilibrium conditions. The key result for us is that the North expands production of the financially intensive good

assume that the North has better institutions, which allow it to achieve greater efficiency in the market for external finance. The quality of institutions is undoubtedly important, but for our purposes this alternative modeling approach will yield similar results.

(η_N increases compared to autarky), while in the South, the financially intensive sector contracts (η_S falls, possibly to zero). Thus, the size of the financial system, that is, the amount of borrowing and lending that occurs in the economy, increases in the North and decreases in the South.

This is not without consequence for the quality of the financial system, given here by $\gamma(\eta)$. In particular, as η_N increases, $\gamma(\eta_N)$ goes up as well. This means that the agents operating in sector 1 in the North are able to fulfill their external financing needs more often, lowering the fraction of periods during which they lose output due to unsatisfied liquidity needs.

In the South, as the share of agents employed in the financial sector contracts, production in the sector 1 experiences more periods in which some agents' external financing needs are not satisfied. Thus, the quality of the financial system deteriorates. For some parameter values, sector 1 disappears from the South entirely. This this case, an entrepreneur wishing to enter the sector experiences the most difficult conditions, with γ at its highest value of $\gamma(0)$.

2.3.1 Gains from Trade

While the main purpose of the model we present here is to show that the financial outcomes – the size of the financial sector and its quality – are affected by trade, it may also be useful to analyze aggregate welfare implications of trade. We show that under some conditions, the South may lose from trade. The key insight is that when production is characterized by externalities, one of the countries may lose as a result of trade. When the sector which exhibits the externality shrinks, the remaining firms experience a *de facto* productivity decrease, and this effect can more than offset traditional comparative-advantage based gains. The mechanism is well known (see Helpman and Krugman, 1985, ch. 3).

Since we've assumed that utility is linear in the consumption of the final good, and set its price as the numeraire, aggregate welfare in these economies is proportional to the real output. Thus, if the autarky prices in the two countries are given by the country superscript – p_1^N, p_2^N, p_1^S, p_2^S, – then the autarky welfare is proportional to

$$\Omega_{aut}^N = p_1^N \left[1 - \gamma(\eta_N^{aut})\right] \eta_N^{aut} + p_2^N (1 - \eta_N^{aut})$$

in the North, and

$$\Omega_{aut}^S = p_1^S \left[1 - \gamma(\eta_S^{aut})\right] \eta_S^{aut} + p_2^S (1 - \eta_S^{aut})$$

in the South.

Correspondingly, if trade prices are given by p_1^T and p_2^T, welfare under trade is:

$$\Omega_T^N = p_1^T \left[1 - \gamma(\eta_N^T)\right] \eta_N^T + p_2^T (1 - \eta_N^T)$$

in the North, and

$$\Omega_T^S = p_1^T \left[1 - \gamma(\eta_S^T)\right] \eta_S^T + p_2^T (1 - \eta_S^T)$$

in the South, keeping in mind that η_N^T may be 1 and η_S^T may be 0: only one sector could be operating in some countries under trade.

As a result of trade, sector 1 expands in the North and shrinks in the South: $\eta_N^T > \eta_N^{aut}$ and $\eta_S^T < \eta_S^{aut}$. We can see that in the North there are standard comparative advantage-driven gains that come from reallocating resources to sector 1. Furthermore, as sector 1 grows in the North, the *de facto* productivity of Northern firms in this sector grows as well, $1 - \gamma(\eta_N^T) > 1 - \gamma(\eta_N^{aut})$. Thus, the North experiences additional gains. As the size of the financial sector grows, the financial system improves, and thus less output is lost due to unfulfilled need for external finance.

In the South, we see that the standard comparative advantage-driven gains are offset by the deterioration of the financial system, and the resulting drop in productivity in the financially intensive sector. As the financial system shrinks, there are more and more unfilled needs for external finance, and thus the firms operating (or considering operating) in that sector face a low productivity. This lowers the opportunity cost of labor in the South, and thus in some cases may even imply that the real price of intermediate 2, to which labor is reallocated after trade, is lower under trade than in autarky. In the Appendix, we provide a proof that the South may on aggregate lose from trade.

2.4 Equilibrium with Factor Mobility

The best decentralized equilibrium outcome is achieved in this model when factors are mobile. We state the equilibrium conditions here.

