Trade, Inequality, and the Political Economy of Institutions*

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Abstract

This paper investigates the relationship between international trade and the quality of economic institutions. We model institutions as fixed costs of entry, in a framework that has two key features. First, preferences over entry costs differ across firms and depend on firm size. Larger firms prefer to set higher costs of entry, in order to reduce competition. Second, these costs are endogenously determined in a political economy equilibrium. Trade opening can lead to higher entry costs when it changes the political power in favor of a small elite of large exporters, who in turn prefer to install high entry barriers.

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1 Introduction

Economic institutions, such as quality of contract enforcement, property rights, rule of law, and the like, are increasingly viewed as key determinants of economic performance (Acemoglu, Johnson, and Robinson [1]). While it has been established that institutions are important in explaining income differences across countries, what in turn explains those institutional differences is still an open question, both theoretically and empirically.

This paper investigates how exposure to international trade affects a country's institutions. This is an important question because it is widely hoped that greater openness could improve institutional quality through a variety of channels, including reducing rents, creating constituencies for reform, and inducing specialization in sectors that demand good institutions (IMF [21]; Johnson, Ostry, and Subramanian [23]). While trade openness does seem to be associated with better institutions in a cross-section of countries, in practice the relationship between institutions and trade is likely to be much more nuanced.[1] As documented by both historians and economists, in many instances international trade contributed to concentration of political power in the hands of groups that were interested in setting up, or perpetuating, bad institutions.[2] Thus, it is important to understand under what conditions greater trade openness results in a deterioration of institutions, rather than their improvement.

The goal of this paper is to provide a framework rich enough to incorporate both positive and negative effects of trade on institutions. We build a model in which institutional quality is determined in a political economy equilibrium, and then compare outcomes in autarky and trade. The production side of the economy is based on the Melitz [26] model of trade with heterogeneous firms and monopolistic competition. Firms differ in their productivity, face fixed costs to production and foreign trade, and have some market power. For a given fixed cost of entry, only sufficiently productive firms operate. Similarly, only the most productive firms export. Heterogeneous productivity implies that profits differ across firms, generating wealth inequality across agents.

In our model we interpret institutional quality as the fixed cost of production. When

[1] See, e.g., Rodrik, Subramanian and Trebbi [31], Rigobon and Rodrik [29], and Levchenko [25].

[2] In the 1700s, for example, the economies of the Caribbean were highly involved in international trade, but trade expansion in that period coincided with the emergence of slave societies and oligarchic regimes (Sokoloff and Engerman [34] Rogozinski [32]). During the period 1880-1930, Central American economies and politics were dominated by large fruit-exporting companies, which destabilized the political systems of the countries in the region as they were jockeying to install regimes most favorable to their business interests (Woodward [38]). In the context of oil exporting countries, Sala-i-Martin and Subramanian [20] argue that trade in natural resources has a negative impact on growth through worsening institutional quality rather than Dutch disease.

this cost is high, institutions are bad, and fewer firms can operate.[3] The imperfectly competitive nature of the economy provides scope for rent seeking behavior. In the model, every producer has to pay the same fixed cost. We first illustrate how preferences over institutional quality depend on firm size. Each producer has a preferred level of the fixed cost, which increases with firm productivity: the larger the firm, the worse it wants institutions to be. Why wouldn't everyone prefer the lowest possible fixed cost? On the one hand, a higher fixed cost decreases profits one for one, and same for everyone. On the other hand, setting a higher fixed cost prevents entry by the lowest-productivity firms, which reduces competition and increases profits. This second effect is more pronounced for firms with higher productivity. More productive firms would thus prefer higher entry barriers – worse institutions.[4]

Barriers to entry are determined endogenously in a political economy equilibrium. The key assumption is that political power is positively related to economic size: the larger the firm, the more political weight it has.[5] We adopt the political economy framework of Bénabou [9], which modifies the median voter model to give wealthier agents a higher voting weight. These ingredients are enough to characterize the autarky and trade equilibria. Firms decide on the fixed costs of production common to all, a decision process in which larger firms receive a larger weight. Production takes place and goods markets clear. We use this framework to compare equilibrium institutions under autarky and trade, in order to illustrate the effects of opening.

In particular, Melitz [26] shows that access to foreign markets allows the most productive firms to grow to a size that would not have been possible in autarky. At the same time, increased competition in the domestic markets reduces the size of non-exporting firms and their profits. The distribution of profits becomes more unequal than it was in autarky:

[3] Narrowly, this fixed cost can be interpreted as a bureaucratic or corruption-related cost of starting and operating a business. For instance, Djankov et al. [15] document large differences in the amount of time and money it requires to start a business in a large sample of countries. More broadly, it can be a reduced-form way of modeling any impediment to doing business that would prevent some firms from entering or producing efficiently. For example, it could be a cost of establishing formal property rights over land or other assets. Or, in the Rajan and Zingales [27] view of the role of financial development, the institutional quality parameter can be thought of as a prohibitive cost of external finance.

[4] This feature of the model corresponds to the increasingly common view that large firms are less affected by bad institutions than small and medium size firms. Beck, Demirgüç-Kunt and Maksimovic [8] find that bad institutions have a greater negative impact on growth of small firms than large firms. Furthermore, Rajan and Zingales [27, 28] argue that larger firms may actually prefer to make institutions worse, *ceteris paribus*, in order to forestall entry and decrease competition in both goods and factor markets. These authors argue that financial development languished in the interwar period and beyond partly because large corporations wanted to restrict access to external finance by smaller firms in order to reduce competition.

[5] There is a body of evidence that individuals with higher incomes participate more in the political process (Bénabou [9]). There is also evidence that larger firms engage more in lobbying activity (see, for example, Bombardini [11].)

larger firms grow larger, while smaller firms become smaller or disappear under trade. Thus, greater trade exposure can potentially result in an economy dominated by a small elite of large exporters.

This leads to two effects through which trade affects institutional quality. The first is the foreign competition effect. The presence of foreign competition generally implies that each firm would prefer better institutions under trade than in autarky. The second is the political power effect. As the largest firms export under trade and grow larger while the smaller firms shrink, political power shifts in favor of big exporting firms. Because larger firms want institutions to be worse, this effect acts to lower institutional quality. The political power effect drives the key result of the paper. Greater exposure to international markets can worsen institutions when it increases the political power of a small elite of large exporters, who prefer to maintain bad institutions.

