

Specialization and Welfare in the Presence of Imperfectly Integrated Capital Markets and Learning-by-Doing

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Abstract

We study a two-sector, two-period model with learning externalities in the modern sector and imperfectly integrated capital markets. We find that higher capital market integration lowers the requirements on the learning pattern necessary for free trade to lead to an equilibrium with maximal specialization in modern sector activities. We further find that the equilibrium with maximal specialization in modern sector activities Pareto dominates, if it exists, any other free trade equilibrium, and that autarky can Pareto dominate free trade if capital markets are poorly integrated, even when there is maximal specialization in modern sector activities under free trade. (98 words)

Key words: Capital market integration; learning-by-doing; trade patterns; gains from trade

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1 Introduction

It has long been argued that free trade can be harmful for countries specializing in traditional activities with low learning potentials if specialization in modern activities leads to substantial learning-by-doing (LBD). This argument has often been used to support the protection of so-called infant industries.¹ Baldwin (1969), Corden (1974) and many others, however, have highlighted that private firms can be expected to specialize in modern activities even in the presence of LBD if doing so is socially optimal unless learning is external to the firms engaging in modern activities or unless capital markets are imperfect, such that modern firms cannot finance initial losses even when future profits would considerably exceed these losses.

There exists an extensive literature on how infant industry protection can alter specialization and trade patterns, and, thereby, the gains from trade in the presence of LBD. This literature delivers interesting insights and points towards policy measures that could increase the gains from trade openness. However, in reality, the potential welfare gains from such interventions often remain unrealized, partly because these interventions are prone to cronyism, corruption and rent seeking (see, e.g., Krueger, 1974, 1990, 1995; and Ades and di Tella, 1997). In this paper, we therefore study how financial development and international integration of domestic capital markets affect specialization and the gains from free trade in the presence of LBD. Like infant industry protection, financial development and capital market integration can make modern goods production, which is initially unprofitable, more attractive. But unlike infant industry protection, financial development and capital market integration do not provide any means that government officials and bureaucrats could easily misuse.

We present a simple two-sector, two-period model with two types of imperfections: First, entrepreneurs must pay relatively high interest rates on loans since domestic capital markets are underdeveloped and imperfectly integrated into international capital

¹See, e.g., Corden (1974) for a comprehensive outline of this argument.

markets. Second, production of modern goods is associated with LBD that is – unlike in the existing literature – partly internal to the entrepreneurs producing modern goods, and partly external to them. Hence, all entrepreneurs learn when modern goods are produced domestically, but those who produce these goods learn more. The presence of external LBD gives rise to the possibility of multiple equilibria.

We find a trade-off between imperfect capital market integration and LBD: The more developed and the better internationally integrated the domestic capital markets are, the lower can internal and total LBD be such that maximal specialization in modern activities is still an equilibrium, and also such that this equilibrium is unique. This suggests that financial development and capital market integration can potentially induce specialization in modern activities with high learning potentials as it lowers the requirements on the LBD pattern necessary for such specialization to occur in equilibrium.

When looking at welfare, we find – as many scholars might presume – that the equilibrium with maximal specialization in modern activities Pareto dominates, if it exists, all other equilibria under free trade. Further, we find that if capital markets are poorly internationally integrated or underdeveloped, autarky can Pareto dominate free trade even when there is maximal specialization in modern activities under free trade. The reason is that autarky allows the prices of modern goods to be high in the first period so that some entrepreneurs can engage in modern goods production without having to take out expensive loans. Thus, if loans are sufficiently costly, and if learning from modern activities is not too much lower under autarky than with maximal specialization in modern activities, all entrepreneurs and workers might be better off under autarky. This result that free trade can be Pareto dominated by autarky in the absence of any uncertainties, and even when all entrepreneurs optimally specialize in modern activities under free trade, is new to the literature.

The literature on capital market imperfections as a potential reason for suboptimally low modern sector activities is rather limited. Notable exceptions include the contribu-

tions of Flam and Staiger (1991), and Bond (1993). However, their focus is quite different from ours: They analyze whether and how infant industry protection could lead to specialization in modern activities in the presence of capital market imperfections, while we study whether and how financial development and capital market integration in themselves may lead to specialization in modern activities (in the presence of partly external LBD).