Proposition 3: Equilibrium in the integrated economy

The equilibrium of the integrated economy is characterized by a vector of prices (p_1, p_2, r) and the number η of entrepreneurs investing in the risky project in the two countries combined, such that:

1. Intermediate good market clearing conditions:

$$p_1 = \alpha A \left[\frac{2 - \eta}{\eta \left[1 - \gamma(\eta)\right]}\right]^{1-\alpha}, \tag{13}$$

$$p_2 = (1 - \alpha) A \left[\frac{\eta \left[1 - \gamma(\eta)\right]}{2 - \eta}\right]^{\alpha}; \tag{14}$$

2. Project choice arbitrage condition:

$$p_1 R\left[1-\gamma\left(\eta\right)\right]-rC=p_2 R; \tag{15}$$

3. Time $t=0$ credit market clearing conditions:

$$\eta C \leq \left(W_N+W_S\right),$$

and

$$\eta C < \left(W_N+W_S\right) \Rightarrow r=0.$$

We can make several observations about the integrated world and how it compares to the autarky allocation. The equilibrium size of the financial sector is $\eta^I = \min\left[2\alpha, \frac{W_N+W_S}{C}\right]$, which is weakly greater than the combined size of the financial sector when the two countries are in autarky, and is strictly greater if in autarky one of the countries is wealth-constrained. Also, while the South may lose on aggregate in the trade equilibrium, it is clear that in the fully integrated equilibrium the South gains with certainty. This is because Southern entrepreneurs are able to enter the financially intensive sector which has access to the worldwide financial markets.

Though the integrated economy equilibrium is still suboptimal, it is nevertheless worth noticing through equation (7) that the market failure, measured by the term $-\alpha\frac{\gamma'(\eta)}{1-\gamma(\eta)}$ is smaller as η gets larger. When wealth can move costlessly between the two countries, liquidity shocks that hit entrepreneurs are averaged out at the world level, which decreases the likelihood of a negative aggregate shock occurring. The poorer country benefits more from integration than the richer country.

3 Empirical Evidence

The model presented in the section above illustrates the main point of the paper: to the extent both the size and the quality of a country's financial system are equilibrium outcomes of local demand and supply for external finance, they will be influenced by trade. Thus, the impact of trade is expected to be differential across countries. When trade leads to specialization in financially dependent goods, it will lead to growth of the financial system. Conversely, when trade leads a country to import the financially dependent goods rather

than produce them domestically, the financial system will shrink after trade opening, *ceteris paribus*.

We test the predictions of our model using a dataset compiled by Beck, Demirguc-Kunt, and Levine (2000). It consists of measures of financial development plus a variety of other country-level variables, including trade openness, for 22 OECD countries and 55 developing countries. The dataset is also available as a panel, reporting data at 5-year intervals from 1965 to 1995. The list of countries is presented in Table 1.

The key question is how do we proxy for financial comparative advantage: which countries should we expect to export financially dependent goods? The model gives the answer in terms of per capita income: a richer country will specialize in the financially intensive good. Perhaps at least as relevant empirically is the quality of institutions dimension: countries with better enforcement of contracts and property rights will be expected to export the financially dependent good under trade. In practice, of course, institutional quality and per capita incomes are extremely highly correlated ($\rho \approx 0.85$), and thus the two sources of financial comparative advantage will tend to reinforce each other. Thus, in the present empirical work we will take per capita incomes as a sufficient statistic for the degree of financial comparative advantage.

Thus, we attempt to show that trade led to faster financial development in richer countries, and slower financial development in poorer countries. As a first pass, we split the sample into OECD and non-OECD countries,[4] and run the following basic specification in the two subsamples:

$$FinDev_j = \alpha + \beta * Trade65_j + \boldsymbol{\delta} * \mathbf{X}_j + \varepsilon_j, \tag{16}$$

where $FinDev_j$ is the change in country j's financial development over the period 1965-95, $Trade65_j$ is a country's trade openness in 1965 and $\mathbf{X}_j$ is a set of controls. Financial development is measured by the ratio of private credit to GDP, while trade openness is measured by (Exports+Imports)/GDP. The list of controls includes initial level of private credit to GDP, initial per capita GDP, a measure of human capital (average years of secondary schooling in the population), as well as legal origin dummies. Variable definitions and summary statistics are presented in Table 2.

The results are presented in Table 3. Column 1 estimates equation (16) for the OECD countries. In developed countries, trade openness has if anything a positive effect on sub-

[4] As expected, the differences in per capita income across these two groups are pronounced. In the OECD sample, per capita GDP is $7354, while in the other sample, $1010.

sequent financial development, though it is not statistically significant.[5] The fact that the positive effect of trade on financial development is not strong in the OECD sample is not surprising, as a large share of OECD trade is with other OECD countries, and the financial comparative advantage is not likely to be especially important in this trade relative to other determinants, such as increasing returns. By contrast, in developing countries trade openness has a negative effect. Column 2 replicates the regression from Column 1 in the non-OECD sample. The coefficient on the trade variable is negative and significant, with a p-value of 8%.

