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Financial Constraints, the Distribution of Wealth and International Trade

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Financial Constraints, the Distribution of Wealth and International Trade*

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Abstract

We develop a simple theoretical model to examine the impact of the distribution of wealth on the patterns of trade when capital markets are imperfect. Our model predicts that the dispersion of wealth can be a determinant of comparative advantage for low-income countries with poor financial institutions. We find support for these prediction using export and financial panel data from a large sample of countries.

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1. Introduction

As the Heckscher-Ohlin-Mundell paradigm predicts, in a world where capital markets are perfect and production exhibits constant-returns to scale, aggregate wealth endowments can be an important source of comparative advantage, but their internal distribution does not matter for the patterns of international trade. This is because in the absence of financial frictions the only factor that determines the availability of external finance is a project's net present value. In real life financial markets are far from perfect. Informational asymmetries between lenders and borrowers, corporate governance quality shortcomings and non-negligible intermediation costs are only a sample of the types of problems that beset financial markets. The presence of financial frictions implies that an entrepreneur's wealth is a second factor that lenders need to consider when providing external finance. Entrepreneurs with profitable projects but insufficient wealth cannot obtain external funds; i.e. they are financially constrained. A steadily growing literature examines the implications of financial constraints for the patterns and volume of international trade.

Much of the literature focuses on the quality of institutions.[1] In a recent paper Ju and Wei (2008) suggest that only for those countries with poor quality financial systems will financial constraints influence comparative advantage. For countries with well-functioning financial markets, finance is secondary to the real sector. Financial constraints are not sufficiently restrictive to prevent them from expanding those sectors where they have a comparative advantage. In contrast, for countries with poor quality institutions finance becomes a primary source of comparative advantage. When capital is not efficiently allocated its aggregate level becomes a poor predictor of economic performance.

In this paper, we argue that the same reasoning might also apply to the distribution of wealth, especially for economies that are not very wealthy. For a given level of endowments and institutional quality, those with higher inequality are less affected by financial frictions. The intuition is that a transfer of wealth from the poor to the relatively wealthy might alleviate financial constraints sufficiently to allow the economy to specialize in those sectors where it has a comparative advantage. This prediction is not entirely surprising given that it only extends the implications of the

[1] See for example, Antras and Caballero (2009), Beck (2002), Bougheas and Falvey (2010), Chaney (2005), Egger and Keuschnigg (2009), Ju and Wei (2008), Kletzer and Bardhan (1987), Manova (2008b), Matsuyama (2005) and Wynne (2005).

Aghion and Bolton (1997) trickle-down argument to open economies. However, the prediction is derived from a simplified model that allows us to concentrate our analysis on the relationship between the wealth distribution and the patterns of trade. We analyze a two-sector model of trade with heterogeneous agents but we only allow for two levels of wealth endowments.[2] Nevertheless, even this simplified environment offers useful suggestions on the sensitivity of our results to alternative specifications of the endowment distribution.

The possibility that the constraints of financial dependency can be overcome in different ways, may take on added significance in time off global financial upheaval. As we have recently observed, a financial crisis may sharply limit firms' access to external finance, even in an otherwise efficiently functioning financial system. Where firms are heavily dependent on external finance their ability to export will be curtailed. Meanwhile those firms that rely on internal financing may also be adversely affected, but to a lesser degree. The latter may gain a competitive advantage in times of financial crisis.

We also take a first look at international data from a sample that includes countries from all stages of development. Our preliminary findings on institutional quality and per-capita income confirm earlier results.[3] Our findings also provide some (albeit weak) evidence on the predicted relationship between income dispersion and comparative advantage.

2. A Simple Model

Consider an economy with a population of N risk-neutral agents. These agents are of two types distinguished by their level of endowments of assets A. The proportion of poor agents is π and each is endowed with $\underline{A}$ units of assets, while the rich are endowed with $\overline{A}$ $\left(\underline{A} < \overline{A} < 1\right)$ units of assets. Each agent is also endowed with one unit of labor. The total assets in the economy are $\mathcal{A} = N\{\pi\underline{A} + [1-\pi]\overline{A}\} \equiv N\hat{A}$. The economy produces two final goods - a primary commodity and a manufacturing product. All agents have homothetic preferences allocating equal shares of their income to each good. Without loss of generality we assume that the manufacturing

[2] See also Bougheas and Falvey (2010), Egger and Keuschnigg (2009), Foellmi (2010) and Wynne (2005) for other related work on the relationship between the distribution of wealth and international trade.

