Small-Scale Firms and Trade Liberalization

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Abstract

We explore how integrating into the world economy affects the incomes of manufacturers in less developed countries (LDCs). We show that cutting back trade barriers has asymmetric effects on the incomes of the two typical groups of entrepreneurs. Whereas access to foreign markets benefits those entrepreneurs who are able to run large-scale factories, credit-rationed entrepreneurs running a micro firm lose. The reason is simple. After the liberalization has taken place, wealthy entrepreneurs are no longer restricted to their small home markets and increase factor demand. The resulting increase in factor prices, in particular the rise of the interest rate, hurts the relatively poor borrowers. We suggest that these distributional consequences help to understand why attempts to implement free trade policies may fail in LDCs characterized by a highly unequal size-distribution of firms.

JEL classification: O11, F13, O16

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1 Introduction

Although most developing countries abolished policies of diversification and import substitution some 20 or 30 years ago, the tariff and non-tariff barriers that were supposed to be temporary when erected in the 1950s and 1960s became more or less permanent. Significant trade liberalizations were not made until the 1990s. However, despite this decline in trade barriers during the last decade, the manufacturing sector in most less developed countries (LDCs) remains relatively protected. For instance, average unweighted tariffs in Sub-Saharan Africa in 1998 were roughly four times as high as in developed countries (World Bank, 2001). In addition, Latin American countries that cut trade restrictions strongest turned to antidumping laws during the nineties in order to substitute for tariff and non-tariff restrictions (World Bank, 2003). This is puzzling because those LDCs participating in the "Third Wave of Globalization" by scaling back trade barriers are also the countries with the most impressive macroeconomic performance over the last two decades (World Bank, 2002).

The aim of this paper is to gain insights into the forces behind persistently high trade barriers by looking at how integrating into the world market affects the incomes of the manufacturers in a LDC. We show that removing trade barriers may have asymmetric effects on the incomes of the two typical groups of entrepreneurs in developing countries, namely the entrepreneurs operating a relatively small firm and those entrepreneurs who have the internal funds to run large-scale factories. A highly *dualistic size-distribution of firms* with a large number of small family businesses, a small number of large enterprises and almost no medium-sized firms (missing middle) is characteristic for the manufacturing sector in LDCs (Tybout, 2000). Note that, in contrast to the large literature on the "political economy of trade policy", we do not focus on redistribution along industry lines (specific factor models, e.g. Grossman and Helpman, 1994) or along factor lines (Heckscher-Ohlin models, e.g. Mayer, 1984 or Rogowski, 1989) but on the different impact of trade liberalization on the incomes of small and large monopolists, respectively. In particular, we show

that trade liberalizations have a negative impact on the incomes of the owners of small family businesses whereas the owners of large companies win.

The mechanism we focus on is simple. Suppose that there is a manufacturing sector consisting of a large number of *monopolists* and that the wealth distribution among these monopolists is very uneven in the sense that few individuals own most of the capital. Indeed, throughout the developing world, ownership of productive assets is highly concentrated (Deininger and Squire, 1998). However, due to the limited size of the home market under autarky, a rich entrepreneur will not have invested the whole capital endowment into the own firm. To escape strongly decreasing marginal returns and very low prices, he will lend some capital to entrepreneurs that have to rely more or less on external finance. Being small compared to the market demand and consequently facing relatively high mark-ups, owners of family businesses increase - relative to a situation in financial autarky - their firm sizes to the extent the (possibly imperfect) capital market allows.

Suppose now that the trade barriers are significantly cut back or removed at all. In this new situation, wealthy entrepreneurs are no longer restricted to the small domestic demand that forced them to charge low prices. Instead, they can sell now any quantity they like at the prevalent world market price. As a consequence, the rich lenders increase their firm sizes and shorten capital supply. The incomes of the owners of micro enterprises are hit quite differently by the opening. Due to the smaller capital supply, the interest rate rises. At the same time the prices for goods manufactured by the small fall. The reason for the price collapse of these goods is simple. After integrating into the world economy, these goods are no longer "scarce" since they can be imported at any quantity from abroad.

The size of these asymmetric effects on the incomes of the poorer and the richer entrepreneurs depends on essentially two factors. First, we show that - for a given distribution of capital endowments - the large manufacturers gain a lot and the owners of small firms lose relatively little when the credit markets are poorly developed. In such a situation, the provision of goods is very uneven

and, as a consequence, aggregate demand is low. This hurts all monopolistic producers but in particular the large ones. Second, given the level of financial development, the rich can win more when the distribution is very uneven. The reason is that an unequal distribution of capital endowments drives down the interest rate - given the capital market is imperfect. For the same reason, we expect the poor to lose a lot when the distribution is characterized by a "missing middle".

As just outlined, an important stylized fact about the manufacturing sector in LDCs is that the size-distribution of firms is highly dualistic. A major obstacle that prevents small establishments from becoming large is imperfect enforcement of credit contracts (or in general poor law enforcement) which makes *capital markets imperfect*. In such a situation, access to credit is limited in particular for small firms since they lack either an appropriate collateral or reputation (Sleuwaegen and Goedhuys, 2002) or both. The significance of capital market imperfections is documented in a number of empirical papers, among them Nugent and Nabli (1992), Banerjee and Duflo (2002) and Sleuwaegen and Goedhuys (2002). For simplicity, we abstract in our model from any other channel and focus on capital market imperfections (in interaction with the wealth distribution) as the central element leading to an uneven size-distribution and limiting the incomes of the owners of small firms. However, we are well aware of the fact that there exist many other factors that adversely affect in particularly or solely entrepreneurs running small firms (Little, 1987). But we challenge the view put forth by many scholars (e.g. Tybout, 2000) that a protectionist trade regime in a monopolistic environment favors entrepreneurs running a large-scale factory. We provide theoretical arguments - along the lines already presented above - that in particular owners of credit-rationed family businesses take advantage of obstacles to trade.

Given this asymmetric impact of obstacles to trade on the incomes of entrepreneurs we suggest that the actual trade policy in a country mirrors in parts the two different groups' relative strength in the political process.[1] At this point,

[1]In the early stages of a country's economic development, the workforce consists in large

a look at Latin America's 19th century economic history is quite illustrative. At the beginning of the century, the agricultural (for instance in Argentina and Brazil) and the mining sector (for instance in Bolivia, Mexico, and Peru) were dominant in the young, recently independent Latin American economies. Other industries played a minor role (Thorp, 1998). Running large-scale plantations or mines and hence producing mainly for the world market, landowners and mineral exporters were strongly in favour of free trade and against import restrictions (Coatsworth and Williamson, 2002). Cardoso and Faletto (1979) even argue that direct access to export markets in Europe, primarily in England, was one of the central motivations behind the Latin America's producers fight for independence from the crown. As a consequence, import tariffs were relatively low in the first half of the 19th century.[2] However, during the century, new (infant) industries owned by an urban elite emerged. Running relatively small enterprises, the "urban capitalist" as well as the artisans fought for the protection of domestic industry. Since these groups exerted disproportionate lobbying influence on politicians, average tariffs experienced a major increase towards the end of the century.[3]

Trade policies that led to strong redistribution between rural and urban areas can also be found in African history. After independence, in many African countries export marketing boards (that were established by the colonial powers to stabilize incomes in presence of fluctuating commodity prices) started to tax heavily the exports of outward-oriented industries (primarily in the agricultural sector). It is often argued in the literature (e.g. Bates, 1981) that this export taxation not only served to generate revenue for the government but was also designed to keep domestic commodity prices low and to direct productive resources towards urban infant industries (that, of course, were highly protected

parts of entrepreneurs or own-account workers. See Gollin (2000), Table 1.

[2]Note, however, that average tariffs in Latin America were high compared to Europe or Asia (Coatsworth and Williamson, 2002). Centeno (1997) underlines that this fact may be rooted in the young countries' low capacity to tax income or wealth. So, custom taxes which are easily collected were a perfect solution to fiscal problems.

[3]See Coatsworth and Williamson (2002), Figure 2a.

from foreign competition).