The key effect that our model illustrates is that trade affects financial development differently depending on how strong are the forces of financial comparative advantage, as proxied by per capita income. Thus, we augment the basic specification by including an interaction term between trade and per capita GDP:

$$FinDev_j = \alpha + \beta_1 * Trade65_j + \beta_2 * Trade65_j * Income65_j + \boldsymbol{\delta} * \mathbf{X}_j + \varepsilon_j, \qquad (17)$$

This allows us to pool the sample and test for the differential impact of trade. While now we are agnostic about the sign of the main effect of trade, β_1, we are interested in whether the coefficient on the interaction term, β_2, is positive and significant. Column 3 presents the results of estimating equation (17). To ease interpretation of the interaction coefficient, all variables have been demeaned. The main effect of trade openness on financial development is positive but not significant in the full sample. The trade-income interaction term, by contrast, is positive and significant at 1% level. Column 4 presents a specification that includes a full set of GDP interaction terms, allowing the effect of other regressors on financial development to be affected differentially for rich and poor countries. The coefficients of interest are virtually unchanged in the more flexible specification.

The results show that trade affects financial development differentially based on a country's level of income. In particular, for a country at the mean of the per capita GDP distribution, the effect of trade on financial development is given by the coefficient on the main trade term, slightly positive in this sample, though not statistically different from zero at 0.3. A country which is in the 25th percentile of per capita income distribution is affected by trade negatively, with the derivative of financial development with respect to trade being -0.2. In a country in the 10th percentile of the per capita income distribution, that negative effect has magnitude of -0.7. By contrast, in a country that is in the 75th

[5] The coefficient in the OECD sample is not significant, however, if outlier Japan is dropped from the sample, the coefficient increases by a factor of more than 1.5 and becomes significant at 2% level. Japan is indeed an exception, as it is relatively closed but experienced a very strong financial sector expansion in the last 30 years.

percentile of the income distribution, the effect of trade on financial development is positive, with the derivative being 0.96.

While the Ordinary Least Squares estimates suggest that the correlations present in the data support the main argument we are making in this paper, they do not let us argue that the relationship between trade openness and the pace of financial development is indeed causal. We can address this issue by instrumenting for trade openness with a variable that does not directly affect financial development. Such a variable was constructed by Frankel and Romer (1999). Using on the gravity model of trade, these authors construct a predicted measure of trade openness based on geographical characteristics, such as land area, population, and distance to other countries. This instrument for trade openness has since been widely used in the literature.

Columns (5) and (6) of Table 3 replicate the pooled sample specifications of Columns (3) and (4), using as an instrument for trade openness the predicted trade openness constructed by Frankel and Romer, and as an instrument for the trade-income interaction term the interaction between the Frankel and Romer variable and income. The point estimates on the coefficients of interest are similar to the OLS coefficients, and significant.

To check the robustness of this result, it is important to establish that it is not driven by outliers. In presenting robustness checks, we report the instrumental variables estimates throughout. Using OLS estimates leaves all the conclusions unchanged, in fact the coefficients of interest are if anything more robust in the OLS estimation. Table 4 presents the results of reestimating the basic specification, first dropping outliers on trade, then on income. The two least open countries in the data set are United States and Japan. The two most open countries are the Gambia and Guyana. Results of dropping these in turn are presented in Columns (1) and (2) of Table 4. Though the significance level deteriorates somewhat, the point estimates are similar to the base specification and remain significant. We then drop outliers on income. The wealthiest countries in our sample are United States and Switzerland. The three poorest countries are Rwanda, India, and Pakistan.[6] We present the results in Columns (3) and (4) of Table 4. We see that the results are not driven purely by income outliers. The coefficients change little and remain significant.

As another robustness check, Table 5 presents estimation results when alternative indicators of financial development are used. We use two alternative measures, the ratio of liquid liabilities (M2) to GDP, and claims of deposit money banks on nonfinancial domestic

[6] Since India and Pakistan's per capita incomes are virtually identical, we drop both of them in this robustness check.

sectors as share of GDP. The former is broader than the main measure that we use, while the latter is an indicator of banking finance in particular. Table 5 shows that the effect we are highlighting is not driven purely by our measure of financial development. The coefficient on the interaction term of interest is significant and reveals a similar effect of trade on these alternative measures of financial system growth. The point estimates indicate, however, that the effect of trade on these indicators of financial development is appreciably negative only for countries in the bottom quartile of the income distribution.