[3] See Beck (2003), Hur, Raj and Riyanto (2006), Manova (2008a,b) and Slaveryd and Vlachos (2005).

product is the numeraire and denote by P the price of the primary commodity. Production of one unit of the primary commodity requires the input of one unit of labor. In modeling the manufacturing sector we follow closely the fixed-investment model of Holmström and Tirole (1997). For the production of the manufacturing product there are two technologies available. The safe technology is constant returns to scale, requiring x unit of assets as input for the production of x units of final output. The risky technology involves an investment project of fixed size, involving an entrepreneur, who uses her labor endowment to run the project and one unit of assets as inputs. This technology yields R units of the manufacturing product with probability p and nothing with probability $1-p$. The probability of success of the project depends on the effort exerted by the entrepreneur. When the entrepreneur exerts a high level of effort $p = p_H$, while when her level of effort is low $p = p_L$. However, in the latter case she derives an additional benefit B. We assume that $p_H R > 1 > p_L R + B$ which implies that the risky technology is socially efficient only when the entrepreneur exerts effort.

Since $\underline{A} < \overline{A} < 1$, an entrepreneur with assets A wishing to adopt the risky technology must borrow $1 - A$. We assume that this loan is repaid only if the project is successful. In a competitive financial market, the expected payoffs to entrepreneurs who do and don't exert effort are, respectively

$$p_H\{R - r[1 - A]\} \qquad \text{and} \qquad p_L\{R - r[1 - A]\} + B$$

where r denotes the equilibrium interest rate. The incentive compatibility condition that ensures that the borrower exerts the high level of effort is then given by

$$[p_H - p_L]\{R - r[1 - A]\} \geq B$$

where the left-hand side is equal to the expected benefit of exerting a high level of effort.

By setting the incentive compatibility condition to equality and solving for A we derive a threshold level of initial endowments $A^* = 1 - \frac{1}{r}\left[R - \frac{B}{p^H - p^L}\right]$ such that only those agents with $A \geq A^*$ can obtain external funds and thus become entrepreneurs. The quality of financial institutions is then captured by $R - \frac{B}{p^H - p^L}$. The smaller this variable, the higher the endowment threshold. From now on we assume that $\underline{A} < A^* < \overline{A}$ for all relevant r; put differently, we focus on equilibria where only the wealthy agents are financially unconstrained.

Our aim is to understand how changes in inequality can affect the pattern of international trade. In perfect financial markets, which in our case mean effort is observable, any agent with a project that has a positive present value can obtain external funds. What matters for obtaining the equilibrium is only the level of aggregate wealth and not its distribution. As we will see below this is not necessarily the case when we introduce financial market frictions.

It turns out that we need to consider two general cases that depend on the proportion of poor agents. The total borrowing requirement if all rich agents undertake the risky project is $LD = N[1-\pi]\left[1-\overline{A}\right]$ and the total assets available from poor agents are $LS = N\pi\underline{A}$. Equating these, one obtains the unique $\hat{\pi}$ at which aggregate wealth is just sufficient to finance the projects of all financially unconstrained agents

$$\hat{\pi} = \frac{1-\overline{A}}{\underline{A}+1-\overline{A}}$$

Note that an increase in per capita wealth, through either the rich or the poor, reduces $\hat{\pi}$. When $\pi < \hat{\pi}$, $LD > LS$ and there will be some financially unconstrained agents that will be employed in the primary sector and invest their assets in the financial market; while when $\pi > \hat{\pi}$, $LD < LS$ and some assets will be invested in the safe but low-return technology.

2.1. Low π: Inequality and Financial Frictions are Irrelevant

In this case the proportion of agents that qualify for access to external funds is too high. The aggregate wealth in the economy is not sufficient to finance all eligible projects and thus some wealthy agents will enter the primary sector and invest their endowments of assets in the financial market. But all assets are invested in the more efficient but risky technology. As all wealthy agents are identical, in equilibrium, they must be indifferent between finding employment in the primary sector and becoming entrepreneurs, implying that $P + p_H r\overline{A} = p_H\{R - r[1-\overline{A}]\}$ in equilibrium. The left-hand side is equal to the expected income of a wealthy agent who decides to be employed in the primary sector and invests her wealth in the financial market, while the right-hand side is equal to the expected income of a wealthy agent who decides to become an entrepreneur. This condition can be simplified to

(1) $P = p_H[R - r]$

revealing an unambiguously negative relationship between the equilibrium relative price of the primary good and the interest rate (expressed in terms of manufactures).