When is the political power effect stronger than the foreign competition effect? The comparative statics show that when a country captures only a small share of world production in the industry subject to rent seeking, or if the country is relatively large, the foreign competition effect of trade predominates. Thus, while the power does shift to larger firms, these firms still prefer to improve institutions after trade opening. On the opposite end, institutions are most likely to deteriorate when the country is small relative to the rest of the world, but captures a relatively large share of world trade in the industry subject to rent seeking. Intuitively, if a country produces most of the world's supply of the rent-bearing good, the foreign competition effect will be weakest. Furthermore, having a large trading partner allows the largest exporting firms to grow unchecked relative to domestic GDP, giving them a great deal of political power.

This framework can help explain why, contrary to expectations, more trade sometimes fails to have a disciplining effect and improve institutional quality. At the same time, it is important to emphasize that this paper does not argue – or deliver the analytical result – that institutions always deteriorate after trade opening. Indeed, such a prediction would be clearly counterfactual. Instead, a more nuanced set of comparative statics emerges, in which the final outcome depends on country characteristics.[6] Moreover, the two conflicting effects in the model are interesting in themselves, whether or not they lead to an ultimate deterioration of institutions.

Note that the paper does not attempt to endogenize trade opening. Endogenous trade

[6] The comparative statics are suggestive of the experience of the Caribbean in the 18th century, or Central America in the late 19th-early 20th: these were indeed small economies that had much larger trading partners, and captured large shares of world trade in their respective exports.

policy has been the subject of a large literature, and remains beyond the scope of this paper.[7] Nonetheless, we believe that our exercise is still well worth pursuing. First, in many instances changes in trade openness have indeed been exogenous, driven by technological shocks or changes in colonial regimes. Second, many other factors besides ensuing institutional change contribute to the formation of trade policy. Thus, it could be that even when trade openness is endogenous, it is driven by factors unrelated to those we are modeling. Finally, in order to analyze trade opening and endogenous institutions simultaneously, it is important to first understand how the former affects the latter. This model is a step in that direction.

This paper is part of a growing literature on the impact of trade openness on domestic institutions. Using different theoretical frameworks, Segura-Cayuela [33], Stefanadis [35], and Dal Bó and Dal Bó [14] demonstrate that economic institutions and policies can deteriorate as a result of trade opening in countries with weak political institutions. By contrast, Levchenko [25] shows that trade opening can lead to institutional improvement due to a foreign competition effect. None of the papers above model the changes in the balance of political power central to this paper. Without using a formal theoretical framework, Acemoglu, Johnson, and Robinson [2] argue that in some West European countries, Atlantic trade during the period 1500-1850 engendered good institutions by creating a merchant class, which became a powerful lobby for institutional improvement. This paper shows that the newly powerful groups need not favor better institutions under trade, and thus trade opening will not necessarily lead to institutional improvement.

In focusing on the interaction of trade and domestic political economy, our paper is related to Bardhan [7] and Verdier [37]. These authors suggest that trade may shift domestic political power in such a way as to prevent efficient or equitable redistribution. Finally, our work is also related to the literature on the political economy dimension of the natural resource curse (see, e.g. Tornell and Lane [36] Isham et al. [22]).

The rest of the paper is organized as follows. Section 2 describes preferences, technology, and the equilibrium resource allocation in autarky and under trade for a given level of institutional quality. Section 3 lays out the political economy setup and characterizes the political economy equilibria. Section 4 presents the main result of the paper, which is a comparison of equilibrium institutions in autarky and under trade. It begins with an analytic discussion of the conditions under which institutions may deteriorate with trade opening. Then, it presents the results of a numerical simulation of the model, with which we

[7] See, e.g., Rodrik [30], and Grossman and Helpman [18].

perform the comparative statics. Section 5 concludes. Proofs of propositions are collected in the Appendix.

2 Goods and Factor Market Equilibrium

2.1 The Environment

Consider an economy comprised of two countries, the North (N) and the South (S), and two sectors. One of the sectors produces a homogeneous good z, while the other sector produces a continuum of differentiated goods $x(v)$. Consumer preferences over the goods are governed by the utility function

$$U = \left(\int_{v \in \mathcal{V}} x(v)^{\alpha} dv \right)^{\frac{\beta}{\alpha}} z^{(1-\beta)},$$

where $\mathcal{V}$ is the set of available varieties of good x. In country $i = N, S$, utility maximization leads to the following demand functions, given total expenditure E^i and goods prices p_z^i and $p^i(v)$:

$$z^i = \frac{(1-\beta)E^i}{p_z^i}$$

and

$$x^i(v) = \frac{\beta E^i}{\int_{v \in \mathcal{V}^i} p^i(v)^{1-\varepsilon} dv} p^i(v)^{-\varepsilon}, \tag{1}$$

$\forall v \in \mathcal{V}^i$, where $\varepsilon = 1/(1-\alpha) > 1$.

The only factor of production is labor, with country endowments L^N and L^S. The homogeneous good z is produced with a linear technology that requires one unit of L to produce one unit of z. For the sake of tractability, we assume that z can be traded costlessly. This assumption is also adopted by Helpman, Melitz, and Yeaple [19], and Chaney [13], and greatly simplifies the analysis. This is because as long as both countries produce some z, wages are equalized in the two countries. We normalize the price of z, and therefore the wage, to 1.

Each firm in the differentiated sector is able to produce a unique variety of good x. Country $i = N, S$ is endowed with a fixed mass n^i of these varieties. Firms in this sector have heterogeneous productivity. In particular, each firm is characterized by a marginal cost parameter a, which is the number of units of L that it requires in order to produce an additional unit of good x. Each firm with marginal cost a is free not to produce. If it does decide to produce, it must pay a fixed cost common across firms. Let f be the fixed cost of production in the South, and f^N in the North. We assume that the fixed cost in the

South can take on the values in the interval $[\underline{f}, \overline{f}]$, and below we endogenize it in a political economy equilibrium. In this section, we derive the main results regarding the equilibrium production allocation for a given value of South's f.

A firm that decides to incur the fixed cost then faces a downward-sloping demand curve for its unique variety given by (1) in country $i = N, S$. As is well known, isoelastic demand gives rise to a constant markup over marginal cost. A firm based in the South with marginal cost a serving the domestic market maximizes profit by setting the price equal to a/α, and its resulting domestic profit can be written as:

$$\pi_D^S(a) = \frac{(1-\alpha)\beta E^S}{\int_{v \in \mathcal{V}^S} p^S(v)^{1-\varepsilon} dv} \left(\frac{a}{\alpha}\right)^{1-\varepsilon} - f, \tag{2}$$

with a corresponding expression in the North.