We can also use the panel dimension of the data to shed light on this relationship. In particular, we test whether financial development over a five-year horizon is affected by trade openness in the beginning of the period:

$$FinDev_{jt} = \alpha + \beta_1 * Trade_{jt-1} + \beta_2 * Trade_{jt-1} * Income_{jt-1} + \boldsymbol{\delta} * \mathbf{X}_{jt-1} + \eta_j + \varepsilon_{jt},$$

where t = 1965-69, 1970-74, 1975-79, 1980-84, 1985-89, and 1990-95. The specification includes a full set of country dummies, thus controlling for any country characteristics that are not time-varying. The results are presented in Table 6. Unfortunately, we cannot use the instrumental variables approach here, as the trade openness instrument is not time-varying, and thus is perfectly correlated with the country fixed effects. Column 1 contains the base specification. The trade-income interaction term is positive and significant, in parallel to the cross-sectional regression. We establish that this effect is not driven by our choice of financial development variable in Columns 2 and 3. The interaction of interest remains significant when we use alternative measures of financial development. In the last column, we include a full set of time dummies. We see that our results are not driven purely by omitted time effects, in fact the coefficient of interest is virtually unchanged.

4 Conclusion

It has been documented that the differences in financial development between developed and developing countries are substantial, and that these differences are an important determinant of trade patterns. Departing from the realization that financial development affects trade patterns, this paper asks the opposite question: will openness to trade affect countries' financial development?

We build a model in which each country's financial system is an endogenous outcome of entrepreneurs' demand for external finance. In this world, when a poor and a rich country open to trade, the poorer country begins to import the financially dependent good, rather than produce it domestically. This in turn implies that demand for external finance

decreases, and the domestic financial system deteriorates. This effect may or may not generate losses from trade to the poor country, but the deterioration of the financial system may be important for a wide variety of reasons that are beyond the scope of this model. Indeed, the importance of financial development to fostering long-run growth and reducing output volatility has received a great deal of attention in the literature.

In the model we presented, the comparative advantage that generates the key effect comes purely from differences in wealth between countries. However, in practice institutional quality – contract enforcement, property rights, investor protection, etc. – has been shown to be quite important to financial development (La Porta et al., 1997). Institutional differences will tend to reinforce the financial comparative advantage in favor of rich countries, and exacerbate the effects we highlight here.

We provide empirical evidence that trade openness affects countries' financial systems differentially. In richer countries trade promotes financial system growth, in poorer ones the effect is the opposite. While the results in this paper are suggestive, there are a number of important caveats. The empirical proxy of financial development we use is the ratio of total lending to GDP, which is a measure of the size of the financial system and not its quality. Thus, while the results are consistent with the model we presented in this paper, they do not allow us to conclude that the quality of the financial system is affected as well as its size.

The strength of financial comparative advantage was proxied crudely by the interaction of aggregate trade openness and per capita income. Perhaps the revealed financial comparative advantage can be measured more precisely by looking at industry-level import and export data and the implied "financial content of trade." Implementing more sophisticated empirical tests of the influence of trade on the financial system remains on the research agenda.

5 Appendix 1

Proof of Lemma 1:

γ^t is a random variable with the following probability distribution:

$$\gamma^t = \begin{cases} 0 & \text{with probability } \frac{1}{2^\eta} \sum_{k=0}^{Int\left(\frac{\eta+1}{2}\right)} \binom{\eta}{k} \\ 1 - \frac{2k}{\eta} & \text{with probability } \frac{1}{2^\eta}\binom{\eta}{k} \text{ for } 0 \leq k \leq Int\left(\frac{\eta-1}{2}\right) \end{cases},$$

and this implies that

$$E\left(\gamma^t\right) = \frac{1}{2^\eta}\binom{\eta-1}{Int\left(\frac{\eta-1}{2}\right)} \equiv \gamma\left(\eta\right)$$

and it is easy to check that $\gamma(1) = 1/2$ and $\lim_{\eta\to\infty}\gamma(\eta) = 0$. Furthermore the sequences $\{2\eta[\gamma(2\eta+2) - \gamma(2\eta)]\}_{\eta\geq 1}$ and $\{(2\eta-1)[\gamma(2\eta+1) - \gamma(2\eta-1)]\}_{\eta\geq 1}$ are positive and decreasing. In the rest of the paper, the notation $\gamma'(\eta)$ will refer to $\frac{1}{2}[\gamma(2k+2) - \gamma(2k)]$ if η is of the form $\eta = 2k$ for some $k \geq 1$ and $\frac{1}{2}[\gamma(2k+1) - \gamma(2k-1)]$ if η is of the form $\eta = 2k-1$ for some $k \geq 1$.
Q.E.D.

Proof of Corollary 1:

Rewriting the arbitrage condition (6) in terms of η, the expression becomes:

$$\alpha A\left[\frac{1-\eta}{\eta[1-\gamma(\eta)]}\right]^{1-\alpha} R[1-\gamma(\eta)] - rC = (1-\alpha)A\left[\frac{\eta[1-\gamma(\eta)]}{1-\eta}\right]^{\alpha} R,$$

which can be simplified to

$$\alpha AR\left(\frac{1-\eta}{\eta}\right)^{1-\alpha} - \frac{r}{[1-\gamma(\eta)]^{\alpha}}C = (1-\alpha)AR\left(\frac{\eta}{1-\eta}\right)^{\alpha}.$$

When interest rates drop to zero, the arbitrage condition becomes

$$\alpha AR\left(\frac{1-\eta}{\eta}\right)^{1-\alpha} = (1-\alpha)AR\left(\frac{\eta}{1-\eta}\right)^{\alpha},$$

which implies that

$$\eta = \alpha.$$

Q.E.D.