As long as the financial market and one of the goods markets are in equilibrium the other goods market will also be in equilibrium. We focus on the market for the primary commodity. Let θ denote the fraction of rich agents who enter the primary sector, which is determined by financial market clearing. The total supply of funds is $N\{\pi\underline{A} + \theta[1-\pi]\overline{A}\}$, which includes the supply of funds by the poor agents and the supply of funds by those rich agents employed in the primary sector. The demand for funds is $N[1-\theta][1-\pi]\left[1-\overline{A}\right]$. Equating these and solving for θ we get

(2) $\theta = 1 - \frac{\hat{A}}{1-\pi}$

All agents in the primary sector produce one unit so that the total supply of the primary commodity is $N\{\pi + \theta[1-\pi]\}$. Every agent in the economy spends half of her income on the primary commodity and thus total demand is

$$\pi N\left[\frac{P+p_H r\underline{A}}{2P}\right] + [1-\pi]N\left[\frac{P+p_H r\overline{A}}{2P}\right] = \frac{N}{2}\left[1+\frac{p_H r\hat{A}}{P}\right]$$

Equating demand and supply and solving, we get

(3) $P = \frac{p_H r\hat{A}}{2(\pi+\theta(1-\pi))-1}$

Substituting (2) into (3) and using (1) we find that

(4)[4] $r = R\frac{1-2\hat{A}}{1-\hat{A}}$

and

(5) $P = p_H R\frac{\hat{A}}{1-\hat{A}}$

Note that r is decreasing and P is increasing in $\hat{A}$, but that neither of these solutions depends on the distribution of wealth in the economy. The reason is that financial constraints do not bind as there are agents eligible to obtain external funds but who

[4] Equation (3) and (4) indicate a further constraint for the existence of this equilibrium. (3) must hold in the limiting case where $\theta = 0$ implying that $\hat{\pi} > 1/2$ for $P > 0$. The same issue is reflected in (4) where $1 > 2\hat{A}$ is required for $r > 0$. The point is that as an economy becomes wealthier through asset accumulation in this equilibrium, labour is withdrawn from the primary sector as more rich agents become entrepreneurs. Manufacturing output expands, primary output falls and so P rises and r falls. Eventually, given the constant expenditure shares, it becomes optimal to increase primary production, but this can only be achieved by switching assets to the safe technology thereby freeing up formerly entrepreneurial labour for use in the primary sector. Clearly in this case it is relative factor supplies rather than financial constraints that dictate the use of the safe technology, so we will not consider it further, other than to point out that this constraint does not apply to a small open economy where additional consumption of primary products can be provided through imports.

opt not to do so. The equilibrium prices are the same as those that would obtain in the absence of financial frictions. The only difference is that under perfect financial markets all agents would have been eligible to obtain funds, while here poor agents can only find employment in the primary sector. Any redistribution of wealth that maintains the average and leaves the proportion of poor people below the threshold level has no effect on the economy's equilibrium. But changes in aggregate wealth do. All manufacturing output is produced using the more efficient technology and any extra wealth will be employed using that technology. For any given {P, r}, an increase in aggregate wealth increases the demand for the primary product and reduces the supply as rich agents are drawn into the manufacturing sector, tending to increase P. For given θ, an increase in $\underline{A}$ increases the supply of funds without affecting the demand, while an increase in $\overline{A}$ increases the supply of funds and reduces the demand. In each case the response is a reduction in θ and a fall in r[5]. Finally, a higher expected return on the risky technology boosts both the demand for funds and the supply of the manufacturing product causing both prices to increase.

2.2. High π: Inequality and Financial Frictions Matter

When the proportion of unconstrained agents is low the level of aggregate investment in the risky technology is lower than the level of aggregate endowments and some assets are invested in the safe technology. But for this to be the case poor agents must be indifferent between lending their endowments to entrepreneurs and investing them in the safe technology. Since the latter produces 1 unit of manufacturing output, this implies that the equilibrium interest rate must satisfy $p_H r = 1$. The quantity of assets borrowed for investment in the risky technology is LD, and total investment in the risky technology is $[1-\pi]N$. Investment in the safe technology is $LS - LD = N\{\hat{A} - (1-\pi)\}$. Given that now only the poor agents produce the primary commodity its total supply is equal to πN. Both types of agents spend half of their income on the primary commodity so that total demand is equal to

$$\frac{N}{2P}\left\{\pi\left[P + p_H r\underline{A}\right] + [1-\pi]p_H\left[R - r\left[1-\overline{A}\right]\right]\right\} = \frac{N}{2P}\{\pi P + \hat{A} + [1-\pi]p_H[R-r]\}$$

Equating the two sides of the market and solving for the price yields

[5] The equilibrium volume of financial activity is $N\hat{A}\left[1-\overline{A}\right]$, which is increasing in $\underline{A}$, but is only increasing in $\overline{A}$ as long as $\left[1-\overline{A}\right][1-\pi] > \hat{A}$ initially.