Note that our model differs in several dimensions from models, among them Mayer's (1984) median-voter model and Grossman and Helpman's (1994) special-interest group model, that contributed to the literature on "the political economy of trade policy". Focussing on a for LDCs characteristic environment, that is on imperfect markets in presence of high wealth inequality, we are interested in redistribution among rich an poor capital owners as a result of major trade liberalization steps. Consequently, we do not allow for industry-specific tariffs or subsidies. The analysis presented here is on a higher level of aggregation. Our aim is not to explain cross-industry variations in tariffs but to analyze the distributional consequences of the decision to join or to absent from an integration agreement that affects import or export restrictions for the whole manufacturing sector. In addition, consistent with the focus on the broad lines of trade policy, our model does not comprise specific factors. Instead, we are interested in the distribution of and the returns to the mobile factor (here capital) and highlight the role of factor market imperfections.[4]

The organization of the paper is as follows. Section (2) sets up the basic model for a closed economy and shows existence and uniqueness of the equilibrium. In Section (3), we derive comparative static results. In particular, we discuss the impact of changes in the level of financial development or the wealth distribution on both the size-distribution of firms and the income distribution. The effects of trade liberalisations on the size-distribution of firms as well on the income distribution are explored in Section (4). Section (5) concludes.

[4]Trade policy cannot affect the return to the "mobile" factor in Grossman and Helpman (1994) because there is a freely traded numeraire good that is manufactured with constant returns to scale form the "mobile" factor alone. Mayer's (1984) analysis in Section III assumes that the "mobile" factor is equally distributed among the individuals.

2 The Model

2.1 Preferences, and the Goods Market Structure

The economy is populated by a continuum of individuals. The population size is normalized to 1. The individuals are heterogeneous with respect to their initial capital endowment $\omega(i), i \in [0,1]$, but otherwise identical. The initial wealth endowments are distributed according to the distribution function $G(\omega)$, which gives the measure of the population with wealth less than ω.

Beside this wealth endowment, each individual has access to a technology that allows to transform 1 capital unit into 1 unit of a differentiated product. In addition, we make the crucial assumption that these individual technologies cannot be sold or imitated, i.e. we assume that each individual is *personally* endowed with a special business skill. This assumption seems to be appropriate since we focus on developing countries where family businesses (that transfer family specific human capital down through the generations) account for the overwhelming part of economic activity (Bhattacharya and Ravikumar, 2001). As a consequence, each individual is a monopoly supplier of a single, differentiated good. Note that, as long as the economy is closed, the continuum of goods is of the same mass as the continuum of individuals. Free trade may enlarge the spectrum of available goods to home residents. The results presented in this section are derived for a closed economy, but they can easily be extended to an open one as it is done in Section 4.

The utility function of the individuals is assumed to be of the familiar CES-form

$$U = \left[\int_0^1 c(j)^{\frac{\sigma-1}{\sigma}} dj \right]^{\frac{\sigma}{\sigma-1}}, \ \sigma > 1, \tag{1}$$

where $c(j)$ is consumption of good j. Note that all goods enter the utility function symmetrically. Hence, each monopolist faces the same isoelastic demand curve. Individual i maximizes the objective function (1) subject to the budget

constraint

$$\int_0^1 p(j)c(j)dj = y(\omega(i)), \tag{2}$$

where $p(j)$ is the price of good j. $y(\omega(i))$ is defined as individual i's (nominal) income. The exact functional relationship between income and initial wealth is specified in Subsection 2.3. Under these conditions, individual i's demand for the jth good is given by

$$\left(\frac{p(j)}{P}\right)^{-\sigma} \frac{y(\omega(i))}{P}, \tag{3}$$

where $P = \left[\int_0^1 p(j)^{1-\sigma}\right]^{1/(1-\sigma)}$ is the familiar CES price index. In a goods market equilibrium, aggregate demand for good j must be equal to its supply which is, due to the linear technology, equal to the capital invested into individual j's firm. As it is shown in the following subsection, the amount of capital entrepreneur j invest into his firm depends on his wealth endowment. Therefore, entrepreneur j's amount of investment (firm size, project size) is denoted by $k(\omega(j))$. The goods market equilibrium condition allows us to express the real price of good j as a function of the firm size and the real output:

$$\frac{p(j)}{P} = \left(\frac{Y}{P}\right)^{\frac{1}{\sigma}} k(\omega(j))^{-\frac{1}{\sigma}}, \tag{4}$$

where $Y \equiv \int_0^1 p(j)k(\omega(j))dj$ is the nominal output in our economy. Note that, in a goods market equilibrium, the real price is strictly decreasing in the firm size $k(\omega(j))$. The reason is simple. A larger investment translates one-to-one into higher output. Since the marginal utility from consuming a given good decreases in the quantity consumed, the consumers can only be induced to buy higher quantities by lower prices.

Later on, it will be very helpful to have an expression for the real output (aggregate real income) that depends only on the size-distribution of firms. Using equation (4) in the definition of the nominal output, we obtain

$$\frac{Y}{P} = \left[\int_0^1 k(\omega(j))^{\frac{\sigma-1}{\sigma}} dj\right]^{\frac{\sigma}{\sigma-1}}. \tag{5}$$

Henceforth we use $P = 1$ as the numéraire. This implies that nominal output equals real output. In addition, for ease of notation, we do not distinguish between the indices for goods and the indices for individuals.

2.2 The Capital Market

As mentioned above, the technology each individual is endowed with cannot be transferred form one agent to another. This is not true for the wealth endowments. Capital can be exchanged across individuals, and each capital unit has the same productivity no matter to which firm the unit is allocated. However, we assume that the capital market is imperfect in the sense that borrowing at the equilibrium interest rate is limited. Following Matsuyama (2000) in the modelling of capital market imperfection, credit-rationing arises from imperfect enforcement of (credit) contracts.[5] The micro foundation for the capital market imperfection chosen here seems to be highly relevant for developing countries. Many authors stress that access to debt (but also equity) in LDCs is frequently limited because of poor collateral law and weak judicial law, making it hard to enforce contracts in a court.[6] In the event of default, borrower i loses only a fraction $\lambda \in (0, 1]$ of his project output $p(i)k(i)$. The parameter λ can be viewed as a measure for the level of financial development. A small λ means that creditor rights are poorly developed whereas a value close to 1 stands for strong creditor protection. Note that poor law enforcement prevents individuals in our model also from overcoming the credit market imperfection by pooling their wealth endowment. Indeed, La Porta et. al. (1998) provide some empirical evidence showing that poor legal protection results in high ownership concentration.

Taking into account the borrower's incentives, a lender will only give credit up to $\lambda p(i)k(i)/\rho$ where ρ denotes the equilibrium interest rate. So, a borrower will never renege on his debt in equilibrium. The maximum amount $k(\omega(i))$ that entrepreneur i can invest is then given by $k(\omega(i)) = \omega(i) + \frac{\lambda}{\rho} p(i)k(\omega(i))$.

[5] This type of credit market imperfections, also known as costly state verification, was first introduced by Townsend (1979).

[6] World Bank (2001) reviews this literature.

Using equation (4) we get

$$k(\omega(i)) = \omega(i) + \frac{\lambda}{\rho} Y^{\frac{1}{\sigma}} k(\omega(i))^{1-\frac{1}{\sigma}}. \tag{6}$$

Equation (6) determines $k(\omega(i))$ implicitly and can only be solved explicitly if $\omega(i) = 0$. In this case, the project size $k(0)$ is given by $(\lambda/\rho)^{\sigma} Y$ and the equilibirum price for this project size is simply

$$p(k(0)) = \frac{\rho}{\lambda}. \tag{7}$$

Note that $p(k(0))$ is the highest price that is paid in equilibrium since the prices decrease in the firm size. In the lemma below, we show that the maximum amount of credit and, consequently, the maximum investment depend positively on the initial capital endowment. That is, initial wealth plays the role of a collateral in our model. So, we get the intuitive result that wealthier individuals may run larger firms. However the impact of an additional wealth unit on the firm size decreases in the wealth level. This is because marginal return falls when the firm grows large. Since initial wealth is the only source of heterogeneity among individuals, the index for individuals will be dropped for the rest of this section. That is, we write $k(\omega)$ in place of $k(\omega(i))$ if convenient.