Good x can be traded, but international trade is subject to both fixed and per unit costs. In particular, in order to export, a producer of good x must pay a fixed cost f_X, and a per-unit iceberg cost τ. We assume that these trade costs are the same for the two countries. If the firm with marginal cost a decides to pay the fixed cost of exporting, its effective marginal cost of serving the foreign market is τa, and thus it sets the foreign price equal to $\tau a/\alpha$. Export profits for a Southern firm are then:

$$\pi_X^S(a) = \frac{(1-\alpha)\beta E^N}{\int_{v \in \mathcal{V}^N} p^N(v)^{1-\varepsilon} dv} \left(\frac{\tau a}{\alpha}\right)^{1-\varepsilon} - f_X, \tag{3}$$

with a similar expression for a Northern firm exporting to the South.

The distribution of a across firms is characterized by the cumulative distribution function $G(a)$. Following Helpman, Melitz, and Yeaple [19], we assume that labor productivity, $1/a$, follows the Pareto distribution. This implies that the distribution of marginal cost is given by $G(a) = (ba)^k$, for $0 < a \leq 1/b$. Using the Pareto distribution of productivities leads to a Pareto distribution of firm sales, which approximates well the distribution of firm sales in the U.S. economy. The Appendix describes it in detail, and presents closed-form solutions to the autarky and trade equilibria when $1/a$ is Pareto.[8]

To set the stage for the political economy analysis below, we now compare the equilibrium production allocations in autarky and under trade.

2.2 Autarky

To determine the autarky equilibrium production structure requires finding the cutoff level of marginal cost, a_A, such that all firms above this marginal cost decide not to produce.

[8]The use of the Pareto distribution in the heterogeneous firms models is becoming increasingly common. See, among others, Ghironi and Melitz [17], Chaney [13], and Arkolakis [5].

(Here and in the Political Economy section below, we omit the country superscripts whenever that creates no ambiguity.) In this model, the firms' marginal cost takes values on the interval $(0, \frac{1}{b}]$. We assume that the parameter values are such that the least productive firm does not operate, and thus the equilibrium is interior ($a_A < \frac{1}{b}$). A sufficient restriction on parameter values for this to hold is:

$$\underline{f} > \frac{(1-\alpha)\,\beta\,[k-(\varepsilon-1)]\,L}{nk\left[1-(1-\alpha)\,\beta\frac{\varepsilon-1}{k}\right]}. \tag{4}$$

The firm with marginal cost a_A makes zero profit in equilibrium, a condition that can be written as:

$$\frac{(1-\alpha)\,\beta E}{nV\,(a_A)}a_A^{1-\varepsilon} = f. \tag{5}$$

where $V(y) \equiv \int_0^y a^{1-\varepsilon} dG(a)$.[9] The equilibrium value of E is found by imposing the goods market-clearing condition that expenditure must equal income:

$$E = L + n\int_0^{a_A} \pi_A(a) dG(a), \tag{6}$$

where $\pi_A(a)$ is the autarky profit of a firm with marginal cost a, given by (2). There is no free entry in the model, that is, the mass of potential producers (but not actual ones) is fixed. This means that total income, given by the equation above, is the sum of total labor income and the profits accruing to all firms in the economy.[10]

The two equations (5) and (6) in two unknowns E and a_A characterize the autarky equilibrium in this economy, illustrated in Figure 1. On the horizontal axis is a, the firm's marginal cost parameter (thus, the most productive firms are closest to zero). On the vertical axis is firm profit. The zero profit cutoff, a_A, is defined by the intersection of the profit curve with the horizontal axis. All firms with marginal cost higher than a_A do not produce. For the producing firms, profit increases in productivity. Higher f means that in equilibrium, fewer firms operate: $\frac{\partial a_A}{\partial f} < 0$. That is, the higher is f, the more productive a firm needs to be in order to survive.

2.3 Trade

Solving for the trade equilibrium involves finding the production cutoffs a_D^i, and the exporting cutoffs a_X^i, for the two countries $i = N, S$. The cutoff values for production and

[9] This notation is useful for writing the integrals of prices: $\int_{v\in\mathcal{V}} p(v)^{1-\varepsilon} dv = n\int_0^{a_A} (\frac{a}{\alpha})^{1-\varepsilon} dG(a) = \frac{n}{\alpha^{1-\varepsilon}} V(a_A)$, leading to equation (5).

[10] The assumption of a fixed mass of potential producers is made for analytical tractability, as well as for adapting the model to the political economy setup. It has also been used by Eaton and Kortum [16], Chaney [13], and Arkolakis [5].

exporting in the South are characterized by:

$$\frac{(1-\alpha)\beta E^S}{n^S V(a_D^S) + n^N \tau^{1-\varepsilon} V(a_X^N)} \left(a_D^S\right)^{1-\varepsilon} = f, \tag{7}$$

and

$$\frac{(1-\alpha)\beta E^N}{n^N V(a_D^N) + n^S \tau^{1-\varepsilon} V(a_X^S)} \left(\tau a_X^S\right)^{1-\varepsilon} = f_X, \tag{8}$$

with a corresponding pair of conditions in the North.[11] Comparing these to the autarky demand (5), we see that the denominators in these expressions reflect the fact that some varieties of good x consumed in each country are imported from abroad. The model is closed by imposing the condition that expenditure equals income in both countries. In particular, total income is the sum of labor income and all profits accruing to firms from selling in the domestic and export markets:

$$E^i = L^i + n^i \int_0^{a_D^i} \pi_D^i(a) dG(a) + n^i \int_0^{a_X^i} \pi_X^i(a) dG(a), \tag{9}$$

$i = N, S$, with domestic and foreign profits given by (2) and (3) for both countries.

Equations (7)-(9) determine the equilibrium values of a_D^i, a_X^i, and E^i. How does the trade equilibrium differ from the autarky equilibrium for given levels of f? For the political economy effects we wish to illustrate, the trade equilibrium has two key features. First, not all firms for whom it is profitable to produce domestically find it worthwhile to export. Thus only the most productive firms export and grow as a result of trade opening. This comes from assuming a sufficiently large fixed cost of exporting (f_X) as introduced by Melitz [26]. It has become a standard feature in the large subsequent literature on trade with heterogeneous firms. Second, domestic profits decrease as a result of trade opening. The following lemma describes the conditions under which this takes place.