Proof that the South may on aggregate lose from trade

South's welfare in autarky is

$$\Omega^S_{aut} = p^S_1\left[1-\gamma(\eta^{aut}_S)\right]\eta^{aut}_S + p^S_2(1-\eta^{aut}_S)$$

and under trade:

$$\Omega^S_T = p^T_1\left[1-\gamma(\eta^T_S)\right]\eta^T_S + p^T_2(1-\eta^T_S).$$

Project choice arbitrage conditions in the South in autarky and trade imply the following inequalities:

$$p^S_1\left[1-\gamma(\eta^S_{aut})\right] \geq p^S_2$$

and

$$p^T_1\left[1-\gamma(\eta^S_T)\right] \leq p^T_2$$

Together, these imply that

$$\Omega^S_{aut} \geq p^S_2$$

and observing that if $p_1^T\left[1-\gamma(\eta_T^S)\right] < p_2^T$ then $\eta_T^S = 0$, it is also true that:

$$\Omega_T^S = p_2^T.$$

Therefore, the South loses from trade if $p_2^S > p_2^T$.

Writing out

$$p_2^S = (1-\alpha)\,A\left[\frac{\eta_{aut}^S\left[1-\gamma\left(\eta_{aut}^S\right)\right]}{1-\eta_{aut}^S}\right]^{\alpha}$$

and

$$p_2^T = (1-\alpha)\,A\left[\frac{\eta_N^T\left[1-\gamma\left(\eta_N^T\right)\right]+\eta_S^T\left[1-\gamma\left(\eta_S^T\right)\right]}{(1-\eta_N^T)+(1-\eta_S^T)}\right]^{\alpha}$$

we see that $p_2^S > p_2^T$ if and only if $\frac{\eta_{aut}^S\left[1-\gamma\left(\eta_{aut}^S\right)\right]}{1-\eta_{aut}^S} > \frac{\eta_N^T\left[1-\gamma\left(\eta_N^T\right)\right]+\eta_S^T\left[1-\gamma\left(\eta_S^T\right)\right]}{(1-\eta_N^T)+(1-\eta_S^T)}$. These ratios are proportional to $\frac{p_2^S}{p_1^S}$and $\frac{p_2^T}{p_1^T}$, thus $p_2^S > p_2^T$ if $\frac{p_2^S}{p_1^S} > \frac{p_2^T}{p_1^T}$.

From project choice arbitrage conditions, we know that

$$\frac{p_2^S}{p_1^S} = \left[1-\gamma\left(\eta_{aut}^S\right)\right] - r_A^S C$$

and if sector 1 operates in the South,

$$\frac{p_2^T}{p_1^T} = 1-\gamma\left(\eta_S^T\right).$$

Thus, when sector 1 operates in the South, the country loses from trade if:

$$\left[1-\gamma\left(\eta_{aut}^S\right)\right] - r_A^S C > 1-\gamma\left(\eta_S^T\right),$$

which will be true for small r_A^S: the country is not too wealth-constrained in autarky.

This discussion is suggestive of the set of conditions under which the South is most likely to lose from trade. When the South is not too wealth-constrained in autarky, and still produces intermediate 1 under trade, the *de facto* productivity loss coming from the deterioration of the financial system is most severe. Note that this will happen if the North is wealth-constrained under trade: there is not enough wealth in the North to accommodate the entire world production of intermediate 1. This suggests that the South would gain relatively more from opening to trade with a country that is much wealthier rather than slightly more wealthy. Of course, the conditions for the South to lose from trade that are stated here are not necessary.