Lemma 1 *Given an interest rate ρ, the maximum investment size is strictly increasing and concave in the initial capital endowment.*

Proof. *The marginal impact of capital endowment on k is given by*

$$\frac{dk(\omega)}{d\omega} = \frac{1}{1 - \frac{\lambda}{\rho} p(k(\omega)) \frac{\sigma-1}{\sigma}}$$

and must be positive since the highest price paid in equilibrium is ρ/λ (equation 7). Having established a positive relationship between k and ω, equation (4) tells us that $\frac{d^2 k(\omega)}{d\omega^2}$ must be negative. ■

If not restricted by the capital market imperfection, an entrepreneur increases his project size up to the point where the marginal revenue $\frac{d[p(k)k]}{dk} = \frac{\sigma-1}{\sigma} Y^{1/\sigma} k$ is equal to the equilibrium interest rate ρ (marginal costs). So, the

optimal project size, denote it by $\widetilde{k}$, and the initial wealth endowment that allows exactly for this project size, denote it by $\widetilde{\omega}$, are given by

$$\widetilde{k} = Y\rho^{-\sigma}\left(\frac{\sigma-1}{\sigma}\right)^{\sigma} \tag{8}$$

and

$$\widetilde{\omega} = \begin{cases} \left(1-\lambda\frac{\sigma}{\sigma-1}\right)\widetilde{k} & : \quad \lambda < \frac{\sigma-1}{\sigma} \\ 0 & : \quad \lambda \geq \frac{\sigma-1}{\sigma} \end{cases} \tag{9}$$

respectively. As can be seen from equation (9), there exists a group of restricted entrepreneurs if and only if $\lambda < \frac{\sigma-1}{\sigma}$. Instead, if $\lambda \geq \frac{\sigma-1}{\sigma}$, even individuals with zero capital endowment can choose the opimal firm size and will produce at the point where marginal revenue equals marginal costs. Why? The smaller σ (the elasticity of demand), the higher is the constant mark-up $\frac{\sigma}{\sigma-1}$ over marginal costs ρ. So, even for poor individuals, the project output relative to the payment obligation is large if σ is small. This means that only a strong capital market imperfection (a very low λ) leads a borrower to renege on his debt. Put in other terms, the capital market imperfection is binding for some individuals in equilibrium if and only if the imperfection in the capital market is larger than the imperfection in the product market.

We are now ready to discuss the size-distribution of firms. The project sizes of individuals with initial endowment between 0 and $\widetilde{\omega}$ are implicitly determined by equation (6). By Lemma 1, the firm sizes of these entrepreneurs increase in the initial wealth endowment ω. Individuals whose endowments lie in the range $[\widetilde{\omega}, \widetilde{k}]$ invest $\widetilde{k}$ and borrow the difference $\widetilde{k} - \omega$. Finally, very rich individuals ($\omega > \widetilde{k}$) manage a firm of size $\widetilde{k}$ and, in addition, act as lenders. So, given that the capital market is imperfect, an uneven distribution of initial wealth endowments and an uneven size-distribution of firms go hand in hand. The discussion so far is summarized in equation (10) and in Figure 1.

$$k^*(\omega) = \begin{cases} k(\omega) & : \quad \omega < \widetilde{\omega} \\ \widetilde{k} & : \quad \omega \geq \widetilde{\omega} \end{cases} \tag{10}$$

Since each firm faces the downward-sloping demand curve (4), the prices across goods differ as well. Larger firms charge lower prices - despite the fact that each good enters the utility function symmetrically.

The preceding discussion leads us directly to a specification of aggregate (gross-) capital demand which is simply the sum over all firm sizes:

$$K^D(\rho) = \int_0^{\infty} k^*(\omega)dG(\omega) = \int_0^{\widetilde{\omega}} k(\omega)dG(\omega) + \int_{\widetilde{\omega}}^{\infty} \widetilde{k}dG(\omega), \tag{11}$$

Since the project sizes of both the restricted and unrestricted individuals depend on ρ, aggregate capital demand depends on ρ as well. In contrast, aggregate capital is exogenous and therefore inelastically supplied: $K^S = E[\omega] = \int_0^{\infty} \omega dG(\omega)$. The following proposition focuses on the capital market equilibrium. The equilibrium is shown in Figure 2.

Proposition 1 *There exists a unique capital market equilibrium.*

Proof. (i) We first focus on the case $\lambda < \frac{\sigma-1}{\sigma}$ (credit-rationing). It is not possible to compute aggregate (gross-) capital demand explicitly. However, we can show that capital demand decreases uniformly in ρ. Since (gross-) capital demand is the sum over all individual project sizes, we have to determine how these project size depend on ρ. The two derivatives are given by

$$\frac{dk(\omega)}{d\rho} = \frac{-\frac{\lambda}{\rho^2}p(k(\omega))k(\omega) + \frac{\lambda}{\rho}\frac{1}{\sigma}\frac{k(\omega)}{Y}\left(\frac{k(\omega)}{Y}\right)^{-1/\sigma}\frac{dY}{d\rho}}{1 - \frac{\lambda}{\rho}\left(\frac{k(\omega)}{Y}\right)^{-1/\sigma}\frac{\sigma-1}{\sigma}} < 0$$

and

$$\frac{d\widetilde{k}}{d\rho} = \frac{\widetilde{k}}{Y}\frac{dY}{d\rho} - Y\rho^{-\sigma-1}\sigma\left(\frac{\sigma-1}{\sigma}\right)^{\sigma} < 0,$$

respectively. By Lemma 1, the denominator of the first equation is positive. Holding Y constant, an increase in the interest rate decreases both $k(\omega)$ and $\widetilde{k}$. This means that $dY/d\rho$ must be negative (equation 5) as well. Thus, taking into account that Y adjusts endogenously reinforces the direct effect of the increase in the interest rate. So, we have to show that $dY/d\rho$ is greater than minus infinity. Using equation (5), we have

$$\frac{dY}{d\rho} = \int_0^{\widetilde{\omega}} p(k(\omega)) \frac{dk(\omega)}{d\rho} dG(\omega) + \int_{\widetilde{\omega}}^{\infty} p(\widetilde{k}) \frac{d\widetilde{k}}{d\rho} dG(\omega)$$

Using the expression for $dk(\omega)/d\rho$ and $d\widetilde{k}/d\rho$ in the above equation and rearranging terms results in

$$\frac{dY}{d\rho} = \left[\int_0^{\widetilde{\omega}} \frac{p(k(\omega))k(\omega)}{Y} x(\omega) dG(\omega) + \int_{\widetilde{\omega}}^{\infty} \frac{p(\widetilde{k})\widetilde{k}}{Y} dG(\omega) \right] \frac{dY}{d\rho} - \Delta,$$

where Δ and the term in brackets are positive constants. The factor $x(\omega)$ is given by

$$x(\omega) = \frac{\frac{\lambda}{\rho} \left(\frac{k(\omega)}{Y} \right)^{-1/\sigma} \frac{1}{\sigma}}{1 - \frac{\lambda}{\rho} \left(\frac{k(\omega)}{Y} \right)^{-1/\sigma} \frac{\sigma - 1}{\sigma}}.$$

Note that $dY/d\rho$ is greater than minus infinity if and only if the term in brackets is strictly smaller than 1. Assume for a short while that $x(\omega)$ equals 1 for all ω. In this case, the term in brackets is exactly 1. Thus, a sufficient condition to establish that the term in brackets is smaller than 1 is $\frac{\lambda}{\rho} \left(k(\omega)/Y \right)^{-1/\sigma} \frac{1}{\sigma} < 1 - \frac{\lambda}{\rho} \left(k(\omega)/Y \right)^{-1/\sigma} \frac{\sigma - 1}{\sigma}$ for some $\omega < \widetilde{\omega}$. This is equivalent to $\lambda p(k(\omega))/\rho < 1$ for some $\omega < \widetilde{\omega}$. Since the price of goods of individuals with endowment zero is given by ρ/λ (equation 7) and the prices are decreasing in the firm size (equation 4), the latter inequality holds for all individuals with $\omega > 0$. Hence, we may conclude that capital demand decreases uniformly in ρ. It is easy to see that K^D reaches zero at $\rho = \frac{\sigma - 1}{\sigma}$. In this situation, we have $\widetilde{k} = Y = \left[\int_0^{\widetilde{\omega}} k^*(\omega)^{(\sigma-1)/\sigma} dG(\omega) + (1 - G(\widetilde{\omega})) \widetilde{k}^{(\sigma-1)/\sigma} \right]^{\sigma/(\sigma-1)}$, where the first equality follows from equation (8). Since $k^*(\omega) < \widetilde{k} \; \forall \; \omega < \widetilde{\omega}$ and $\widetilde{\omega} > 0$, the only solution to the above equation is $\widetilde{k} = \widetilde{\omega} = 0$ which means that capital demand is zero. From equation (6) we know that K^D goes to infinity as ρ approaches λ from above. Since capital supply is constant, we can conclude that there exists a unique equilibrium.

(ii) Assume now that $\lambda \geq \frac{\sigma - 1}{\sigma}$ (no credit-rationing). In this situation, capital demand can easily be computed and is given by $\int_0^{\infty} \widetilde{k} dG(\omega) = Y \rho^{-\sigma} \left(\frac{\sigma - 1}{\sigma} \right)^{\sigma}$.