Lemma 1 *(The Melitz Effect) Equilibrium thresholds satisfy $a_D^S < a_A$ if:*

$$\left(\frac{\underline{f}}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}} > \frac{(1-\alpha)\,\beta\,(\varepsilon-1)}{k} \frac{L^N}{L^S} \left(\frac{n^S}{n^N}\right)^2.$$

This condition is satisfied if one or more of the following properties hold:

1. *$\underline{f}$ is sufficiently large relative to f^N;*

[11] Each firm with productivity a serving the domestic market sets the price of a/α. Foreign firms set the price $\tau a/\alpha$. In the South, only firms with marginal cost below a_D^S operate in equilibrium, and only Northern firms with marginal cost below a_X^N sell in the South, thus $\int_{v\in\mathcal{V}^S} p^S(v)^{1-\varepsilon} dv = n^S \int_0^{a_D^S} (\frac{a}{\alpha})^{1-\varepsilon} dG(a) + n^N \int_0^{a_X^N} (\frac{\tau a}{\alpha})^{1-\varepsilon} dG(a) = \frac{n^S}{\alpha^{1-\varepsilon}} V(a_D^S) + n^N \left(\frac{\tau}{\alpha}\right)^{1-\varepsilon} V(a_X^N)$, using the $V(a)$ notation.

2. *Either* β, n^S/n^N, *and/or* L^N/L^S *are sufficiently small.*$\blacksquare$

Figure 1 illustrates the impact of trade opening. As drawn, firms with marginal cost higher than a_D do not produce at all. Firms with marginal cost between a_X and a_D produce only for the domestic market, while the rest of the firms serve both the domestic and export markets. When countries open to trade, the least productive firms drop out, firms with intermediate productivity suffer a decrease in total profits, and only the most productive firms are better off compared to autarky. The distribution of profits is more unequal under trade.[12]

3 Political Economy

In this paper, the fixed cost of production f is the parameter that captures institutional quality. In our view, it reflects one of the key consequences of bad institutions, namely that they are entry barriers for firms to operate or join the formal economy. As shown above, a high level of f acts to prevent entry by some firms, and thus we consider higher f to be a symptom of a lower quality of institutions. A narrow interpretation of f could be actual corruption or red-tape costs that an entrepreneur needs to pay to start or operate a business. More broadly, one can think of f as an assessment of the investment climate as a whole. It could be argued that the various aspects of a poor institutional environment (ineffective judicial system, high expropriation risk, prohibitive cost of external finance, etc.) to some extent act to restrict entry, and are hence summarized by the parameter f.

The quality of institutions in the South, f, is determined endogenously through a political economy mechanism in which entrepreneurs participate; for simplicity we abstract from the participation of L in the political process.[13] Throughout, we assume that institutions in the North f^N remain exogenous and fixed. In order to characterize the equilibrium outcome, this section specifies entrepreneurs' preferences, and the political economy mechanism through which institutional quality is determined. In this framework, preferences are equated with entrepreneurs' wealth, and wealthier entrepreneurs prefer to have worse

[12] The Melitz effect does not obtain for all parameter configurations because, unlike Melitz [26], this model has asymmetric countries and fixed n^N and n^S. Nonetheless, as the condition in Lemma 1 makes clear, the Melitz effect takes place unambiguously in this model when countries are symmetric ($L^N = L^S$; $n^N = n^S$; and $f^N = f$) – the assumption maintained in the original Melitz [26] contribution.

[13] This simplification does not affect the results. To include labor in the political process, one can for example assume that each entrepreneur supplies L/n units of labor. Labor is paid a nominal wage equal to 1 so that entrepreneurs get paid L/n in addition to their profits. While this alternative modeling choice will make each agent prefer better institutions, it does not affect the way preferences depend on firm size, and, most importantly, how trade opening changes preferences. The nature of the political economy game will also not be altered.

institutions. For this, the connection to the production side of the model is essential. First, the imperfectly competitive nature of the differentiated goods sector provides scope for rent seeking behavior. And second, when a firm's wealth is positively related to its profits, it is indeed the case that larger firms prefer worse institutions.

When it comes to the political economy mechanism, the effect we would like to capture is that agents with higher incomes have a higher weight in the policy decision. For instance, Bombardini [11] documents that larger firms are more involved in lobbying activity, and thus one would expect them to have a higher weight in the determination of policies. Rather than assuming a specific bargaining game, this paper adopts a reduced-form approach based on Bénabou [9]. This approach modifies the basic median voter setup to allow for a connection between income and the effective number of votes.

This section describes the political economy environment, defines an equilibrium, and proves a set of propositions showing its existence and stability. The next section presents the main result of the paper, which is the comparison between the autarky and trade equilibrium institutions. As the rest of the analysis focuses on a single country – the South, to save on notation we omit the country superscripts unless they are needed.

3.1 The Setup

Firms participate in a political game that determines the level of barriers $f \in \left[\underline{f}, \overline{f}\right]$.[14] Since f is now endogenous, all equilibrium values discussed in the previous section are functions of f. An agent is characterized by her wealth w. For the rest of the paper, we assume that wealth is derived from profits, so that for any entrepreneur with marginal cost $a \in \left(0, \frac{1}{b}\right]$, it can be expressed as $w_r(a, f)$, where $r = A, T$ refers to a particular regime that occurs in the economy, that is, autarky or trade. More specifically, wealth is given by:

$$w_A(a, f) = \begin{cases} \pi_A(a, f) & if \quad a < a_A(f) \\ 0 & if \quad a \geq a_A(f) \end{cases} \tag{10}$$

in autarky, and

$$w_T(a, f) = \begin{cases} \pi_D(a, f) + \pi_X(a, f) & if \quad a < a_X(f) \\ \pi_D(a, f) & if \quad a \in [a_X(f), a_D(f)) \\ 0 & if \quad a \geq a_D(f) \end{cases} \tag{11}$$

under trade.[15]

[14] As will become clear below, the quality of institutions, f, must be restricted to a bounded interval in order to ensure that a non-degenerate equilibrium exists (see Proposition 3).

[15] For the mechanisms in the paper to go through, it is necessary that the agents participating in the political process identify their fortunes with the profits of particular firms. One way to rationalize this

For a given distribution of wealth $F(.)$, the pivotal voter has a level of wealth w_p characterized by:

$$2\int_0^{w_p} \lambda(w)\, dF(w) = \int_0^{+\infty} \lambda(w)\, dF(w). \tag{12}$$

The political weight function, $\lambda(.)$, has the following simple functional form:

$$\lambda(w) = w^{\lambda},$$

where $\lambda \geq 0$ is a constant.[16] Higher values of λ give more political power to richer individuals, while $\lambda = 0$ yields the median voter outcome. Also, convergence of the integrals defined by (12) requires that $\lambda \leq \frac{k}{\varepsilon-1}$. This paper assumes that there is some wealth bias in the political system, i.e. $\lambda > 0$.