The result that autarky might Pareto dominate free trade moreover relates this paper to the seminal contribution of Newbery and Stiglitz (1984). They show that autarky may Pareto dominate free trade in the presence of production uncertainties. In their model as well as in ours, it is the price mechanism that can make autarky superior by raising the prices of domestically scarce goods.

Our paper further relates to Krugman (1987), Young (1991), and Redding (1999) who analyze the effects of external LBD and trade in dynamic models. They, however, do not look at the role of capital market integration.

The remainder of this paper is organized as follows: Section 2 introduces the model. Section 3 derives and discusses the equilibria under free trade. Section 4 compares welfare in different free trade equilibria and the equilibrium under autarky. Section 5 briefly discusses some policy implications and concludes.

2 The Model

There is a small open economy with two tradable goods, the traditional good x and the modern good y . There are two periods $t = 1, 2$.

There is a continuum of households with measure one. Each household has preferences

$$U = c_1^\phi + \beta c_2^\phi \tag{1}$$

with $c_t = x_t^{1-\alpha} y_t^\alpha$, where $\beta \in [0, 1]$ is the discount factor. We assume $\phi = 1$ to simplify

the algebra and to ensure that loans are used only to cover temporary losses arising from modern sector activities, and not to smooth consumption over time.

The share e of the households are entrepreneurs; the others are workers. Entrepreneurs and workers both have the possibility to work in the traditional sector, where each household can produce one unit per period. Entrepreneurs further have an indivisible project in the modern sector, which requires their own labor and one additional worker.^{2,3} An entrepreneur who hires a worker to produce modern goods is said to run a firm. Each firm can produce $y_t = A_t$ in period t with $A_1 = A$ and $A_2 = \mu(i_1, s_1)A$, where $s_t \in [0, 1]$ is the measure of entrepreneurs running a modern firm in period t , and where $i_t = 1$ for entrepreneurs who run a modern firm in period t and $i_t = 0$ for other entrepreneurs. The LBD-induced productivity increase $\mu(i_1, s_1)$ satisfies (i) $\mu(0, 0) = 1$, (ii) $\mu(1, s_1) > \mu(0, s_1)$ for all s_1 , (iii) $\partial\mu(i_1, s_1)/\partial s_1 > 0$ for all i_1 , and is (iv) continuous in s_1 . Property (ii) implies internal LBD, i.e., that entrepreneurs who were running a firm in period 1 can run a firm more productively in period 2 than entrepreneurs who were not running a firm in period 1. Property (iii) implies external LBD, i.e., that all entrepreneurs can run a firm more productively in period 2, the more entrepreneurs were running a firm in period 1.

We assume that the share e of entrepreneurs satisfies $\alpha/2 < e < 1/2$. The first inequality will ensure that not all entrepreneurs run a modern firm under autarky. This tends to raise the attractiveness of free trade relative to autarky since it implies that more external LBD can potentially take place under free trade than under autarky. The second inequality ensures that there are always more workers than positions available in the modern sector.

Domestic goods markets (in case of autarky) and labor markets are assumed to be

²The division of households into entrepreneurs and non-entrepreneurs combined with the assumptions that there is one indivisible project per entrepreneur and that production requires some of the non-entrepreneurs' endowment goes back to Bernanke and Gertler (1990). Our setting is even closer to Bond (1993), where production also requires each entrepreneur to hire one non-entrepreneur.

³Alternatively, we could assume that workers can run modern firms, but that they are unable to learn. Given our assumptions below, workers would never run a firm in equilibrium.

competitive. Combined with $e < 1/2$, competitive labor markets imply that workers are willing to work in the modern sector if their wage ω matches the return they get from working in the traditional sector.

Agents can get a loan in period 1 if they can repay this loan as well as the associated interest payments in period 2. The interest rate is r^* at international capital markets; for simplicity β and r^* satisfy $\beta(1 + r^*) = 1$. Domestic capital markets may however be imperfectly integrated into international capital markets. As a consequence, domestic households must pay the interest rate $r = r^*/\psi$ on loans, where $\psi \in (0, 1]$ measures capital market integration: The higher ψ is, the more domestic capital markets are integrated into international capital markets and, thus, the lower the wedge between the domestic interest rate r and the international rate r^* . Alternatively, one may interpret ψ as a measure of financial development. In addition, we assume that the domestic interest rate on savings $r^s \leq r^*$, e.g., $r^s = \psi r^*$.