Since all agents run a firm of the same size, (gross-) capital supply, K^S, can be written as $\widetilde{k} = Y$. Hence, the equilibrium interest rate, which can be calculated by equating capital demand and capital supply, is completely independent of capital supply and equals $\frac{\sigma-1}{\sigma}$. This means that the capital demand curve is horizontal at $\frac{\sigma-1}{\sigma}$. ■

Finally, consider the case $\lambda = 0$, a situation characterized by absent creditor rights, in which default is not followed by sanctions. Under these circumstances, the equilibrium is easily derived as the capital market does not exist at all. No borrower would ever honour his debt and, consequently, there are no lenders. In this benchmark case, the firm size of each agent would be given by his initial capital endowment.

2.3 The Income Distribution

This subsection explores how the distribution of the initial capital endowments and the income distribution are related. To this end we look at the function that relates initial capital endowment, ω, to income, y:

$$y(\omega) = \begin{cases} (1-\lambda)p(k(\omega))k(\omega) & : \quad \omega < \widetilde{\omega} \\ p(\widetilde{k})\widetilde{k} + (\omega - \widetilde{k})\rho & : \quad \omega \geq \widetilde{\omega} \end{cases} \tag{12}$$

The following lemma shows that income is a concave function of initial wealth. Hence the income distribution is more equal than the distribution of capital endowments.

Lemma 2 *In an equilibrium, an individual's income is strictly increasing and concave in his initial capital endowment.*

Proof. The marginal return of initial capital endowment is given by

$$\frac{dy(\omega)}{d\omega} = \begin{cases} (1-\lambda)\frac{\sigma-1}{\sigma}p(k(\omega))\left[1 - \frac{\lambda}{\rho}p(k(\omega))\frac{\sigma-1}{\sigma}\right]^{-1} & : \quad \omega < \widetilde{\omega} \\ \rho & : \quad \omega \geq \widetilde{\omega} \end{cases} \tag{13}$$

The signs of both the upper and the lower expression in the above equation are positive (see proof of Lemma 1). Whereas ρ is constant in an equilibrium,

the behaviour of $dy/d\omega$ remains to be discussed if $\omega < \widetilde{\omega}$. By Lemma 1, k is positively related to ω and by equation (4), the price decreases in the firm size. This means that the larger the initial capital endowment, ω, the smaller the numerator and the bigger the denominator. Hence, if $\widetilde{\omega} > 0$, the marginal return decreases until $\widetilde{\omega}$ is reached and then remains constant. ■

By showing that y is strictly concave as long as $\omega < \widetilde{\omega}$, the above lemma makes immediately clear that the income distribution must be more equal than the endowment distribution in the case where $\widetilde{\omega} > 0$. This statement remains true if $\lambda \geq \frac{\sigma-1}{\sigma}$ and, consequently, $\widetilde{\omega} = 0$. In that case, the income function takes the simple form $Y/\sigma + \frac{\sigma-1}{\sigma}\omega$. So, as long as the firms have monopoly power, the income distribution is more equal than the wealth distribution. This is an important point. In a closed economy (where big companies may not export parts of their production), wealthy entrepreneurs are forced to become lenders because of the limited size of the home market. Due to monopoly price setting, the equilibrium interest rate will be lower than the marginal product of capital. This benefits the owners of family businesses and hurts export-oriented entrepreneurs running large-scale factories.

3 Financial Development and Inequality

This section explores how variations in the level of financial development, λ, and variations in the distribution of initial capital endowments affect both the income distribution and the size-distribution of firms. We use the *Dalton Principle* (Dalton, 1920) to rank these distributions with respect to inequality. That is, if one distribution can be achieved from another by constructing a sequence of regressive transfers, i.e. transfers from a set poorer individuals (smaller firms) to a set of richer individuals (bigger firms), then the former distribution is more unequal than the latter. Note that, because of decreasing marginal contribution to real output with respect to individual firm sizes (equation 5), a more uneven size-distribution of firms translates into a lower real output, Y.

Our first aim is to determine, how a variation in λ affects the size-distribution

of firms, real output, and the income distribution for a given distribution of the initial endowments (Subsection 3.1). In Subsection 3.2 we discuss the effects of a regressive transfer of the initial capital endowments and hold λ constant.

3.1 Variation in the Capital Market Efficiency

Size-Distribution of Firms. The two polar cases, namely (i) $\lambda \geq \frac{\sigma-1}{\sigma}$ and (ii) $\lambda = 0$ were already briefly discussed in the previous section. (i) A near perfect capital market leads to perfect equity in the size-distribution of firms. The reason is simple. If the legal system works reasonably well, the fraction of the monopoly profit that is lost conditional on default is high even for a monopolist who has no initial capital endowment. So, also initially very poor individuals will honour the dept - even when they run large firms. Hence, credit-rationing does not occur. Firm sizes will fully equalize since each firm has the same technology, faces the same demand curve and sets the same profit-maximizing price. So, in our model, full equity is the "natural" (Nugent and Nabli, 1992) size-distribution, i.e. the size-distribution that would emerge on the basis of technology and market size alone. By equation (5), real output is *maximized*. (ii) In the opposite case, if $\lambda = 0$, the distribution of the initial capital endowments and the size-distribution of firms are identical. This means that the latter is more unequal than in a situation with an existent, but imperfect capital market. By equation (5), real output is *minimized*. The impact of an arbitrary change in λ on the size-distribution of firms and on the real output is given in the proposition below.

Proposition 2 *A decline in λ leads to a more uneven size-distribution of firms and decreases real output and the interest rate.*

Proof. The firm sizes of the restricted and the unrestricted entrepreneurs are determined by $k(\omega(i)) = \omega(i) + \lambda X k(\omega(i))^{(\sigma-1)/\sigma}$ and $\widetilde{k} = X^{\sigma}\left[(\sigma-1)/\sigma\right]^{\sigma}$, where $X \equiv Y^{1/\sigma}/\rho$. It is immediately clear that X may not fall when λ decreases since, in such a case, both the restricted and unrestricted entrepreneurs would

invest less, and, consequently, capital supply would exceed capital demand. It is also obvious that λX must be smaller in the new equilibrium than in the old. Otherwise, each entrepreneur would invest more than before and capital demand would exceed capital supply. Since X must rise and λX must fall, the firm sizes in the new equilibrium are smaller up to a certain $\widehat{\omega}$ and are higher above this threshold level (see Figure 3). According to our definition, the size-distribution of firms is more unequal in the new equilibrium. By equation (5), the marginal contribution to real output of a $high - k$ firm is lower than that of a $low - k$ firm.Hence, real output decreases ($k(j) \equiv k(\omega(i))$). Now, we can immediately conclude that the interest rate must fall as well. ■

We conclude that the link between the two distributions is very close if the capital market is poorly developed and that there is only a weak relationship if λ is close to 1.

Note that from the above proof follows immediately that the marginal impact of X on $k(\omega(i))$,

$$\frac{dk(\omega(i))}{dX} = \frac{\lambda k(\omega(i))^{(\sigma-1)/\sigma}}{1 - \lambda X k(\omega(i))^{-1/\sigma} \frac{\sigma-1}{\sigma}}, \tag{14}$$

is small if the capital market is poorely developed. In the above expression, a small λ leads to both a small nominator and a large denominator.

Income Distribution. We start again with a discussion of the two polar cases. (i) As noted earlier, $y(\omega)|_{\lambda \geq (\sigma-1)/\sigma}$ equals $Y/\sigma + \frac{\sigma-1}{\sigma}\omega$, where $\frac{\sigma-1}{\sigma}$ is the equilibrium interest rate. (ii) If capital markets are absent ($\lambda = 0$), the income is simply given by the revenue generated by running a firm of size ω: $y(\omega)|_{\lambda=0} = Y^{1/\sigma}\omega^{(\sigma-1)/\sigma}$.[7] Note that the function $y(\omega)|_{\lambda \geq (\sigma-1)/\sigma}$ does not depend on the distribution of initial capital endowments whereas $y(\omega)|_{\lambda=0} = Y^{1/\sigma}\omega^{(\sigma-1)/\sigma}$ clearly does (remember the above discussion of regressive transfers). It is obvious that any $y(\omega)|_{\lambda>0}$-curve must lie everywhere above the $y(\omega)|_{\lambda=0}$-line. Clearly, all individuals are better off in the new situation since demand has increased. For the wealthy individuals, there is even a

[7] Of course, the output Y depends on λ and on the distribution of capital endowments (if $\lambda < \frac{\sigma}{\sigma-1}$).

second positive effect. They face not only higher prices but can escape diminishing returns to investment by becoming lenders on the credit market. This allows the small entrepreneurs to borrow and to increase their firm sizes. It is exactly this channel through which real output increases.