The two ingredients necessary to define a political economy equilibrium are (i) the identity of the pivotal voter, given by her marginal cost of production $a = p$, and (ii) the institutions that the pivotal voter prefers. We start with the latter.

3.2 The Preference Curve

Agents' preferences are simply linear in real wealth, that is, nominal wealth defined by (10) or (11), divided by the consumption price index. For any f, let $P_r(f)$ denote the price level in autarky ($r = A$) and under trade ($r = T$), respectively. Thus, if given the choice to set the level of entry barriers f, an agent will seek to maximize her real wealth $w_r(a, f)/P_r(f)$.

The Preference Curve, denoted $f_r(a)$, is the locus of all the points $(a, f) \in \left(0, \frac{1}{b}\right] \times \left[\underline{f}, \overline{f}\right]$ such that f is the preferred level of entry barriers of an entrepreneur with marginal cost a. The following proposition describes the properties of the Preference Curve.

Proposition 1 *When the share β of the differentiated good CES composite in the total consumption basket is sufficiently low, the Preference Curve is piecewise continuously differentiable and there exist a_L, $a_H \in \left(0, \frac{1}{b}\right]$, with $a_H \leq a_L$, such that:*

setting could be to assume that the entrepreneurs are distinct agents with endowments of technology to produce the differentiated good with a certain productivity. In other words, each firm's profits constitute the wealth/income of one specific entrepreneur. In this sense, entrepreneurial ability would be akin to a fixed factor. This contrasts with the assumption typically made in trade models that workers hold a mutual fund of all the firms in the economy, and firm profits are rebated to the workers as dividends. Note that homothetic preferences imply that aggregate demand is well-behaved, and the analysis of the production allocation is unaffected by the assumption of distinct and heterogeneous entrepreneurs. To achieve non-trivial political effects, as in any political economy framework, it is essential to assume non-transferable utility (see, e.g. Krusell and Rios-Rull [24], or Acemoglu and Robinson [3]), because otherwise the Coase solution would always prevail. In this setting, the natural way to generate non-transferable utility is to assume that entrepreneurs cannot commit to vote for the socially optimal level of institutions, and/or to make transfers to each other *ex post*. This could be due to incomplete contracts arising from a variety of possible frictions. As a consequence, entrepreneurs' political weights are a function of their wealth.

[16] Note that whether $\lambda(.)$ is a function of nominal or real wealth is irrelevant.

- *for* $a \in (a_L, a_H)$ *(interior solutions)* $f_r(a)$ *is defined implicitly by:*

$$\frac{\partial}{\partial f}\left[\frac{w_r(a,f)}{P_r(f)}\right]\bigg|_{f=f_r(a)} = 0; \tag{13}$$

- *otherwise (corner solutions):*

$$f_r(a) = \begin{cases} \overline{f} & if \quad a \leq a_H \\ \underline{f} & if \quad a \geq a_L \end{cases}. \tag{14}$$

Furthermore, when defined by (13)*, the Preference Curve is strictly decreasing.*■

The Preference Curve specified in this proposition is depicted in Figure 2. The first part states that when the wealth-maximizing level of f is interior, it can be obtained simply by taking the first-order condition of wealth maximization with respect to f. When the solution is not interior, the entrepreneur prefers either $\overline{f}$ or $\underline{f}$, and all entrepreneurs that are more (less) productive also prefer $\overline{f}$ ($\underline{f}$). The second part states that wealthier agents prefer worse institutions.

Why would any producer prefer to set f at any level higher than $\underline{f}$? Combining (5) and (2), the autarky real profits can be expressed as:

$$\frac{\pi_A(a,f)}{P_A(f)} = \frac{f a_A^{\varepsilon-1}(f)\, a^{1-\varepsilon} - f}{P_A(f)}, \tag{15}$$

where a_A is the production cutoff in autarky. The fixed cost f affects real wealth through three channels. The first two have to do with the nominal profits in the numerator. Raising f lowers the total profits one for one, because the firm must pay higher fixed costs. However, higher f also increases nominal variable profits $f a_A^{\varepsilon-1}(f)\, a^{1-\varepsilon}$, because it leads to less entry. Most importantly, variable profits are multiplicative in $a^{1-\varepsilon}$, a term that rises and falls with the firm's productivity. Thus, the latter effect is more pronounced for more productive firms, which implies that these firms prefer to live with worse institutions. The third effect has to do with the price level. A higher value of f leads to fewer producers, and thus fewer varieties and a higher consumption price level. Note that the strength of this price level effect depends crucially on β, which is the share of the industry in the overall consumption basket.

Figure 3 illustrates this proposition. It reproduces the autarky profits from Figure 1 for two different levels of f. Raising f forces the least productive firms to drop out. Furthermore, the slope of the profit line is higher in absolute value for higher f: variable profits are greater at each productivity. Thus, firms above a certain productivity cutoff actually prefer a higher f, as the variable profit effect is stronger than the fixed cost and price effects.

The proof to the proposition shows the conditions under which the variable profit effect dominates the other two, and more productive firms indeed prefer worse institutions. In autarky, it turns out that without the price level effect, more productive firms always prefer worse institutions. The price level effect, in turn, does not overturn this pattern as long as $\beta < \varepsilon - 1$, that is, either the elasticity of substitution is sufficiently high, or the share of the differentiated good CES composite in the total consumption basket is sufficiently low.[17] Under trade, it is not possible to recover an explicit restriction on β. However, the intuition for the result is exactly the same: while the general equilibrium price level effect pushes agents to prefer better institutions, it can be made arbitrarily weak by lowering β.

It is sensible to abstract from the general equilibrium price level effect in this application. When larger firms in any one industry favor policies to restrict entry, it is prima facie plausible that they ignore the effect of these barriers on their overall consumption price index. In other words, when an entrepreneur is considering actions to raise entry barriers to her competitors, it is unlikely that consuming fewer varieties produced by her competitors affects her preferences appreciably.

Note also that in order to specify the Preference Curve under the trade regime, one must take into account the endogenous choice of firms to export at each value of f. The Appendix provides a full treatment of this issue. The endogenous exporting decision may produce a discontinuity in the Preference Curve under trade, but it does not change the result that it is decreasing.

Having completed the description of firms' preferences, we now move to the discussion of the political economy mechanism.