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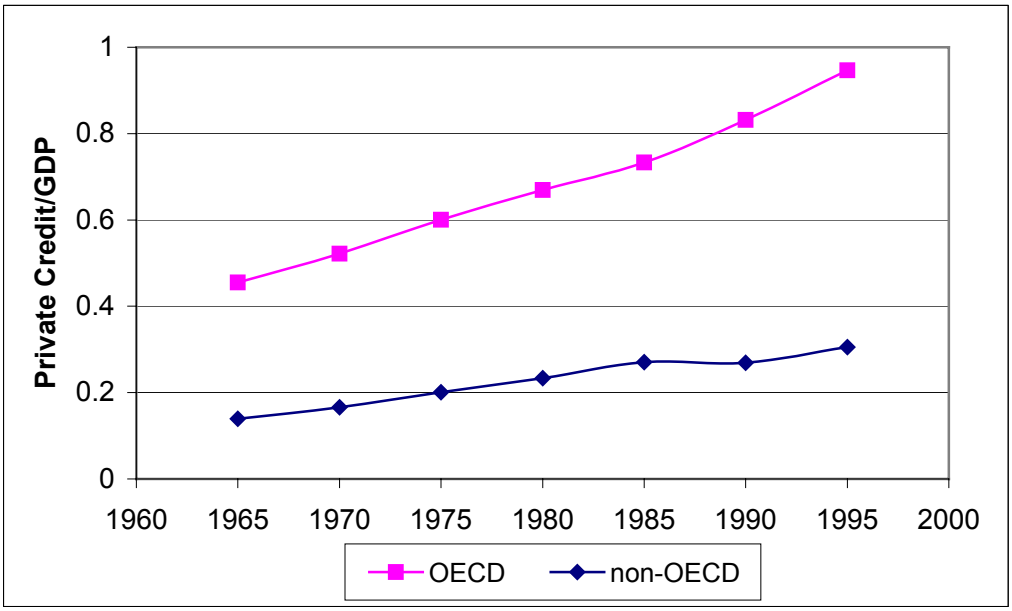
_Figure 1: Financial Development Over Time in Developed and Developing Countries



Source: Beck, Demirguc-Kunt, and Levine (2000).

Figure 2: Timing of the risky project

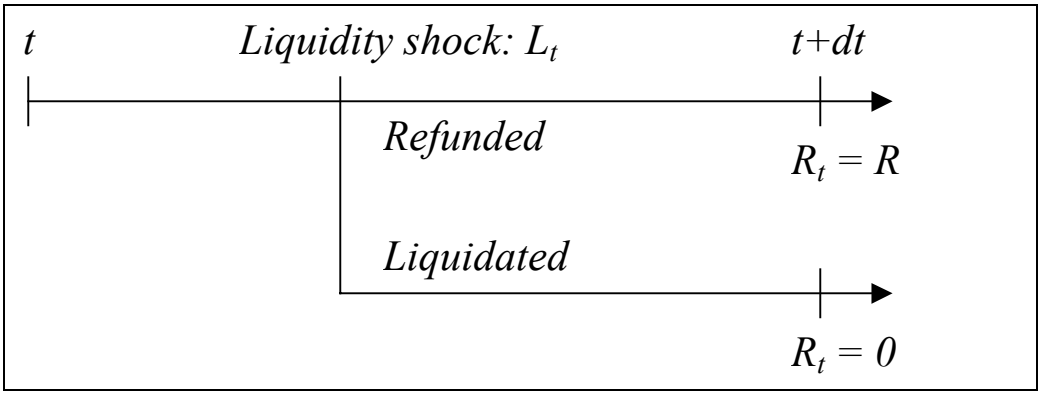


Figure 3: Timing of the static economy

Table 1: Country list

OECD	non-OECD	
Australia*	Algeria	Malawi
Austria*	Argentina*	Malaysia*
Belgium*	Bolivia*	Mauritius*
Canada*	Brazil*	Mexico*
Denmark*	Cameroon	Nepal
Finland*	Central African Republic	Nicaragua
France*	Chile*	Niger*
Germany*	Colombia*	Pakistan*
Greece*	Congo	Panama*
Ireland*	Costa Rica*	Papua New Guinea
Israel*	Cyprus	Paraguay*
Italy*	Dominican Republic*	Peru*
Japan*	Ecuador*	Philippines*
Netherlands*	Egypt, Arab Rep.	Rwanda*
New Zealand*	El Salvador*	Senegal*
Norway*	Gambia, The*	Sierra Leone
Portugal*	Ghana*	South Africa*
Spain*	Guatemala*	Sri Lanka*
Sweden*	Guyana*	Sudan*
Switzerland*	Haiti*	Syria
United Kingdom*	Honduras*	Thailand*
United States*	India*	Togo
	Indonesia	Trinidad and Tobago*
	Iran, Islamic Republic of	Uruguay*
	Jamaica*	Venezuela
	Kenya*	Zaire
	Korea, Republic of	Zimbabwe
	Lesotho	

* indicates countries included in the cross-sectional regression

Table 2: Variable Definitions and Summary Statistics

Name	Definition	Mean	St. Dev.
FinDev	Log growth in (Private Credit)/GDP, 1965-1995	0.574196	0.6722497
Trade65	(Imports+Exports)/GDP in 1965	0.5474669	0.4745315
PrivateCredit65	Private Credit in 1965	0.3010849	0.2505624
Income	Log of per capita GDP	7.468612	1.261692
School	Average years of secondary schooling in total population	0.8835088	0.7760051
English	English legal origin		
French	French legal origin		
German	German legal origin		

Source: Beck, Demirguc-Kunt, and Levine (2000).