What happens when λ is increased from some arbitrary positive level? It turns out that the results are no longer so unambiguous as in the discussion above. There are three effects. First, there is the positive effect mentioned above of an upward-shift of the individual demand functions due to rising Y on both the borrowers' and the lenders' incomes. Second, with λ and Y higher, individuals can borrow more and therefore individuals with wealth $\omega < \tilde{\omega}$ increase their firm size $k(\omega)$ given ρ. This increases wealth too (as marginal revenue exceeds marginal costs for constrained agents). However, there is a third effect: a better working legal system leads to a higher interest rate because the upward shift in capital demand clearly benefits the lenders. Due to the rise in ρ, the interest payments of the borrowers increase as well. For net borrowers, this negative influence on their incomes may be stronger than the positive demand effect.[8] But it can been shown that this is very unlikely to be the case if λ is low.

3.2 Wealth Inequality

Size-Distribution of Firms. Again, the two polar cases are quickly discussed. If the capital markets are near-perfect ($\lambda \geq \frac{\sigma-1}{\sigma}$), all firms are of equal size hence the distribution of initial capital endowments has no influence on the size-distribution of firms. In addition, a fully equalized firm structure will be

[8] Note that

$$\frac{dy(\omega)}{d\lambda} = (1-\lambda)\frac{1}{\sigma}(k/Y)^{(\sigma-1)/\sigma}\frac{dY}{d\lambda} + \left((1-\lambda)\frac{\sigma-1}{\sigma}(k/Y)^{-1/\sigma} - \rho\right)\left(\frac{dk}{d\lambda} + \frac{dk}{dY}\frac{dY}{d\lambda}\right) - (k-\omega)\frac{d\rho}{d\lambda}$$

The three terms on the right-hand side of the equation capture, in turn, the three effects mentioned in the text. In the above proposition we proved that $\frac{dY}{d\lambda} > 0$ and $\frac{dk}{d\lambda} > 0$. Using (6) it is straightforward to show that $\frac{dk}{dY} > 0$.

the equilibrium if the inequality is low: If the wealth of the poorest individual is larger than $\tilde{w}$, every entrepreneur will choose the optimal unconstrained firm size $\tilde{k}$. Using (9) we then see that firm sizes will be equalized if $\underline{w} \geq \tilde{w} = \left(1 - \lambda \frac{\sigma}{\sigma - 1}\right) E[w]$ where $\underline{w}$ denotes the wealth of the poorest agent (note that $\tilde{k} = K^s = E[w]$ in the symmetric equilibrium). Obviously, this condition will be violated more easily if λ is low. This leads us to the other polar case: if the capital market is inexistent ($\lambda = 0$), the size-distribution of firms is identical to the wealth distribution. As a surprise we will see that the link between the distribution of initial capital endowments and the size-distribution of firms is ambiguous if lies between the two polar cases. Not every regressive transfer of endowment units - which, according to our definition, increases unambiguously the inequality in the endowment distribution - results in a more unequal size-distribution of firms.

First note that a regressive transfer from one set of *unrestricted* individuals to another will not affect the size-distribution of firms. The former group of individuals decreases its net capital supply exactly to the same extent as the latter increases net capital supply. Thus, the project sizes of the involved individuals remain unaffected. This is also true for all aggregate variables. This argumentation becomes more complicated if we redistribute from restricted individuals. To discuss this type of redistribution properly we have - as a first step - to prove some helpful facts. This is done in the lemma below.

Lemma 3 *(i) A regressive transfer decreases ρ and increases X. (ii) Bigger firms may expand their project sizes to a greater extent than smaller firms if $X = \frac{Y^{1/\sigma}}{\rho}$ rises.*

Proof. (i) The regressive transfer decreases - given ρ, Y, and therefore $X = Y^{1/\sigma}/\rho$ - (gross-) capital demand: The restricted recipients may increase their capital demand only to a smaller extent than the poor donors are forced to decrease their capital demand (Lemma 1) and the unrestricted recipients even leave their capital demand unchanged (equation 8). Now, assume that ρ remains constant or increases. Given this assumption and the preceding argumentation,

we know that the real output Y must fall. However, this decline decreases capital demand again. Hence, capital supply exceeds capital demand. We conclude that ρ must fall to restore the equality of capital demand and supply. The sign of the change in X follows now immediately. We know from above that, if X is held constant, a regressive transfer decreases capital demand. If X turns out to be smaller in the new equilibrium, capital demand is reduced again. Hence, it is necessary that X increases.

(ii) The sign of $d\left[dk(\omega)/dX\right]/dk(\omega)$ is determined by the sign of $1-\lambda p(k(\omega))/\rho$. We know from equation (7) that the highest price in the economy is ρ/λ. All individuals with a positive capital endowment (and therefore bigger firm sizes) charge lower prices. Our claim immediately follows. ■

Since any endowment transfer from a set of *restricted* poorer individuals to a set of richer individuals (whether restricted or not plays no role) decreases the interest rate (Lemma 3, (i)), some poor individuals - who are possibly not involved into the transfer - may increase their firm size. Due to this general equilibrium effect, the new size-distribution of firms cannot be deemed more unequal than the original size-distribution. For the same reason, we may not conclude that an arbitrary regressive transfer decreases real output: The indirect interest rate effect - leading to bigger project sizes of the non-involved poor - can outweigh the direct negative effect of a regressive transfer.[9] However, this effect is the smaller the less developed the capital market is (equation 14), and it vanishes if the capital market is inexistent. Put in other terms, redistribution from individuals with high marginal returns to investment to individuals with a low marginal return does not necessarily reduce output because the interest rate falls. Hence, the central intuition of models characterized by absent capital markets (e.g. Bénabou, 1996) does, in general, not go through if we consider intermediate levels of capital market imperfections.

An unambiguous prediction about the impact of a regressive transfer on both the size-distribution of firms and the real output can be made if the transfer

[9] This can be shown, for example, in a simple case where the population is divided into two classes and a certain share of the population is assumed to have no wealth endowment at all.

involves the set of the poorest restricted individuals (no matter how large this set is). This can be seen as follows. If we decrease the wealth endowment of the poorest (say) z percent of the population by a given amount per person, the interest rate decreases (and X increases). Hence, all recipients but also all non-involved individuals increase their firm sizes. So, the group of the poorest z percent of the population may invest less in the new equilibrium. But we can even say more. Because the increase in X affects the richer in this set of "poor individuals" stronger (Lemma 3, (ii)) it must be the case that that the smallest firms have to cut down their firms sizes most, and so on. Thus, we may conclude that a regressive transfer involving the poorest part of the population leads to a more uneven size-distribution of firms and decreases real output. To summarize, the main findings of this subsection are stated in the proposition below.

Proposition 3 *Redistribution of initial capital endowments from poorer, credit-rationed individuals to richer individuals tends to decrease real output. A regressive transfer that involves the set of poorest individuals results unambiguously in a more uneven size-distribution of firms and in a lower output.*

Income Distribution. Under near-perfect capital markets ($\lambda \geq \frac{\sigma-1}{\sigma}$), the incomes of the individuals that are not involved into the regressive transfer remain unaffected since demand does not change. Under inexistent capital markets ($\lambda = 0$), the incomes of the not involved individuals decrease relatively to the same extent. So, given these indirect (general equilibrium) effects of a regressive transfer, we conclude that, in the two polar cases, the income distribution becomes more unequal as consequence of a regressive transfer.

For intermediate levels of capital market imperfection, a clear-cut prediction how the income of the not involved individuals is affected cannot be made. To see this, we rewrite equation (12):

$$y(\omega) = \begin{cases} (1-\lambda)Y^{1/\sigma}k(\omega)^{(\sigma-1)/\sigma} & : \quad \omega < \widetilde{\omega} \\ \frac{\rho\widetilde{k}}{1-\sigma} + \omega\rho & : \quad \omega \geq \widetilde{\omega} \end{cases} . \tag{15}$$

Consider first the more likely case in which redistribution adversely affects output. The impact on the wealth of the restricted individuals is ambiguous. On the one hand, demand decreases. On the other hand, the fall in the interest rate not only allows the restricted entrepreneurs to run larger firms (Lemma 3) but also reduces their interest payments. This is exactly the reason why at least the very wealthy lenders lose. The situation becomes clearer if, as a consequence of a regressive transfer, output increases. In this situation, the income of the not involved restricted individuals improves for sure since they are not only able to run larger firms now but demand has shifted up as well. Again, the income of the very rich is adversely affected since their income consists in large parts of interest payments and the interest rate has fallen. So, we conclude that the general equilibrium effects that occur when a regressive transfer is carried out tend to have asymmetric effects on the incomes of the poor and rich, respectively.