3.3 The Political Curve

The Political Curve is defined by the set of points $(p, f) \in \left[0, \frac{1}{b}\right] \times \left[\underline{f}, \overline{f}\right]$, such that p is the marginal cost of the pivotal voter in the economy characterized by an entry barrier level f. That is, the Political Curve $p_r(f)$ is defined implicitly by:

$$2 \int_0^{p_r(f)} \left[w_r(a, f)\right]^\lambda dG(a) = \int_0^{1/b} \left[w_r(a, f)\right]^\lambda dG(a) . \tag{16}$$

This equation expresses the identity of the pivotal voter in terms of marginal cost $a = p$ rather than nominal wealth w. The following proposition characterizes the Political Curve.

[17] In practice, this restriction is unlikely to bind. While $\beta < 1$ by construction, available estimates put ε in the range of 3 to 10 across industries (see Anderson and van Wincoop [4]).

Proposition 2 *The Political Curve $p_r(f)$ given implicitly by* (16) *is well-defined and continuous with respect to f. Furthermore, when*

$$\left(1+\frac{f}{f_X}\right)\frac{\varepsilon-1}{k}+\left(\frac{f}{f_X}\right)^{\frac{k}{\varepsilon-1}}\frac{1}{\tau^k}\frac{n^N}{n^S}\geq 1 \tag{17}$$

and the share β of the differentiated good CES composite in the total consumption basket is sufficiently low, the Political Curve is a downward-sloping function of f.■

Figure 2 illustrates the Political Curve specified in this proposition. The proposition shows that under certain conditions, the Political Curve is downward-sloping. Put differently, for any two fixed costs such that $f_h > f_l$, the pivotal firm under f_h is more productive than the pivotal firm under f_l: $p_h < p_l$. That is, we would like to restrict attention to cases in which a higher level of fixed cost results in a pivotal voter that is more productive. This is a sensible requirement: as shown in the previous subsection, a higher level of f decreases the wealth of the least productive firms, and increases the wealth of the most productive firms, thus shifting the voting weight towards the higher productivity firms.[18]

Nonetheless, for this proposition to hold, certain restrictions must be satisfied. First, the function $\lambda(w)$ must give more weight to wealthier agents relative to less wealthy ones ($\lambda > 0$).[19] In addition, the profit curve as a function of a must be everywhere steeper for higher f, as depicted in Figure 3. It turns out that in autarky this is always the case, so no further restrictions need to be imposed. Similarly, under trade it is also always the case for firms that never export. Since exporting firms add domestic and foreign profits, additional sufficient regularity conditions must be satisfied, as stated in the proposition. They are there to rule out cases in which adding export profits raises the wealth of less productive firms faster than that of the more productive ones.[20]

[18] We must make a note about the consistency of the parameter restrictions we have now imposed on the model to ensure that it is well-behaved. Namely, we need to ensure that the solution to the model is interior (equation 4), that the Melitz effect takes place for some parameter values (Lemma 1), and that the Political Curve is downward-sloping (Proposition 2) above. In addition, we must make sure that none of these conditions become violated as β becomes small, as that is important for several propositions as well. Examining these restrictions reveals that they are indeed mutually consistent. Each of them can be interpreted as a lower bound on $\underline{f}$ given the other parameter values. Thus, we can select $\underline{f}$ to be bounded from below by the most stringent of these conditions. Finally, these conditions are not violated as β gets closer to zero; indeed they become easier to satisfy for smaller β.

[19] Under a simple median voter system in which all agents have identical political weight, the Political Curve is always a vertical line, and thus the changes in the distribution of wealth do not affect the configuration of political power.

[20] In practice, the first parameter restriction is not likely to bind. In this model under the Pareto distribution assumption, the ratio $\frac{k}{\varepsilon-1}$ regulates the slope of the power law in the distribution of firm size. Available estimates put this ratio at quite close to 1. For instance, Axtell [6] uses Census data for U.S. firms to obtain an estimate of $\frac{k}{\varepsilon-1} = 1.06$, implying that $\frac{\varepsilon-1}{k} = 0.943$. Clearly, the term in the first parentheses is also

3.4 Equilibrium: Definition, Existence, Characterization

As the discussion above makes clear, there is a two-way dependence in this setup: the identity of the pivotal firm, p, depends on the level of f, while the level of f depends on the identity of the pivotal firm. The equilibrium must thus be a fixed point.

Definition 1 *An equilibrium of the economy in the regime $r = A, T$ is a pair (f_r, p_r) such that $f_r = f_r(p_r)$ and $p_r = p_r(f_r)$, where $f_r \in \left[\underline{f}, \overline{f}\right]$ and $p_r \in \left(0, \frac{1}{b}\right]$.*

In order to address issues of stability, we do not consider an explicitly dynamic setting. Instead, we define the following function: for any $f \in \left[\underline{f}, \overline{f}\right]$,

$$\Phi_r(f) = f_r[p_r(f)],$$

and for any $n \geq 1$,

$$\Phi_r^0(f) = f, \text{ and } \Phi_r^n(p) = \Phi_r\left[\Phi_r^{n-1}(f)\right]. \tag{18}$$

Definition 2 *An equilibrium (f_r, p_r) is stable if there exists $\rho > 0$, such that for any $\eta > 0$, there exists an integer $\nu \geq 1$ such that for any $n \geq \nu$, and any $\tilde{f} \in (f_r - \rho, f_r + \rho) \cap \left[\underline{f}, \overline{f}\right]$,*

$$\left|\Phi_r^n\left(\tilde{f}\right) - f_r\right| < \eta. \tag{19}$$

In other words, an equilibrium will be considered stable if, after a small perturbation (of size ρ) around the equilibrium point, the system converges back to the same equilibrium, with (18) characterizing the transition. The definition of stability above corresponds to the concept of asymptotic stability in dynamic processes. Two generic cases of equilibria that violate the stability requirement are: (i) a "cycling" case, in which the process is bounded but does not converge; (ii) the process diverges after a perturbation and reaches a corner solution. The following proposition proves existence and stability of an equilibrium by considering these two cases.

greater than 1. We must also be mindful that the requirement of a large enough $\frac{f}{f_X}$ in Proposition 2 does not conflict with the condition that f_X must be large enough relative to f so that only the most productive firms export. Notice that the two requirements are clearly not mutually exclusive. For example, when the two countries are symmetric, not all firms export as long as $f_X > \tau^{1-\varepsilon} f$. Since $\tau > 1$ and $1 - \varepsilon < 0$, f_X can be even smaller than f while still creating a separation between domestic and exporting firms. More generally, a sufficient condition for the separation between domestic and exporting firms to occur is that n^S is sufficiently close to n^N and L^S is sufficiently close to L^N. These restrictions are not in contradiction with the requirement (17) in Proposition 2. (A comprehensive treatment of this issue under milder sufficient conditions is available upon request.) The restriction of small enough β is required in order to limit the effect of f on $a_X(f)$, as that brings in new exporting firms, which are on average less productive than existing exporting firms and may push the pivotal voter to the right.