(6) $$P = \frac{[1-\pi]p_H[R-r]+\hat{A}}{\pi}$$

As in the previous case an increase in either aggregate wealth or the expected return of the risky technology pushes the price up. Both changes boost the supply of the manufacturing product, the former by increasing the amount invested in the safe technology[6] the latter by increasing the productivity of the risky technology. But in this case the distribution of endowments also matters. An increase in the proportion of poor agents, which is equivalent to an increase in the mass of financially constrained agents, results in a withdrawal of funds from the risky-technology that are now invested in the less efficient safe technology. In addition, more agents enter the primary sector. All these changes boost the relative supply of the primary commodity and depress its price.

The reason that the distribution of income matters is because financial constraints are binding. Under perfect capital markets all funds would have been invested in the high-return risky technology. However, even if all agents have projects with positive present value only those with sufficiently high endowments, $A \geq A^*$, have access to external funds. Changes in the endowment distribution directly affect the mass of financially constrained agents and consequently the equilibrium under autarky.

2.3. International Trade and the Distribution of Endowments

We assume that the economy is a price-taker in the world markets and we denote by P^* the world price of the primary commodity. If the autarky price is below the world price ($P < P^*$) then the economy will have a comparative advantage in, and thus export, the primary commodity. In contrast, if the world price is below the autarky price ($P > P^*$) then the exporting sector will be manufacturing. Consider once more the two cases analyzed above.

We know that when the proportion of poor agents is low, changes in the distribution of wealth do not have any effect on the autarky price. Without affecting the autarky price they cannot affect the patterns of trade. As in the case where the financial market is frictionless changes in the distribution of wealth do not have any real effects.

[6] Any increase in $\underline{A}$ will be invested in the safe technology leaving the volume of financial activity unchanged. Any increase in $\overline{A}$ will reduce borrowing and hence reduce the volume of financial activity.

This is no longer the case when the proportion of poor agents is high. As the proportion of financially constrained agents goes up the relative supply of the primary sector increases and the autarky price declines. The implication of this last observation for the patterns of international trade is straightforward. The higher the proportion of financially constrained agents, the more likely is that the country will export the primary commodity.

As noted in the introduction, the next section illustrates our results by correlating an indicator of a country's export composition with data on its level of financial development, wealth and income distribution. Although our model is too simple to take directly to the data, it is informative to consider the corresponding relationships in the model. While π is the appropriate indicator of inequality in the model, the proportion of poor agents is not well defined when wealth is continuously distributed. In the latter case the Gini index (G) is typically used as a measure of inequality, and the corresponding formula for our model is

$$G = \frac{[1-\pi]\pi[\overline{A}-\underline{A}]}{2\hat{A}}$$

Unfortunately, G is not a monotonic function of π. An increase in π increases G if π is low, and reduces G if π is high (specifically depending on whether π is less or greater than $\left[1+\sqrt{\underline{A}/\overline{A}}\right]^{-1}$)

Consider a world where countries differ only in their composition of rich and poor agents.[7] Those countries with a high proportion of poor agents ($\pi > \hat{\pi}$), will have lower per capita wealth, will tend to export the primary product and will have some agents who are financially constrained. Within this group, increasing wealth (falling π) will tend to be associated with an increased (though weak) likelihood of exporting the financially constrained goods and an increasing Gini index. Indicators of financial development – [Total Lending]/[Total Wealth] ($= [1-\pi]\left[1-\overline{A}\right]/\hat{A}$), [Total Investment by Entrepreneurs]/[Total Wealth] ($= [1-\pi]\overline{A}/\hat{A}$) and [Total Investment in the Risky Activity]/[Total Wealth] ($= [1-\pi]/\hat{A}$) – will also be increasing with wealth in this group. Countries with a low proportion of poor agents

[7] Clearly this is not the only source of wealth differences. Suppose countries have the same π and the same asset ownership ratio of rich to poor (i.e. $\underline{A}/\overline{A}$ is a constant), but differ in their levels of wealth. Then richer countries will be more likely to export financially constrained goods, will not be financially constrained (since $\hat{\pi}$ falls as wealth rises), but G is the same for all countries. The effects on indicators of financial development can be readily determined.

($\pi < \hat{\pi}$), will have higher per capita wealth, agents who are not financially constrained and will tend to export financially constrained products. Within this group, increasing wealth will tend to be associated with an increased probability of exporting financially constrained goods and a falling Gini Index. But in this group changes in π have no impact on the corresponding indicators of financial development (which are given by $1 - \overline{A}$, $\overline{A}$ and 1 respectively).

In summary, in each case richer countries are more likely to export the financially constrained goods, but this may not be reflected in indicators of financial development for high income countries. At low incomes, an increased likelihood of exporting financially constrained goods is associated with a higher G, while at high incomes it is associated with a lower G.

3. A Preliminary Look at the Data

We have argued that when financial markets are imperfect, the pattern of international trade will depend on both the extent of financial development and the distribution of wealth in the economy. A country is more likely to have a comparative advantage in financially dependent sectors if it (a) has high quality financial institutions and thus deeper financial development, and/or (b) is either wealthy or has an uneven wealth distribution.