4 Integrating into the World Economy

This section explores the distributional consequences of scaling back trade barriers, i.e. the changes in manufacturers' incomes due to an integration into the North' competitive goods markets. In addition, we show how the distributional consequences depend on the level of financial development and the wealth distribution.

Trade Restrictions. Note that, until now, it was assumed that the trade barriers were sufficiently high to make trade between the North and the South impossible. To gain analytical tractability and simplicity we focus on the case where the tariffs or non-tariff barriers that prohibited either imports or exports or both are cut back to zero. In addition, we assume that there are no other obstacles to trade such as transportation costs between the North and the South. So, the law of one price holds for every good.

Goods Markets Structure. The world is now populated by a continuum of individuals (producers). The populations size is L. The South consists of individuals on the interval $[0, 1]$. The remaining individuals are located in the

North. With respect to the number of different goods we discuss two polar cases. In Subsection 4.1, we assume that goods produced in the North are imperfect substitutes to the ones manufactured in the South such that continuum of goods available in the integrated market is given by $[0, L]$. This means that the producers in the South can perpetuate their monopoly power. In Subsection 4.2, exactly the opposite case is discussed. The goods produced in the North and the South are perfect substitutes. As a consequence, the integration removes the monopoly power of the South' manufacturers. In that case, the continuum of goods is given by $[0, 1]$. Individuals elsewhere have the same preferences. The preferences are similar to those in equation (1). The upper limit in the integral is given by L or 1, respectively.

Technology. Manufacturers in the South and in the North have access to the same linear technology, i.e. goods are produced in both regions with the same marginal costs. This assumption is just to make things as simple as possible. The distributional consequences of a trade liberalization to be derived below do not hinge on this assumption. In particular, a lower productivity in the South would only affect the absolute value of the income of an entrepreneur but not the relative change in income after the country has integrated into the world economy. Since technology is the same across regions, total output of good j is given by sum of capital invested into its production, $k^W(j)$. So, for the rest of this section we replace $k(j)$ in equations (4) and (5) by $k^W(j)$ such that Y refers now to worldwide real output.[10]

Capital Markets. We further assume that neither entrepreneurs nor capital is mobile across regions. As a consequence, the interest rates in North and the South may differ. The capital market in the North is assumed to be perfect whereas the South (possibly) suffers form an imperfect financial system. Indeed, there is little doubt that there is a strong relationship between the level of financial development and level of economic activity. For instance, Levine (1997), based on work of King and Levine (1993), provides evidence showing that there is a strong correlation between four different measures of financial

[10] As in the previous sections, the price level is normalized to 1.

development and the GDP per capita. As our last assumption, we presume that the aggregate capital endowment in the North is large relative to that in the South in a sense to be made precise in Subsection 4.2.

4.1 Imperfect Substitutes

Since there is a perfect capital market in the North, the "natural" size-distribution, i.e. full equality in the firm sizes, results in the North under autarky. So, the firm sizes are given by $k^N \equiv \int_1^L \omega(i)di/(L-1)$. Note that neither the size-distribution nor the firm sizes in the North change when we move from autarky to perfectly integrated goods markets. The integration increases the market size of all manufacturers to the same extent. Hence, the relative firm sizes do not change. Since capital is immobile, the absolute firm sizes do not alter as well.

Are these two results also true for the developing South? According to equations (6) and (8) the firm sizes for both the restricted entrepreneurs and the entrepreneurs running the optimal plant size depend on the endogenous ratio $X = Y^{1/\sigma}/\rho$. How does this ratio change when we move from autarky to free trade? A decline of X would induce both the restricted and the unrestricted entrepreneurs to cut their firm sizes. As a consequence, capital supply would exceed capital demand. Parallel reasoning shows that also an increase in X cannot occur in the new equilibrium. This means that the firm sizes as well as the mark-ups are unaffected by the change in the trade regime.

The intuition behind this result is easy to see. Given the interest rate ρ, the increase in the goods prices $p(\omega(j)) = Y^{1/\sigma}k^*(\omega(j))^{-1/\sigma}$, where world real output is given by $Y = \left[\int_0^1 k^*(\omega(j))^{(\sigma-1)/\sigma}dj + \int_1^L (k^N)^{(\sigma-1)/\sigma}dj\right]^{\sigma/(\sigma-1)}$, improves the access to external finance for the restricted individuals and induces unrestricted individuals to manage larger firms. The capital demand curve shifts to the right whereas capital supply remains constant since we assume that capital is immobile between the two regions. So, the interest rate rises. The jump in the interest rate has exactly the opposite effect on the firm sizes as the rise in the prices, and it turns out that the net effect is identically zero for *all firms*.

This, again, is because the CES-Preferences imply that each firms experiences the same increase in the market size when we move to a free trade regime. So, our analysis shows that a central result of Dixit and Stiglitz type trade models, namely that there is little change in the scale of industrial sectors, holds in presence of capital market imperfections and imperfect mobility of production factors.

The impact on the income distribution is now easily derived. Since $Y^{1/\sigma}$ and ρ experience the same relative increase, equation (15) tells us that this is also true for the incomes of the restricted and unrestricted entrepreneurs, respectively. So, the trade liberalization increases the incomes of all entrepreneurs by the same relative magnitude. The results derived in this subsection are summarized in the proposition below.

Proposition 4 *A move from autarky to free trade leaves the size-distribution of firms and the relative incomes in the South unaffected provided that the entrepreneurs can sustain their monopoly power.*

4.2 Perfect Substitutes

Both, the size-distribution of firms as well as the relative incomes are no longer unaffected by an integration if the goods produced in the two regions are perfect substitutes and, as a consequence, all entrepreneurs are price takers.

Since we assume that aggregate capital endowment in the North is large, worldwide investment into each good may equalize no matter what the level of financial development in the South is and no matter what the distribution of capital endowments in the South looks like. So, as a result of the symmetry in preferences and technology, the number of produced units of each good in the North will adjust in such a way that, given production in the South, worldwide output of each good is equal. Thus, the world real output is given by $Y = \int_0^1 k^W dj = k^W = \int_0^L \omega(i)di/L$ and, according to equation (4), the price of each good equals 1. The exact production structure under free trade, as a result of perfect competition an CRS-technology, remains indeterminate.

Since each good produced can be sold at the prevalent world market price, the interest rate in the South increases to 1, the marginal product of capital. As a consequence, the function relating initial capital endowment to income takes now the particularly simple form $y(\omega) = \omega$. Comparing this function to equation (12) we see that integration changes the income distribution. In Figure 4, income under autarky as a function of capital endowment is shown for three different levels of financial development. Whereas the curve OD represents a situation with inexistent capital markets, the curves OC and OB are drawn for an intermediate level of λ and for $\lambda \geq \frac{\sigma-1}{\sigma}$, respectively. The 45-degree radiant (OA) shows the situation after the integration has taken place. The properties of the "income function" under autarky derived in Lemma (2) ensure that there is exactly one crossing (from above) with the 45-degree radiant.[11] So, with respect to changes in absolute income, the trade liberalization divides entrepreneurs into two different groups. Entrepreneurs with capital endowment above some specific level ω^* win whereas the poorer manufacturers lose. Of course, the wealth level that separates winners from losers depends on the level of financial development as well as on the distribution of initial capital endowments (see following subsection). However, the central result that there are two groups whose members are affected differently is independent of both financial development and the wealth distribution.

Proposition 5 *A move from autarky to free trade divides the class of entrepreneurs into two groups. The incomes of owners of "small" establishments decrease whereas entrepreneurs running "large" firms win.*

Intuitively, under autarky the entrepreneurs face downward sloping demand curves as a result of the monopolistic goods market structure. To escape strongly decreasing marginal returns in the small home market, wealthy entrepreneurs lend capital to entrepreneurs poorly endowed with capital at a rate that is (far) below the physical marginal product of capital. This, in turn, leads not only

[11] Of course, if $\lambda = 0$, the incomes before and after the integration coincide a second time at $\omega = 0$.

to a more even provision of goods but is also favourable to the incomes of the "poor" borrowers. The removal of trade barriers alters the situation completely. From the point of view of a single entrepreneur, all goods can now be sold (and also bought) at a price of 1 on the large world market. Thus, access to the competitive world market increases the prices of the large entrepreneurs' goods whereas the small manufacturers are confronted with decreasing prices. As a consequence, the rich are indifferent between increasing their firm sizes (and thereby shortening capital supply) or staying lenders (or both) at a rate of 1, the marginal product of capital. That is the mechanism that led to relatively favourable terms for borrowers ceases to exist.