World market prices in both periods are equal to 1 for traditional goods and equal to p^* for modern goods. Hence, wages are $\omega = 1$ in case of free trade. Entrepreneurs running a modern firm thus make profits $\pi_1 = p^*A - 1$ in period 1 and $\pi_2(i_1, s_1) = p^*\mu(i_1, s_1)A - 1$ in period 2. We can distinguish three relevant cases under trade openness: $p^*A < 1$, $1 \leq p^*A < 2$, and $p^*A \geq 2$. We subsequently focus on the first case, in which entrepreneurs have a static comparative disadvantage in modern activities and in which running a modern firm in period 1 even leads to a loss that needs to be covered by a loan. If $1 \leq p^*A < 2$, entrepreneurs would also have a static comparative disadvantage in modern activities, but would not need a loan to run a firm in period 1. Results would thus be very similar to those in the first case without capital market imperfections, i.e., with $\psi = 1$. If $p^*A \geq 2$, results would be straightforward: All entrepreneurs would run a modern firm in both periods as this would always yield higher returns than traditional activities.

3 Specialization under Free Trade

In this section, we derive the free trade equilibria given $p^*A < 1$. We then assess the effect of international capital market integration ψ on specialization.

In the given setting with constant relative world market prices p^* , interest rates on loans $r \geq r^*$, interest rates on savings $r^s \leq r^*$, and $\phi = 1$, households have no incentive to shift consumption over time, and they care only about the present value of their lifetime income. For workers, this is $1 + \beta$.

Entrepreneurs have four different strategies: Each entrepreneur can in both periods either run a firm or not. The present value of their lifetime income $m(i_1, i_2, s_1)$ resulting from playing these four strategies will be

$$m(0, 0, s_1) = 1 + \beta \quad (2)$$

$$m(0, 1, s_1) = 1 + \beta\pi_2(0, s_1) \quad (3)$$

$$m(1, 0, s_1) = \beta[(1 + r)\pi_1 + 1] \quad (4)$$

$$m(1, 1, s_1) = \beta[(1 + r)\pi_1 + \pi_2(1, s_1)], \quad (5)$$

where $\beta(1 + r)\pi_1$ is the present value of the repayment that entrepreneurs must make if they required a loan in period 1 to cover their losses from running a modern firm, which are equal to $-\pi_1 > 0$.

Strategy $(i_1, i_2) = (1, 0)$ is never played since it is strictly dominated by strategy $(0, 0)$, i.e., since $m(1, 0, s_1) < m(0, 0, s_1)$. Moreover, strategy $(0, 0)$ dominates strategy $(0, 1)$ if and only if $s_1 < s^{crit}$, where s^{crit} is implicitly defined by $\mu(0, s^{crit}) = \frac{2}{p^*A}$.⁴ That is, an entrepreneur who has not run a modern firm in period 1 runs such a firm in period 2 if and only if there have been enough modern firms in period 1 such that external LBD is relatively high.

⁴Given $\partial\mu(0, s_1)/\partial s_1 > 0$ and the definition of s^{crit} , it follows from $s_1 < s^{crit}$ that $\mu(0, s_1) < \frac{2}{p^*A}$ and, hence, $\pi_2(0, s_1) < 1$ and $m(1, 0, s_1) < m(0, 0, s_1)$.

Strategy (1, 1) dominates strategy (0, 1) if and only if $m(1, 1, s_1) > m(0, 1, s_1)$, which is equivalent to $\mu(1, s_1) > \mu(0, s_1) + Q(\psi)$ with

$$Q(\psi) \equiv \frac{1 - \beta(1 + r^*/\psi)(p^*A - 1)}{\beta p^*A} > 0. \quad (6)$$

Note that $Q(1) = \frac{2-p^*A}{\beta p^*A}$, $Q(\psi) \rightarrow \infty$ if $\psi \rightarrow 0$, and $\frac{\partial Q(\psi)}{\partial \psi} < 0$ (since $p^*A < 1$). Hence, an entrepreneur runs a firm in both periods rather than only in period 2 if there is sufficient internal LBD and if capital market integration ψ is relatively high.

Strategy (1, 1) dominates strategy (0, 0) if and only if $m(1, 1, s_1) > m(0, 0, s_1)$, which can be shown to be equivalent to $\mu(1, s_1) > \frac{2}{p^*A} + Q(\psi)$. That is, an entrepreneur runs a firm in both periods rather than never if total LBD and capital market integration ψ are both relatively high.