In this section, we test the above predictions of our model by employing a generalised difference in difference approach to show that credit constraints are an important determinant of international trade flows. We regress the industry level of exports on the level of financial development interacted with a measure of external finance dependence and a measure of wealth inequality. More specifically, we estimate the following specification:

$$X_{cit} = \alpha_0 + \beta_1(EFD_i \times FINDEV_{ct} \times IQT_{ct}) + \beta_2(EFD_i \times FINDEV_{ct}) + \beta_3(IQT_{ct} \times FINDEV_{ct}) + \sum_n \delta_n (FACTOR_{cn} \times INTENSITY_{kn}) + \varphi GDP_{ct} + \gamma_t + \gamma_c + \gamma_i + \varepsilon_{cit}$$

where the X_{cit} denotes log exports in country c in industry i in year t, EFD is the level of external financial dependence for industry i, FINDEV is the level of financial quality for country c, and IQT_{ct} is the level of inequality in country c in year t. The interaction of financial quality with external dependence allows one to capture the

cross sectional and time series variation at the country level through $FINDEV$ and at the industry level through EFD. $FACTOR_{cn}$ is the m_{th} level of endowment (including human, physical, natural resource) in country c and $INTENSITY_{kn}$ is the n_{th} level of factor intensity (including human, physical, natural resource). The interaction between these endowments and their intensities is included to control for the traditional sources of comparative advantage. This ensures that any effect on trade from financial development and its interaction with external finance dependence is independent of these traditional sources. GDP_c is the log of country *c*'s gross domestic product. $\gamma_t, \gamma_c, and\ \gamma_i$ are the time, country and industry specific effects where γ_t is expected to capture any time varying omitted variables and γ_c , γ_i account for country and industry specific omitted characteristics Our main coefficient of interest, is β_1 which is expected to be approximately zero or insignificant for high income countries as financial constraints are less likely to bind. For lower income groups we expect a negative coefficient which would provide evidence consistent with the theoretical model: those countries with low inequality benefit more from financial development given that in high inequality countries the demand for external finance is lower.

For robustness, we have also estimated a similar specification using a financial liberalization dummy, following Manova (2008a), replacing thus our measures of financial development. This new specification controls for endogeneity problems given that other researchers have shown that trade openness can also promote financial development (Huang and Temple, 2005; Do and Levchenko, 2007).

We do all estimations for the whole sample as well as for three distinct income group sub-samples split according to income classifications provided by OECD.

3.1. Data Description

Our data set covers 91 countries and 27 industries for the period 1980-1997.[8] For export flows we use the data set in Manova (2008a) which aggregates to 3-digit ISIC industries data collected from the World Trade Tables. The unit of measurement used for the export flows is the value of shipment in US dollars representing the value of exports of the reporting country. The measure of external finance dependence is from Rajan and Zingales (1998). This variable measures the financing requirements in addition to any internal funds of each US industry. We use this measure as proxy for

[8] The full list of sectors and countries is available in an Appendix available from the authors upon request.

the financial dependence of the same industries in other countries.[9] This variable is calculated as the median ratio of capital expenditure minus cash flow from operations to capital expenditure for each industry over the 10 years from 1980 to 1989.

We use variables that measure the degree of financial development as proxies for the quality of financial institutions (the data is taken from Beck et. al., 2009).[10] The ratio of the level of credit obtained by the private sector from financial intermediaries to GDP (Private Credit) is a good measure as it captures the lending capacity of the financial sector and the use of funds and not just their availability. For robustness we also use the ratio of Liquid liabilities to GDP which is a broader measure of the depth of the financial system as it includes currency plus demand and interest bearing liabilities of banks and non-bank institutions. In addition, we have estimated a specification replacing the measure of financial development with a dummy variable that takes the value of 1 after the country has liberalized its equity markets. The data on equity market liberalization are taken from Bekaert, Harvey and Lundblad (2005).

Unfortunately, measures of wealth distributions are unavailable,[11] and in the absence of a superior alternative we use the income distribution as a proxy for the wealth distribution. We take real GDP per capita, obtained from the Penn World Tables (Heston et. al., 2009), as a proxy for the mean of the distribution of wealth, and income inequality data is obtained from the newly compiled Standardized World Income Inequality Database (SWIID) by Solt (2009).[12]

3.2. Results

In Table 2 we present the results obtained from estimating the above model specification without controlling for the traditional sources of comparative advantage. Since we are estimating a conditional hypothesis we have included all the constitute

[9] This strategy is also followed in Manova (2008b). The ranking of industries is available in the Appendix.

[10] Unfortunately, more direct measures of the quality of financial institutions (degree of contract enforcement, availability of creditors' rights protection, legal origin and availability of credit rating institutions), are only available for a much smaller sample of countries.