Table 3: Regression Results, Cross-Sectional Specification

Dependent Variable: FinDev

	(1)	(2)	(3)	(4)	(5)	(6)
Trade65	0.47	-0.31	0.24	0.30	0.41	0.54
	(0.40)	(0.17)*	(0.18)	(0.21)	(0.34)	(0.41)
Trade65*Income65			0.51	0.53	0.45	0.62
			(0.18)***	(0.18)***	(0.27)*	(0.23)***
PrivateCredit65	-0.99	-1.50	-1.06	-2.09	-1.09	-2.11
	(0.34)**	(1.37)	(0.39)***	(0.74)***	(0.43)**	(0.76)***
Income65	0.40	-0.27	0.01	-0.08	0.01	-0.08
	(0.23)	(0.20)	(0.11)	(0.17)	(0.11)	(0.18)
School65	-0.01	1.05	0.39	0.50	0.41	0.50
	(0.18)	(0.30)***	(0.15)**	(0.19)**	(0.16)**	(0.19)**
English	0.55	0.10	0.19	-2.39	0.15	-2.80
	(0.39)	(0.31)	(0.35)	(2.28)	(0.39)	(2.56)
French	0.23		0.06	-2.65	0.11	-3.01
	(0.30)		(0.35)	(2.17)	(0.35)	(2.42)
German	0.65		0.67	-0.76	0.70	-0.89
	(0.34)*		(0.29)**	(2.43)	(0.30)**	(2.60)
Private Credit65*Income65				1.29		1.35
				(0.48)***		(0.49)***
School65*Income65				-0.24		-0.23
				(0.10)**		(0.10)**
English*Income65				1.79		2.06
				(1.32)		(1.49)
German*Income65				0.60		0.70
				(1.50)		(1.60)
French*Income65				1.71		1.97
				(1.35)		(1.50)
Sample	OECD	non-OECD	full	full	full	full
Observations	22	35	57	57	57	57
Estimation	OLS	OLS	OLS	OLS	IV	IV
R-squared	0.55	0.33	0.28	0.41		

Notes: Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. *FinDev* is the log growth rate of the private credit by deposit money banks and other financial institutions as share of GDP, 1965-1995; *Trade65* is the sum of imports and exports as a share of GDP in 1965. *Income65* is the log of real per capita GDP in 1965; *PrivateCredit65* is private credit by deposit money banks and other financial institutions as share of GDP in 1965; *School65* is the average years of schooling in the population over 25. *English, German,* and *French* indicate legal origin dummies. In Columns (5) and (6) the instrument for trade openness is the predicted openness obtained by Frankel and Romer (1999), and the instrument for *Trade65*Income65* variable is the interaction of the Frankel and Romer instrument and *Income65*. All variables have been demeaned.

Table 4: Regression Results, Robustness Checks

Dependent Variable: FinDev

	(1)	(2)	(3)	(4)
Trade65	0.61	0.43	0.46	0.35
	(0.49)	(0.41)	(0.44)	(0.45)
Trade65*Income65	0.56	0.54	0.56	0.62
	(0.33)*	(0.24)**	(0.26)**	(0.26)**
PrivateCredit65	-2.19	-2.13	-2.07	-1.70
	(0.80)***	(0.79)**	(0.78)**	(0.70)**
Income65	-0.08	-0.10	-0.10	-0.10
	(0.18)	(0.22)	(0.17)	(0.20)
School65	0.49	0.48	0.50	0.56
	(0.21)**	(0.21)**	(0.22)**	(0.20)***
English	-2.61	-3.11	-3.50	-2.70
	(2.53)	(2.75)	(3.06)	(2.57)
French	-2.85	-3.37	-3.75	-2.98
	(2.40)	(2.61)	(2.90)	(2.51)
German	-0.66	-1.00	-1.74	-1.49
	(2.62)	(2.43)	(3.68)	(2.74)
Private Credit65*Income65	1.40	1.65	1.70	0.95
	(0.52)**	(0.56)***	(0.55)***	(0.45)**
School65*Income65	0.24	0.23	0.22	0.23
	(0.10)**	(0.11)**	(0.12)*	(0.14)
English*Income65	1.97	2.38	2.63	1.91
	(1.48)	(1.63)	(1.82)	(1.48)
German*Income65	0.55	0.65	1.20	1.10
	(1.62)	(1.53)	(2.39)	(1.70)
French*Income65	1.87	2.25	2.50	1.96
	(1.49)	(1.64)	(1.84)	(1.57)
Sample	Excl. 2 most open countries	Excl. 2 least open countries	Excl. 2 richest countries	Excl. 3 poorest countries
Observations	55	55	55	54
Estimation	IV	IV	IV	IV

Notes: Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. *FinDev* is the log growth rate of the private credit by deposit money banks and other financial institutions as share of GDP, 1965-1995; *Trade65* is the sum of imports and exports as a share of GDP in 1965. *Income65* is the log of real per capita GDP in 1965; *PrivateCredit65* is private credit by deposit money banks and other financial institutions as share of GDP in 1965; *School65* is the average years of schooling in the population over 25. *English, German,* and *French* indicate legal origin dummies. The instrument for trade openness is the predicted openness obtained by Frankel and Romer (1999), and the instrument for *Trade65*Income65* variable is the interaction of the Frankel and Romer instrument and *Income65*. All variables have been demeaned.