Proposition 3 *When both the Preference Curve and the Political Curve are downward-sloping, an equilibrium exists. Furthermore, there is at least one stable equilibrium.*■

Note that for Proposition 3 to hold, it suffices that both the Preference Curve and the Political Curve are downward-sloping, which will hold under the conditions specified in Propositions 1 and 2. In particular, this assumes that β is sufficiently small to satisfy both Propositions 1 and 2. Given the characterization of the Preference Curve and the Political Curve above, Figure 2 illustrates the definition of equilibrium and its existence. The proof of the proposition shows that one of three cases are possible: equilibrium institutions could be $\underline{f}$, $\overline{f}$, or an interior value of f. The first two occur when the two curves intersect on the flat portions of the Preference Curve. To establish stability, the proof first argues that cycling cannot occur as both Preference and Political Curves are downward-sloping, and then establishes that corner equilibria are stable. Finally, when there exist only interior solutions, the proof shows that the Political Curve must cut the Preference Curve from above at least once, and such an intersection is a stable equilibrium.

4 Comparing Institutions in Autarky and Trade

This section compares the equilibrium institutions in the South under autarky and trade. Throughout, it assumes that the North's institutions are exogenously given, and the only adjustment in the North that takes place is on the production side.

The reorganization of production due to trade opening leads the Political Curve to shift "inwards." Figure 1 depicts, for a given value of f, profits as a function of a in autarky and under trade. As discussed in Section 2, the distribution of wealth becomes more unequal under trade. Profits from domestic sales are lower under trade than they are in autarky ($\pi_D(a, f) < \pi_A(a, f)$), inducing some firms to exit ($a_D(f) < a_A(f)$). At the same time, the most productive firms begin exporting, and their profits grow larger. This increased wealth inequality leads naturally to the inward shift in the Political curve. In particular, the pivotal voter moves to the left, $p_T(f) \leq p_A(f)$ for every f. We label this the *political power effect*: the power shifts towards larger firms under trade compared to autarky. The argument is similar to the one in Proposition 2, and the Appendix provides the formal treatment. Here again, it must be the case that $\lambda > 0$: under a simple median voter system in which one person equals one vote, the pivotal voter remains unchanged and no political power effect takes place.

Proposition 4 *(The Political Power Effect) When Lemma 1 holds, the Political Curve shifts inward when the economy opens to trade: for every* $f \in \left[\underline{f}, \overline{f}\right]$, $p_T(f) \leq p_A(f)$.■

The Preference Curve shifts as well. It turns out that as long as the Melitz effect takes place, each non-exporting firm prefers to have better institutions under trade than in autarky. This intuitive result comes from the fact that domestic profits are lower under trade due to the increased foreign competition. In principle, exporting firms may actually prefer worse institutions under trade, because export profits increase in f. Since the sensitivity of export profits with respect to f goes to zero for β small enough, this effect will eventually disappear for small β. We label this inward shift of the Preference Curve the *foreign competition effect*. The following proposition formalizes it.

Proposition 5 *(The Foreign Competition Effect) When Lemma 1 holds, and/or for small enough values of* β*, the Preference Curve shifts inward when the economy opens to trade: for any* $a \in \left(0, \frac{1}{b}\right]$, $f_T(a) < f_A(a)$. *Every entrepreneur* $a \in \left(0, \frac{1}{b}\right]$ *prefers lower entry barriers under trade than they do in autarky.*■

Note that in this case, assuming small β is not crucial for the main message of the paper: if there is a range of a's in which firms prefer higher entry barriers under trade than in autarky, the political power effect and the foreign competition effect reinforce each other, and institutions deteriorate unambiguously.

In comparing the equilibria resulting in autarky and under trade, the potential difficulty is that the trade equilibrium may not be unique. Thus we must define an equilibrium selection process. We assume that the equilibrium resulting from trade opening is the one to whose basin of attraction the autarky equilibrium f_A belongs. To do so, we first define a basin of attraction with respect to f.

Definition 3 *The basin of attraction* $B(f_r)$ *of an equilibrium* (f_r, p_r) *for* $r = A, T$ *is defined by:*

$$B(f_r) = \left\{ f \in \left[\underline{f}, \overline{f}\right] : \ \forall \eta > 0, \exists \nu > 1, \forall n > \nu, \left|\Phi^n(f) - f_r\right| < \eta \right\}.$$

The basin of attraction of a particular equilibrium is a set of initial values of f from which the system converges to that equilibrium. Because the dynamic process defined by (18) always converges, each point in the interval $\left[\underline{f}, \overline{f}\right]$ belongs to the basin of attraction of some equilibrium. Furthermore, because this dynamic process is deterministic, the basins of attraction do not overlap. Thus, the set of all basins of attraction constitutes a partition of the interval $\left[\underline{f}, \overline{f}\right]$.[21] We now show that there exist parameter values under which the transition from autarky to trade implies a worsening of institutions. Let $f_r^{(-1)}(f)$ denote the entrepreneur who prefers entry barrier f under regime $r = A, T$.

Proposition 6 *Consider a stable autarky equilibrium (f_A, p_A). If $p_T(f_A) < f_T^{(-1)}(f_A)$, then there exists an equilibrium of the economy under trade (f_T, p_T) such that $f_A \in B(f_T)$ and $f_T > f_A$.*■

The above proposition shows that if the political power effect is large enough compared to the foreign competition effect, the economy converges towards an equilibrium with worse institutions as a result of trade opening. In order to compare the foreign competition and political power effects, let us compare the pivotal voter under trade starting from autarky institutions, $p_T(f_A)$, and the entrepreneur who prefers f_A under the trade regime, $f_T^{(-1)}(f_A)$ (see Figure 4). If $p_T(f_A) < f_T^{(-1)}(f_A)$, then the political power effect is stronger than the foreign competition effect, and institutions deteriorate. When is this the case? Consider the following difference:

$$\Delta = \int_0^{f_T^{(-1)}(f_A)} \left[w_T(a, f_A)\right]^\lambda dG(a) - \int_{f_T^{(-1)}(f_A)}^{1/b} \left[w_T(a, f_A)\right]^\lambda dG(a).$$