It follows that $m(1, 1, s_1) > \max\{m(1, 0, s_1), m(0, 0, s_1), m(0, 1, s_1)\}$, such that an entrepreneur runs a modern firm in both periods, if and only if

$$\mu(1, s_1) \geq Q(\psi) + \max\left\{\frac{2}{p^*A}, \mu(0, s_1)\right\}. \quad (7)$$

Since $\partial\mu(1, s_1)/\partial s_1 > 0$, each entrepreneur is more likely to run a modern firm in period 1, the higher the share s_1 of other entrepreneurs he expects to run a modern firm in period 1, at least if $s_1 < s^{crit}$. This effect of external LBD (for entrepreneurs running a modern firm in period 1) gives rise to the possibility of multiple equilibria.

Let us now characterize the different possible equilibria: First, there exists an equilibrium with $s_1 = s_2 = 0$, i.e., without any modern sector activities, if and only if⁵

$$\mu(1, 0) \leq Q(\psi) + \frac{2}{p^*A}. \quad (8)$$

⁵Note that $\frac{2}{p^*A} > \mu(0, 0) = 1$.

This equilibrium is unique if it further holds that

$$\mu(1, s_1) < Q(\psi) + \max \left\{ \frac{2}{p^*A}, \mu(0, s_1) \right\} \quad \forall s_1 \in (0, e]. \quad (9)$$

Second, there may exist interior equilibria with $s_1 = s^* \in (0, e)$ and $s_2 \in [s^*, e]$. In these equilibria, s^* entrepreneurs run a modern firm in both periods, while entrepreneurs not running a modern firm in period 1 run a modern firm in period 2 if and only if $\mu(0, s^*) > \frac{2}{p^*A}$. In such an equilibrium, s^* must satisfy

$$\mu(1, s^*) = Q(\psi) + \max \left\{ \frac{2}{p^*A}, \mu(0, s^*) \right\}, \quad (10)$$

which guarantees that all entrepreneurs are indifferent between traditional and modern activities in period 1 such that s^* of them may indeed choose to run a modern firm.⁶

Third, there may exist an equilibrium in which all entrepreneurs run a modern firm. We subsequently call this equilibrium, in which $s_1 = s_2 = e$, the e -equilibrium. It exists if and only if

$$\mu(1, e) \geq Q(\psi) + \max \left\{ \frac{2}{p^*A}, \mu(0, e) \right\}, \quad (11)$$

and it is unique if it further holds that

$$\mu(1, s) > Q(\psi) + \max \left\{ \frac{2}{p^*A}, \mu(0, s) \right\} \quad \forall s \in [0, e). \quad (12)$$

In the subsequent discussion, we focus on the e -equilibrium, in which all entrepreneurs specialize in modern activities.⁷ As condition (11) states, this equilibrium exists if and only if capital market integration ψ and maximal total LBD $\mu(1, e)$ – relative to maximal external LBD $\mu(0, e)$ if $e > s^{crit}$, and in absolute terms otherwise – are both relatively

⁶There exists at most one interior equilibrium if $\partial\mu(1, s_1)/\partial s_1 \geq \partial\mu(0, s_1)/\partial s_1$. Otherwise, multiple interior equilibria may exist.

⁷There are two reasons for focusing on the e -equilibrium: First, most policy discussions in the trade literature consider measures to induce maximal specialization in modern activities. Second, the e -equilibrium Pareto dominates all other free trade equilibria whenever it exists, as we will show in the next section.

high. Condition (12) shows that high capital market integration ψ and high total and internal LBD are moreover required for this equilibrium to be unique. Conditions (11) and (12) further imply that the requirements on the LBD pattern for existence and uniqueness of the e -equilibrium depend on capital market integration ψ , and vice versa. In particular, it holds

Proposition 1 *The better internationally integrated the domestic capital markets are, the lower can internal and total LBD be for maximal specialization in modern activities to be an equilibrium, and also for it to be the unique equilibrium.*

Proposition 1 implies that capital market integration ψ can help a country to specialize in modern activities even if the possibility of internal LBD is rather limited. The reason is that modern activities with limited internal LBD, which are unprofitable when interest rates on loans are too high, become profitable if interest rates decrease as a consequence of improved capital market integration. By the same token, higher internal and total LBD can help a country to specialize in modern activities even if capital market integration ψ is relatively low.⁸

4 Welfare under Free Trade and Autarky

In this section, we first derive the welfare of entrepreneurs and workers in the different free trade equilibria, as well as in the unique equilibrium under autarky. We then compare welfare in these different equilibria.