Table 5: Regression Results, Alternative Measures of Financial Development

	(1)	(2)	(3)	(4)
Dependent Variable	M2/GDP		Deposit Money Bank Assets/GDP	
Trade65	0.57	0.71	0.39	0.37
	(0.28)**	(0.35)**	(0.37)	(0.45)
Trade65*Income65	0.33	0.50	0.57	0.47
	(0.18)*	(0.22)**	(0.25)**	(0.27)*
Income65	-0.03	-0.21	0.12	-0.07
	(0.08)	(0.10)**	(0.10)	(0.14)
School65	0.20	0.20	0.26	0.49
	(0.10)*	(0.10)**	(0.17)	(0.20)**
English	0.11	-3.35	0.29	-4.03
	(0.26)	(1.49)**	(0.34)	(1.70)**
French	0.17	-3.33	0.36	-3.95
	(0.22)	(1.33)**	(0.31)	(1.55)**
German	0.75	-1.56	0.96	-3.21
	(0.26)***	(1.45)	(0.31)***	(2.07)
M2/GDP65	-0.93	-1.03		
	(0.33)***	(0.42)**		
M2/GDP65*Income65		0.50		
		(0.25)*		
BankAssets65			-1.47	-2.06
			(0.38)***	(0.69)***
BankAssets65*Income65				0.78
				(0.60)
School65*Income65		-0.01		-0.16
		(0.07)		(0.10)
English*Income65		2.14		2.55
		(0.82)**		(0.94)***
German*Income65		1.23		2.27
		(0.93)		(1.40)
French*Income65		2.12		2.67
		(0.90)**		(0.94)***
Observations	57	57	57	57
Estimation	IV	IV	IV	IV

Notes: Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the log growth rate, 1965-1995; *Trade65* is the sum of imports and exports as a share of GDP in 1965. *Income65* is the log of real per capita GDP in 1965; *M2/GDP65* is liquid liabilities as share of GDP in 1965; *BankAssets65* is claims of deposit money banks on nonfinancial domestic sectors as share of GDP in 1965; *School65* is the average years of schooling in the population over 25. *English, German,* and *French* indicate legal origin dummies. The instrument for trade openness is the predicted openness obtained by Frankel and Romer (1999), and the instrument for *Trade65*Income65* variable is the interaction of the Frankel and Romer instrument and *Income65*. All variables have been demeaned.

Table 6: Panel Regression Results

Dependent Variable	(1) Change in Private Credit/GDP	(2) Change in M2/GDP	(3) Change Bank Assets/GDP	(4) Change in Private Credit/GDP
Trade	-2.04	-1.00	-1.12	-2.01
	(0.85)**	(0.49)**	(0.73)	(0.87)**
Trade*Income	0.32	0.16	0.18	0.31
	(0.13)**	(0.07)**	(0.11)*	(0.13)**
Income	-0.25	0.02	-0.04	-0.21
	(0.14)*	(0.09)	(0.12)	(0.16)
School	-0.40	-0.24	-0.55	-0.33
	(0.39)	(0.22)	(0.31)*	(0.42)
School*Income	0.04	0.02	0.06	0.04
	(0.05)	(0.03)	(0.04)	(0.05)
PrivateCredit	-5.70			-5.49
	(1.27)***			(1.30)***
PrivateCredit*Income	0.52			0.50
	(0.15)***			(0.15)***
M2/GDP		-2.62		
		(0.72)***		
(M2/GDP)*Income		0.21		
		(0.09)**		
BankAssets			-4.89	
			(1.02)***	
BankAssets*Income			0.44	
			(0.12)***	
Observations	347	348	347	347
Number of countries	77	77	77	77
Time Effects	no	no	no	yes
R-squared	0.22	0.27	0.27	0.23

Notes: Fixed effects estimates; * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the log growth rate of a financial development indicator over the previous period; *Trade* is the sum of imports and exports as a share of GDP. *Income* is the log of real per capita GDP; *PrivateCredit* is private credit by deposit money banks and other financial institutions as share of GDP; *M2/GDP* is liquid liabilities as share of GDP; *BankAssets* is claims of deposit money banks on nonfinancial domestic sectors as share of GDP; *School* is the average years of schooling in the population over 25.