[11] One possibility is to use the distribution of firm assets that can be obtained from firm level balance sheet data. But such data sets are available for few countries, and they usually exclude the small firms that typically are the most financially constrained.

[12] This dataset overcomes the problems of coverage and comparability affecting earlier datasets by employing a custom missing data algorithm to standardize the UNU-WIDER and the World Bank (Deninger and Squire, 1996) datasets.

variables found in the three way interaction to avoid any inferential errors.[13] The first column of Table 2 shows the estimation results for the whole sample and the other three columns show the corresponding estimations for each income group. Looking at column 1, we find that, consistent with our model prediction, countries with higher income tend to export relatively more goods from sectors that are financially dependent. This result also holds within the high and the middle income groups.

But our main interest is in the coefficient of the three-way interaction term. Column 2 suggests that the coefficient corresponding to the high-income group sample is insignificant. This implies that for high income countries the distribution of wealth does not matter given that these countries are wealthier and have better quality financial institutions. The same coefficient is significantly negative for the other two income groups. This is exactly what our model predicts. Among low income countries, an improvement in the quality of financial institutions will help promote the exports of financially dependent sectors more in those countries with lower income inequality. In countries with higher income inequality, the concentration of wealth implies that there are more agents with access to external finance.

We test the sensitivity of our results by controlling for traditional sources of comparative advantage, namely, natural, human and physical capital resources. We interact the endowments of these variables with the respective sectoral intensity levels. Table 3 reveals that our results still hold. As a robustness test, we also used private credit to private sector from banks as a measure of financial development.[14] Our results still hold (see Table 4).

Finally, our results also hold when we use the financial liberalization dummy instead our measures of financial development. The only difference now is that for the middle-income group the sign on the three-way interaction term is not significant (see Table 5).

4. Concluding Comments: Looking Ahead

Recent work in international trade has suggested that when capital markets are imperfect both the quality of financial institutions and the distribution of income can

[13] See Brambor et al. (2006) for details of the resulting significant inferential errors resulting from omitting all the constitute terms of the multiplicative interaction model. We have only eliminated the variable EFD because is captured by the industry fixed effects.

[14] This indicator does not include non-financial institutions which may not be common in less developed countries.

be sources of comparative advantage. It is clear that healthier institutions provide better solutions to financial constraints arising as a result of frictions in financial markets. Thus countries with better institutions will have an advantage in goods produced by financially dependent sectors. We know that there is a strong relationship between financial and economic development and thus it is not surprising that wealthier countries should also have a comparative advantage in these sectors. However, as our model suggests, a sufficiently high concentration of wealth might be sufficient for overcoming a lack of liquidity in financial markets.

Our empirical work offers some support for the theoretical predictions. Inequality should only matter for countries with low quality institutions since it is in these countries where financial markets are failing to allocate resources efficiently. Thus, in addition to controlling for the level of income we also need to focus on those countries with malfunctioning institutions.

These results are only preliminary. Future work must try to address the following issues. Firstly, in the present paper, we have used financial development indicators as proxies for financial quality. Ideally, we would like to use direct measures of financial quality that presently are not available for the whole sample of countries. Secondly, we have completely ignored the role of foreign direct investment. Multinationals can raise funds in international markets thus avoiding host country constraints imposed by poor quality institutions.[15] If the host countries are predominantly high inequality ones then what our results might be picking up is the effect of FDI rather than that of inequality on the patterns of trade. Lastly, direct measures of the wealth distribution or may even better the distribution of firm net worth would be better alternatives than the income distribution used in the present paper.

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Appendix

Table 1: Measures of Asset tangibility and External Finance Dependence for each Industry

code	Industry	External Finance Dependence	Ranking
356	Plastic products	1.1401	1
385	Professional & scientific equipment	0.961	2
383	Machinery, electric	0.7675	3
362	Glass and products	0.5285	4
390	Other manufactured products	0.4702	5
382	Machinery, except electrical	0.4453	6
321	Textiles	0.4005	7
354	Misc. petroleum and coal products	0.3341	8
384	Transport equipment	0.3069	9
331	Wood products, except furniture	0.284	10
381	Fabricated metal products	0.2371	11
332	Furniture, except metal	0.2357	12
355	Rubber products	0.2265	13
352	Other chemicals	0.2187	14
351	Industrial chemicals	0.205	15
342	Printing and publishing	0.2038	16
341	Paper and products	0.1756	17
311	Food products	0.1368	18
371	Iron and steel	0.0871	19
313	Beverages	0.0772	20
369	Other non-metallic mineral products	0.062	21
353	Petroleum refineries	0.042	22
322	Wearing apparel, except footwear	0.0286	23
372	Non-ferrous metals	0.0055	24
323	Leather products	-0.14	25
361	Pottery, china, earthenware	-0.1459	26
314	Tobacco	-0.4512	27