4.3 Comparative Static Results

To gain insights about the political feasibility of trade liberalizations it is interesting to ask both questions how large the number of losers is and how much they lose. In the case of imperfect substitutes, there is a simple answer: Everybody wins relatively the same. This result is true for any distribution of initial capital endowments and any level of financial development. As a consequence, we expect trade liberalization policies to have strong support among manufacturers. As mentioned above, the situation becomes more complicated in the case of perfect substitutes. It is true that the group size as well as the changes in income depend in general on the efficiency of the capital market and on the wealth distribution. The influence of these two factors is now discussed in turn.

Financial Development. A look at the polar cases in Figure 4, $\lambda = 0$ and $\lambda \geq \frac{\sigma-1}{\sigma}$, gives the basic relationship between the size of the group of the losers and the level of financial development. Given the distribution of initial capital endowments, there are few losers if the capital market does not exist compared to a situation with a near perfect capital market. In addition, in the former case the negative impact on the income of the poor is small whereas the income of the wealthier entrepreneurs rises dramatically when we move from autarky to free trade. In the latter case, exactly the opposite is true.

For intermediate levels of λ the threshold level ω^* separating winners from losers is given by $(1-\lambda)\left[(1-\lambda)+\frac{\lambda}{\rho}\right]^{\sigma-1}Y(\lambda)$ if the crossing with the 45-degree radiant lies in the concave part and by $\left(\frac{1}{\sigma-1}\right)\left(\frac{\sigma-1}{\sigma}\right)^{\sigma}\frac{\rho^{1-\sigma}}{1-\rho}Y(\lambda)$ if the crossing lies in the linear part of $y(\omega)|_{\lambda>0}$.[12] Despite the globally positive relationship between the threshold wealth level ω^* and the level of financial development, ω^* may fall locally at some intermediate levels of λ. This is because of the interest rate effect discussed in Subsection 3.1. However, it can be shown that this may not happen when λ is close to 0 or close to $\frac{\sigma-1}{\sigma}$, i.e. ω^* shifts to the right when λ is increased from 0 to some arbitrary positve level and ω^* approaches ω_B^* (see Figrue 4) from the left as λ goes to $\frac{\sigma-1}{\sigma}$. So, we conclude that - given the wealth distribution - a higher level of financial development is (apart from local non-monotonies) associated with a higher number of losers of a trade liberalization.

Wealth Distribution. How does a regressive transfer, i.e. more inequality in the distribution of initial capital endowments (given the level of financial development), affect the group sizes of the winners and the losers and the incomes (incentives) of the respective group members? With respect to the group sizes, there are two effects. First, there is a *direct effect* if the individuals suffering from the transfer had an endowment above ω_{old}^* before the transfer and below ω_{new}^* after the transfer. So, the direct effect increases the number of losers. Put differently, the more the distribution is skewed to the left the higher is the number of individuals with capital endowment below ω^*. Second, there is an *indirect effect* that results from a change in ω^*. On the one hand, the regressive transfer decreases ρ (Lemma 3) and therefore tends to increase ω^*. On the other hand, a regressive transfer has possibly (but not necessarily, see Subsection 3.2) a negative impact on Y and, as a result, tends to decrease ω^*. The strength of the indirect effect, i.e. how many individuals switch from losers to winners

[12] As long as $\frac{\sigma-1}{\sigma} > \rho(1-\lambda)+\lambda$, the first regime is relevant. Note that, at $\lambda = 0$, the LHS is larger than the RHS whereas at $\lambda \geq \frac{\sigma-1}{\sigma}$ the LHS is smaller than the RHS. In addition, the RHS is monotonically increasing in λ. So, as λ moves from 0 to $\frac{\sigma-1}{\sigma}$ we switch from the first to the second regime.

(or vice versa) due to a change in the threshold level ω^*, depends of course on the density of the wealth distribution at ω^*_{old}. Note, however, that, given ω^*_{old} lies somewhere in between the relatively poor entrepreneurs running small establishments and the rich manufacturers, the indirect effect may not play a particular important role - at least not in developing countries. As mentioned above, both the wealth distribution and the size-distribution of firms are characterized by a missing middle suggesting that the mass of individuals at ω^* is small. Based on this argumentation we expect the number of individuals that oppose a trade liberalization to be high if the wealth distribution (and therefore the size-distribution of firms) is strongly polarized.

How does a regressive transfer affect the incomes of the group members (that are not involved into the transfer) under autarky? Again assuming that the transfer has a negative impact on Y, we have to distinguish between the incomes of the borrowers and the lenders.[13] Since both the interest rate and the aggregate demand (by assumption) fall, the lenders which form the largest part of individuals with capital endowment above ω^* are clearly worse off. This suggests that most of the winners of trade liberalization benefit more from this liberalization when the distribution is more unequal. The income of individuals with a capital endowment below ω^* (which are all borrowers) is hit by two competing effects. First, as it is the case with the lenders, the fall in Y decreases the demand for their products. Second, the fall of the interest rate decreases interest payments and therefore improves their income position. Even though it is in general not clear, we see that there are good reasons to expect that the losers of a trade liberalization lose more when the distribution is polarized. Based on this we suggest that the distributional conflicts arising from a trade liberalization are enforced by a more unequal distribution of capital endowments.

[13]Note that the relatively rich borrowers and all lenders have a capital endowment above ω^*, i.e. it is always true that $\omega^* \leq \widetilde{k}$.

5 Summary and Conclusions

We are interested in the distributional consequences of major trade liberalizations steps primarily in LDCs. The model developed here shows that trade liberalizations removing monopoly power of manufacturers have asymmetric effects on the incomes of the two typical groups of manufacturers in an LDC. Whereas the owners of large companies - being no longer restricted to the small home market - win from an integration into a larger market, the owners of small establishments (family businesses) lose. Their income is hit by two adverse effects. First, being relatively small compared to the economy-wide demand, owners of micro firms face high relative prices under autarky. A significant cut back in trade barriers removes these high mark-ups and ensures that each good can be bought at any quantity. Second, large manufacturers are no longer forced to charge low domestic prices because of their scale of production. Instead, the integration into a large market allows them to sell any quantity at the prevalent price. This leads them to run even larger firms and, as a consequence, to increase factor demand. The rising factor prices, in particular the rise of the interest rate, hurts the small borrowers.

The analysis so far leads us the conclusion that the number of entrepreneurs opposing trade liberalizations because of adverse income effects hinges crucially on the wealth distribution. A very polarized distribution giving rise to a large number of micro and small entrepreneurs is associated with a large number of opposers and only a small winning group. As a further important determinant of the size of the winning and loosing group, respectively, we identify the level of financial development. Poor law enforcement giving rise to highly imperfect or even absent capital markets leads to an inefficient production structure under autarky thereby limiting the number of losers. In addition, large efficiency gains due to an integration give the winners (losers) strong (weak) incentives to participate in the political process. However, the way the division into winners and losers of a trade liberalization translates into policy outcomes depends, in turn, on the political economy of the country under consideration. If decision

making in a country is reasonably well characterized by the median-voter approach we expect high inequality and a protectionist policy to go hand in hand. However, if democracy is not well established and the few economically powerful exert disproportionate or decisive political power, we would expect exactly the opposite relationship. Furthermore, protectionist pressure is weak when law enforcement is poor and, as a consequence, capital markets are hardly developed. Thus, given these comparative static results and the fact that a weak rule of law (and hence malfunctioning capital markets) and weak democratic institutions go hand in hand, we expect a negative inequality-openness relationship in relatively democratic LDCs and positive relationship in less democratic countries.

In pointing out that the losers (in terms of short-run income reductions) of major trade liberalization steps may be the owners of small-scale enterprises this paper helps to understand how a protectionist trade regime may be overcome in the political process. An important implication that can be drawn is that trade liberalizations should be accompanied by measures that prevent the incomes of the small from falling. In particular, we suggest that developing countries should choose policies that remove widespread discrimination of small firms such as a disproportionate tax burden or poor access to the banking system.

References

Banerjee, Abhijit and Esther Duflo (2003); "Do Firms Want to Borrow More? Testing Credit Constraint Using a Directed Lending Program," BREAD Working Paper Number 2003-5.

Bates, Robert (1981); *Markets and States in Tropical Africa: The Political Basis of Agricultural Policies*. Berkeley: University of California Press.