We first look at welfare in the case of free trade. In the given setting with constant relative world market prices p^* , interest rates on loans $r \geq r^*$, interest rates on savings $r^s \leq r^*$, and no incentive to smooth consumption (as $\phi = 1$), the households' utility is simply a function of the present value of their lifetime income $m(i_1, i_2, s_1)$. Given Cobb-Douglas preferences, each household spends its lifetime income such that $x =$

⁸There can, however, be no specialization in modern activities if LBD is exclusively external to firms or if capital market integration is very poor, i.e., if $\psi \rightarrow 0$.

$(1 - \alpha)m(i_1, i_2, s_1)$ and $y = \alpha m(i_1, i_2, s_1)/p^*$, where x and y denote a household's lifetime consumption (in present value terms) of traditional and modern goods, respectively. Hence, welfare of households with lifetime income $m(i_1, i_2, s_1)$ is

$$U^{ft}(i_1, i_2, s_1) = \Omega m(i_1, i_2, s_1)(1/p^*)^\alpha \quad (13)$$

under free trade, with $\Omega \equiv (1 - \alpha)^{1-\alpha} \alpha^\alpha$.

Workers earn $1 + \beta$ in all free trade equilibria. Entrepreneurs who never run a modern firm earn $m(0, 0, s_1) = 1 + \beta$ as well. Moreover, all entrepreneurs in any equilibria in which some entrepreneurs never run a firm must also earn $m(0, 0, s_1) = 1 + \beta$; otherwise entrepreneurs would not be indifferent, and they would all choose the strategy that yields the higher lifetime income. In interior equilibria with $s_1 = s^* < e$ and $s_2 = e$, all entrepreneurs must again earn the same income. Hence, $m(1, 1, s^*) = m(0, 1, s^*) = 1 + \beta\pi_2(0, s^*)$.

In the e -equilibrium, in which all entrepreneurs run a modern firm in both periods, they all earn $m(1, 1, e) = \beta[(1 + r)\pi_1 + \pi_2(1, e)]$. It can be shown that

$$m(1, 1, e) \geq \max \{m(0, 0, s^*), m(0, 1, s^*)\} = \max \{1 + \beta, 1 + \beta\pi_2(0, s^*)\} \quad \text{for all } s^* \quad (14)$$

if and only if

$$\mu(1, e) \geq Q(\psi) + \max \left\{ \frac{2}{p^*A}, \mu(0, s^*) \right\} \quad \text{for all } s^*. \quad (15)$$

It follows from condition (11) and $\partial\mu(0, s_1)/\partial s_1 > 0$ that this inequality must hold whenever the e -equilibrium exists. Hence, the entrepreneurs' income is higher in the e -equilibrium, if it exists, than in any other equilibrium. It follows

Proposition 2 *The e -equilibrium, in which all entrepreneurs specialize in modern activities in both periods, Pareto dominates all other free trade equilibria whenever it exists.*

Proposition 2 suggests a potential role for the government under free trade: To induce

entrepreneurs to coordinate in the equilibrium in which they all specialize in modern activities. Since, in principle, such a coordinating role does not require any government expenses (besides some minor communication costs), the government could improve everybody's situation for free without the need for costly or distorting interventions.

We next derive the unique equilibrium under autarky and the utility that entrepreneurs and workers achieve in this equilibrium. We start by characterizing the equilibrium in a period t in which there are at least $\alpha/2$ entrepreneurs who can run a modern firm with a (weakly) higher productivity than any other firm, i.e., with productivity $A_t^{max} = \max A_t$. As will become evident below, the assumption that $e > \alpha/2$ will guarantee that this holds in equilibrium in both periods. Cobb-Douglas preferences imply $p_t Y_t / (p_t Y_t + X_t) = \alpha$, where p_t is the relative price of modern goods under autarky, Y_t aggregate demand for modern goods and X_t aggregate demand for traditional goods. Further, aggregate production is $Y_t = s_t A_t^{max}$ and $X_t = 1 - 2s_t$. Perfect competition in labor and goods markets implies $\omega = 1$ and $p_t A_t^{max} - \omega = \omega$, such that $p_t = 2/A_t^{max}$. It then follows that $s_t = \alpha/2 \equiv s^a$, $X_t = 1 - \alpha$ and $Y_t = \alpha A_t^{max}/2$.