Source: Rajan and Zingales (1998)

Table 2: ***Financial Development , Wealth Distribution and Trade***

Dependent Variable.: Industry level Export	***Full Sample***	***HY***	***MY***	***LY***
Financial Quality	-1.225	0.072	-1.069	-1.925
(**Private credit- ALL/GDP**)	(0.148)***	(0.396)	(0.343)***	(0.556)***
Gini	0.059	0.011	0.058	0.099
	(0.007)***	(0.008)	(0.012)***	(0.024)***
Financial Quality * External	0.791	0.639	1.938	1.584
Finance Dependence	(0.139)***	(0.455)	(0.493)***	(0.622)**
real GDP	**1.039**	**0.555**	**1.879**	**-0.442**
	(0.097)* **	**(0.144)*** **	**(0.148)*** **	**(0.234)***
Financial Quality*Gini	0.029	-0.004	0.023	0.039
	(0.004)***	(0.014)	(0.008)***	(0.011)***
Gini * External Finance	-0.039	0.003	-0.069	-0.095
Dependence	(0.004)***	(0.008)	(0.016)***	(0.029)***
Financial Quality * Gini * External	**-0.009**	**-0.003**	**-0.035**	**-0.026**
Finance Dependence	**(0.003)*** **	**(0.016)**	**(0.011)*** **	**(0.012)** **
R-square	0.804	0.819	0.654	0.561
# Observation	29144	11045	12915	5184

All regressions include country, year and industry fixed effects. Robust standard errors are in parentheses.
* **, **,* indicates significance at the 1%, 5%, and 10% level.
HY, MY, LY are High Income, Middle Income and Low Income countries respectively.

Table 3: ***Financial Development, Wealth Distribution and Trade: Robustness 1***

Dependent Variable.: Industry level Export	***Full Sample***	***HY***	***MY***	***LY***
Financial Quality(**Private credit-ALL/GDP**)	-1.017	-0.109	-1.823	-1.294
	(0.159)***	(0.459)	(0.394)***	(0.694)*
Gini	0.055	0.026	0.078	0.069
	(0.007)***	(0.009)***	(0.014)***	(0.031)**
Financial Quality * External	0.841	0.141	2.157	1.780
Finance Dependence	(0.142)***	(0.476)	(0.493)***	(0.672)***
real GDP	**0.904**	**0.878**	**1.531**	**-1.125**
	(0.106)* **	**(0.216)*** **	**(0.189)*** **	**(0.272)*** **
Financial Quality*Gini	0.028	-0.007	0.039	0.032
	(0.004)***	(0.016)	(0.009)***	(0.013)**
Gini * External Finance	-0.038	-0.010	-0.079	-0.098
Dependence	(0.004)***	(0.008)	(0.016)***	(0.030)***
Financial Quality * Gini * External	**-0.010**	**0.021**	**-0.040**	**-0.030**
Finance Dependence	**(0.003)*** **	**(0.017)**	**(0.011)*** **	**(0.013)*** **
Capital Resource Endowment(CRE)	-0.000	-0.000	0.000	0.000
	(0.000)***	(0.000)*	(0.000)**	(0.000)
Human Resource Endowment(HRE)	-1.015	-1.564	0.054	-1.730
	(0.158)***	(0.186)***	(0.306)	(1.178)
Natural Resource Endowment(NRE)	-0.000	-0.000	-0.000	0.000
Capital Resource Endowment(CRE)	(0.000)*	(0.000)	(0.000)***	(0.000)***
Capital Resource Endowment *	1.750	-6.526	4.526	2.203
Capital Resource Intensity	(0.345)***	(1.329)***	(0.848)***	(2.081)
Human Resource Endowment *	1.141	1.037	-0.197	1.835
Resource Intensity	(0.076)***	(0.106)***	(0.209)	(0.654)***
Natural Resource Endowment *	0.115	0.141	-0.043	0.425
Natural Resource Intensity	(0.013)***	(0.015)***	(0.022)*	(0.064)***
R-square	0.807	0.821	0.653	0.577
# Observations	25155	9614	11825	3716

All regressions include country, year and industry fixed effects. Robust standard errors are in parentheses.
* **, **,* indicates significance at the 1%, 5%, and 10% level.
HY, MY, LY are High Income, Middle Income and Low Income countries respectively.