Bénabou, Roland (1996); "Inequality and Growth," in B. S. Bernanke and J. Rotemberg, eds., *NBER Macroeconomics Annual* 11. Cambridge, MA: MIT Press.

Bhattacharya, Utpal and B. Ravikumar (2001); "Capital Markets and the Evolution of Family Businesses," *Journal of Business*, 74, 187-219.

Cardoso, Fernando and Enzo Faletto (1979), *Dependency and Development in Latin America*. Berkeley: University of California Press.

Centeno, Miguel Angel (1997); "Blood and Debt: War and Taxation in Nineteenth-Century Latin America," *The American Jouranl of Sociology*, 102, 1565-1605.

Coatsworth, John and Jeffrey Williamson (2002); "The Roots of Latin American Protectionism: Looking Before the Great Depression," NBER Working Paper 8999.

Dalton, Hugh. (1920); "The Measurement of the Inequality of Incomes," *Economic Journal*, 30, 348-.61.

Deininger, Klaus and Lyn Squire (1998); "New Ways of Looking at Old Issues: Inequality and Growth," *Journal of Development Economics*, 57, 259-287.

Gollin, Douglas (2000); "Nobodys Business but My Own: Self Employment and Small Enterprise in Economic Development," mimeo, Williams College.

Goldsmith, Raymond (1969); *Financial Structure and Development*. New Haven, CT: Yale University Press.

Grossman, Gene and Elhanan Helpman (1994); "Protection for Sale," *The American Economic Review*, 84, 833-850.

King, Robert and Ross Levine (1993); "Finance and Growth: Schumpeter Might Be Right," *The Quarterly Journal of Economics*, 108, 717-37.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1998); "Law and Finance," *Journal of Political Economy*, 106, 1113-1155.

Levine, Ross (1997); "Financial Development and Economic Growth: Views and Agenda," *Journal of Economic Literature*, Vol. XXXV, 688-726.

Little, Ian (1987); "Small Manufacturing Enterprises in Developing Countries," *World Bank Economic Review*, 1, 203-235.

Matsuyama, Kiminori (2000); "Endogenous Inequality," *Review of Economic Studies,* 67, 743-59.

Mayer, Wolfgang (1984); "Endogenous Tariff Formation," *The American Economic Review*, 74, 970-985.

Nugent, Jeffrey and Mustapha Nabli (1992); "Development of Financial Markets and the Size Distribution of Manufacturing Establishments: International Comparison," *World Development*, 20, 1489-99.

Rogowski, Ronald (1989); *Commerce and Coalitions.* Princeton, NJ: Princeton University Press.

Sleuwaegen, Leo and Micheline Goedhuys (2002); "Growth of Firms in Developing Countries, Evidence from Côte d'Ivoire," *Journal of Development Economics*, 68, 117-135.

Thorp, Rosemary (1998); *Progress, Poverty and Exclusion. An Economic History of Latin America in the 20th Century.* Baltimore: The John Hopkins University Press.

Townsend, Robert (1979); "Optimal Contracts and Competitive Markets with Costly State Verificatioin," *Journal of Economic Theory*, 21, 265-293.

Tybout, James (2000); "Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?" *Journal of Economic Literature*, Vol. XXXV, 11-44.

World Bank (2001); *Global Economic Prospects*, unpublished proofs. Washington, D.C.: The World Bank.

World Bank (2002); *Globalization, Growth, and Poverty: Building an Inclusive World Economy.* New York: Oxford University Press.

World Bank (2003); "Trade for Development in Latin Americ and the Caribbean", Trade Note 9, International Trade Department.

***Figure 1* – Borrowers and Lenders**

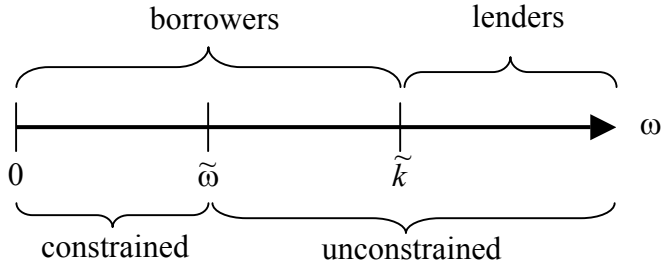

***Figure 2* – Capital Market Equilibrium**

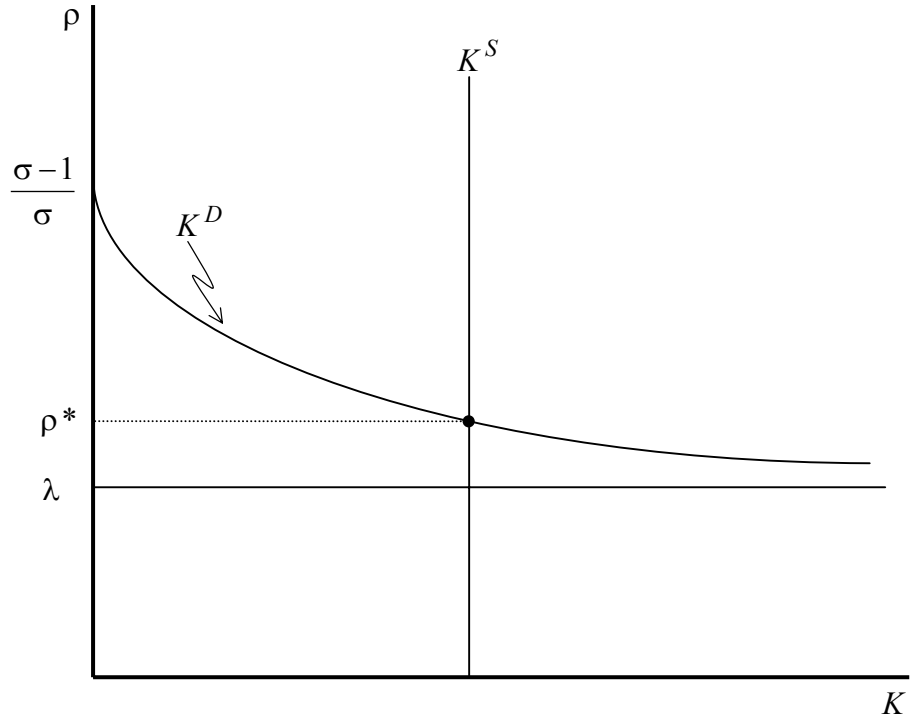

***Figure 3* – Decrease in the Level of Financial Development**

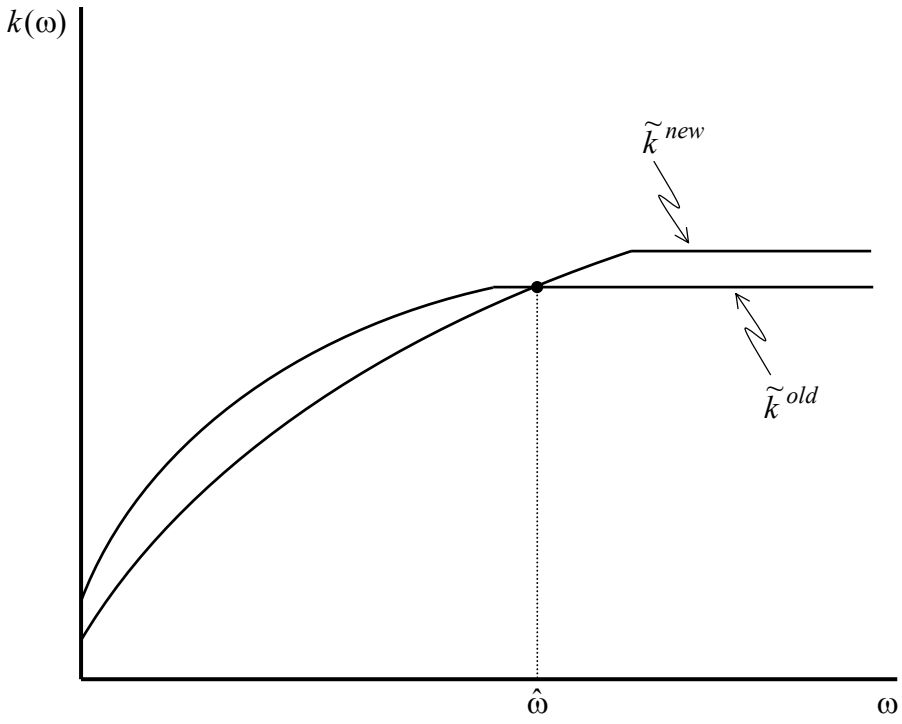

***Figure 4* – Winners and Losers of a Trade Liberalization**