In our model, it thus holds in equilibrium that s^a entrepreneurs run a modern firm in period 1, and that $p_1 = 2/A$, $Y_1 = \alpha A/2$ and $X_1 = 1 - \alpha$. In period 2, the same s^a entrepreneurs run a firm again, and $p_2 = p_1/\mu(1, s_1)$, $Y_2 = \mu(1, s_1)Y_1$ and $X_2 = X_1$. The intuition for this result is as follows: Since perfect competition makes it impossible for entrepreneurs running a modern firm in period 2 to make profits that exceed the returns on traditional activities, entrepreneurs are only willing to run a modern firm in period 1 if their profits equal the returns on traditional activities, even though their productivity is still low. Hence, modern goods prices p must be relatively high in period 1; they then drop to $p_2 < p_1$ as firms learn. It follows from utility function (1) and the autarky equilibrium described above that entrepreneurs and workers achieve utility

$$U^a = \Omega(A/2)^\alpha [1 + \beta \mu(1, s^a)^\alpha] \quad (16)$$

under autarky.

We now compare welfare under free trade and autarky. For all households, welfare under autarky exceeds welfare under free trade with maximal specialization in modern activities if and only if $U^a > U^{ft}(1, 1, e)$, which is equivalent to

$$\mu(1, e) < \frac{(p^*A/2)^\alpha [1 + \beta\mu(1, s^a)^\alpha] + \beta - 1}{\beta p^*A} + Q(\psi). \quad (17)$$

For this to hold, capital market integration ψ must be relatively low such that loans are relatively expensive, and the difference between $\mu(1, e)$ and $\mu(1, s^a)$ must be relatively small, either because external LBD is low or because most entrepreneurs run a modern firm under autarky. The following proposition ensures that condition (17) can hold even when maximal specialization in modern activities is an equilibrium, i.e., even when condition (11) holds:

Proposition 3 *Autarky can Pareto dominate free trade even when all entrepreneurs specialize in equilibrium in modern activities under free trade (and even though this equilibrium Pareto dominates all other free trade equilibria).*

Proof: Suppose $e = 2/5$, $p^*A = 2/3$, $r^* = 1/5$, $\alpha = 3/4$, $\beta = 5/6$, $\mu(i_1, s_1) = 1 + 5i_1 + s_1$, and $\psi = 1/10$. Then, conditions (11) and (17) both hold, implying that the e -equilibrium exists under free trade and that $U^a > U^{ft}(1, 1, e)$. ■

Proposition 3 suggests that free trade may be Pareto dominated by autarky even in the absence of uncertainty and even when all entrepreneurs run a modern firm under free trade and when doing so is privately as well as socially optimal. The reason is that the price mechanism, which only plays under autarky, allows entrepreneurs to learn without having to take out expensive loans. The likelihood that autarky Pareto dominates free trade with maximal specialization in modern activities is thus highest if capital market integration is poor, such that running a modern firm is very costly under free trade, and if the domestic demand for modern goods is relatively strong, such that there is

substantial external LBD (even) under autarky.

5 Conclusions

In this paper, we have studied an economy with imperfect capital markets and internal as well as external LBD in modern activities. We have shown that financial development and international integration of domestic capital markets lower the requirements on the LBD pattern for maximal specialization in modern activities to occur in equilibrium. This suggests that financial development and capital market integration can potentially induce maximal specialization in modern activities in the presence of LBD, at least if this LBD is partly internal to the producers of modern goods. Measures to foster financial development and capital market integration should therefore be considered seriously as alternatives to infant industry protection to induce specialization in modern activities with high learning potentials – not least because these measures are much less vulnerable to cronyism, corruption and rent seeking.

Further, our results give rise to sequencing issues: It can be in the interest of developing countries to foster financial development and capital market integration before opening their goods markets such that free trade then leads to maximal specialization in modern activities, which is the Pareto optimal outcome under free trade.

We have, however, also shown that even maximal specialization in modern activities can be Pareto inferior to autarky if interest rates on loans are very high due to low capital market integration. The reason is that the price mechanism under autarky – but not under free trade – allows for some specialization in modern activities without requiring entrepreneurs to take out costly loans. Financial development and capital market integration are therefore valuable not only because they may induce maximal specialization in modern activities under free trade, but also because they may ensure that free trade with maximal specialization in modern activities is not Pareto dominated by autarky.

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