Table 4: ***Financial Development, Wealth Distribution and Trade: Robustness 2***

Dependent Variable.: Industry level Export	***Full Sample***	***HY***	***MY***	***LY***
Financial Quality(**Private Credit-Bank/GDP**)	-0.836	-0.213	-1.776	-1.282
	(0.151)***	(0.368)	(0.432)***	(0.707)*
Gini	0.055	0.034	0.082	0.075
	(0.008)***	(0.010)***	(0.016)***	(0.033)**
Financial Quality * External	0.876	1.464	2.942	1.319
Finance Dependence	(0.155)***	(0.509)***	(0.603)***	(0.659)**
real GDP	**0.835**	**0.813**	**1.461**	**-1.101**
	(0.106)* **	**(0.216)*** **	**(0.190)*** **	**(0.266)*** **
Financial Quality*Gini	0.027	0.006	0.041	0.034
	(0.004)***	(0.013)	(0.010)***	(0.013)**
Gini * External Finance	-0.038	-0.044	-0.102	-0.070
Dependence	(0.005)***	(0.013)***	(0.020)***	(0.032)**
Financial Quality * Gini * External	**-0.010**	**-0.028**	**-0.055**	**-0.018**
Finance Dependence	**(0.004)** **	**(0.018)**	**(0.013)*** **	**(0.013)**
Capital Resource Endowment(CRE)	-0.000	-0.000	0.000	-0.000
	(0.000)***	(0.000)***	(0.000)*	(0.000)
Human Resource Endowment(HRE)	-0.903	-1.426	0.130	-1.648
	(0.153)***	(0.183)***	(0.297)	(1.198)
Natural Resource Endowment(NRE)	-0.000	-0.000	-0.000	-0.001
Capital Resource Endowment(CRE)	(0.000)**	(0.000)	(0.000)***	(0.000)***
Capital Resource Endowment *	2.201	-5.510	4.606	3.158
Capital Resource Intensity	(0.344)***	(1.295)***	(0.848)***	(2.119)
Human Resource Endowment *	1.101	0.940	-0.206	1.682
Resource Intensity	(0.077)***	(0.106)***	(0.209)	(0.658)**
Natural Resource Endowment *	0.107	0.122	-0.041	0.400
Natural Resource Intensity	(0.013)***	(0.015)***	(0.022)*	(0.064)***
R-square	0.807	0.821	0.653	0.578
# Observations	25101	9614	11771	3716

All regressions include country, year and industry fixed effects. Robust standard errors are in parentheses.
* **, **,* indicates significance at the 1%, 5%, and 10% level.
HY, MY, LY are High Income, Middle Income and Low Income countries respectively.

Table 5: ***Liberalization, Wealth distribution and Trade***

Dependent Variable.: Industry level Export	***Full Sample***	***HY***	***MY***	***LY***
Liberalization	-0.014	-0.236	0.023	-0.219
	(0.155)	(0.602)	(0.309)	(0.537)
Liberalization*External	0.702	0.690	0.559	2.290
Finance Dependence	(0.234)***	(0.446)	(0.549)	(0.884)***
real GDP	**0.840**	**0.733**	**1.391**	**-0.345**
	(0.094)* **	**(0.212)*** **	**(0.156)*** **	**(0.201)***
Gini	0.011	-0.013	0.018	0.002
	(0.005)**	(0.021)	(0.008)**	(0.009)
Gini* Liberalization	0.016	0.032	0.009	0.017
	(0.004)***	(0.020)	(0.007)	(0.011)
Gini *External Finance	-0.036	-0.008	-0.022	-0.023
Dependence	(0.005)***	(0.014)	(0.007)***	(0.009)***
Liberalization * Gini*	**-0.009**	**-0.019**	**-0.006**	**-0.050**
External Finance Dependence	**(0.006)**	**(0.016)**	**(0.012)**	**(0.020)****
Capital Resource Endowment(CRE)	-0.000	-0.000	-0.000	0.000
	(0.000)*	(0.000)	(0.000)	(0.000)
Human Resource Endowment(HRE)	-0.706	-1.280	0.456	0.385
	(0.145)***	(0.170)***	(0.273)*	(0.744)
Natural Resource Endowment(NRE)	0.000	0.000	-0.000	0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Capital Resource Endowment(CRE)	2.261	-4.753	5.845	2.469
Capital Resource Endowment *	(0.310)***	(1.234)***	(0.767)***	(1.081)**
Capital Resource Intensity	1.060	0.973	-0.239	0.587
Human Resource Endowment *	(0.073)***	(0.106)***	(0.194)	(0.319)*
Resource Intensity	0.100	0.139	-0.079	0.462
Natural Resource Endowment *	(0.013)***	(0.015)***	(0.022)***	(0.057)***
R^2	0.800	0.820	0.656	0.664
# Observations	27449	9614	13093	4742

All regressions include country, year and industry fixed effects. Robust standard errors are in parentheses.
* **, **,* indicates significance at the 1%, 5%, and 10% level.
HY, MY, LY are High Income, Middle Income and Low Income countries respectively.

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