It is positive if and only if $p_T(f_A) < f_T^{(-1)}(f_A)$, as required by Proposition 6.[22] Using the autarky pivotal voter, one can rewrite this expression as:

$$\begin{aligned}\Delta &= \left(\int_0^{p_A(f_A)} \left[w_T(a, f_A)\right]^\lambda dG(a) - \int_{p_A(f_A)}^{\frac{1}{b}} \left[w_T(a, f_A)\right]^\lambda dG(a)\right) \\ &\quad -2\int_{f_T^{(-1)}(f_A)}^{p_A(f_A)} \left[w_T(a, f_A)\right]^\lambda dG(a).\end{aligned}$$

The first term measures the magnitude of the Political Curve shift. It is positive, because $p_T(f_A) < p_A(f_A)$. The second term proxies for the strength of the foreign competition effect. It will be large in absolute value when there is a large difference between $p_A(f_A)$ and $f_T^{(-1)}(f_A)$: agents' preferences change strongly between autarky and trade. Note that if the integral of the second term is negative, $\Delta > 0$ unambiguously: the two effects reinforce each other, and institutions deteriorate. This would be the case when the foreign competition effect does not occur, as discussed above. When foreign competition changes preferences in favor of better institutions, the two effects go in opposite directions, and their relative magnitudes determine the equilibrium outcome.

[21] The basin of attraction of an unstable equilibrium (f_r, p_r) is the singleton $\{f_r\}$.

[22] Note that when $p_T(f_A) = f_T^{(-1)}(f_A)$, $\Delta = 0$, since $p_T(f_A)$ is the pivotal voter.

Figure 4 presents the two cases graphically, starting from the same interior autarky equilibrium. The first panel illustrates a transition to a trade equilibrium in which institutions improve as a result of trade. For this to occur, the shift in the Political Curve must be sufficiently small, and the shift in the Preference Curve sufficiently large. The former would occur, for example, if the function $\lambda(w)$ is flat enough. The latter would occur if the foreign competition effect is sufficiently pronounced, that is, when n^N is large enough relative to n^S. The second panel illustrates a case in which institutions deteriorate as a result of trade. If the political power effect is strong enough, or the foreign competition effect is weak enough, institutions will worsen.

What are the conditions under which the two different scenarios are more likely to prevail? The model does not offer an analytical solution that permits comparative statics with pencil and paper, due to both the algebraic complexity of the trade side of the model, and the fact that closed-form expressions for the pivotal firm generally do not exist. Nonetheless, the solution can be implemented numerically in a fairly straightforward manner. In order to focus on the South's market power and the resulting magnitude of the foreign competition effect, we compare changes in institutions for a grid of parameter values. Starting from an autarky equilibrium with good institutions ($f_A = \underline{f}$), we check how it changes in response to trade opening for a grid of L^N's and n^N's.[23]

The results are presented in Figure 5. The shaded area represents ranges of L^S/L^N and n^S/n^N for which institutions deteriorate as a result of opening. Trade is most likely to lead to a worsening of institutions when the economy is both small in size (L^N is large compared to L^S), and captures a large share of world trade in the differentiated good (that is, n^S is large relative to n^N). Under these conditions, there is a large movement in the pivotal voter, while the movement in the Preference Curve is small. Intuitively, when there are relatively few producers of the competing good in the North (n^N is low), the disciplining effect of opening up to foreign competition is weak. On the other hand, when the size of the foreign demand is large relative to the domestic labor force, the incentive to push smaller firms out of the market in order to earn higher profits will be higher. In addition, for those firms

[23] Though this exercise is meant as a numerical example rather than a calibration, whenever possible we adopt parameter values based on existing estimates. The elasticity of substitution $\varepsilon = 5$ (Anderson and van Wincoop [4]); k is set following Helpman, Melitz, and Yeaple [19], who estimate that $k - (\varepsilon - 1) \approx 1.25$; $\tau = 1.21$ (Chaney [13]); $f_X = 150$, set to roughly match the stylized fact that about 20% of firms export (Bernard et al. [10]). The range of fixed costs is set to produce interior solutions for a_D and a_X: $\underline{f} = \frac{(1-\alpha)\beta[k-(\varepsilon-1)]L^S}{n^S k\left[1-(1-\alpha)\beta\frac{\varepsilon-1}{k})\right]} + 10$; $\overline{f} = 181$; f^N is set equal to the autarky institutions in the South. The political weight parameter is $\lambda = 0.65$, yielding an intermediate degree of wealth bias, and good equilibrium autarky institutions. The remaining parameters are: $\beta = 1/3$; $b = 0.1$; $L^S = 1000$; $n^S = 20$. Details the of numerical implementation and the MATLAB programs are available upon request.

that do export, a larger foreign export market means higher profits, *ceteris paribus*, and thus more political power at home. We can also highlight the conditions under which the opposite outcome obtains: the disciplining effect of trade predominates. When the number of domestic firms is small vis-à-vis its trading partner, foreign competition in the domestic market forces even the biggest firms to want to improve institutions in order to increase their profits. Thus, when domestic firms capture a very small share of the world market under trade, the shift in the Preference Curve is large. When this is the case, the economy is likely to retain good institutions or even improve them. This effect is more pronounced when the South is also relatively large – the mirror image of the previous case we analyzed.

5 Conclusion

What can we say about how increased exposure to trade changes a country's institutional quality? Country experiences with trade opening are quite diverse. In some cases, opening led to a diversified economy in which no firm had the power to subvert institutions, while in others trade led to the emergence of a small elite of producers, which captured all of the political influence and installed the kinds of institutions that maximized their profits.

This paper investigates the determination of equilibrium institutions in an environment with heterogeneous firms whose preferences over institutional quality differ. When it comes to the consequences of trade opening, we can separate two effects. First, trade opening changes each agent's preferences over the optimal level of institutions. In most cases, each firm prefers better institutions under trade than in autarky. This is the well-known disciplining effect of trade. The second effect, which is central to this paper, is that trade opening shifts political power towards larger firms. This is because profits are more unequally distributed across firms under trade, and thus economic and political power is more concentrated in the hands of few large exporters. The shift in the political power can have an adverse effect on institutional quality, because large firms want institutions to be worse. Which effect prevails depends on the parameter values. A large country that has a small share of world trade in the good subject to rent seeking will most likely see its institutions improve as a result of trade. On the other hand, a small country that captures a large part of the world market will likely experience a deterioration in institutional quality. Thus, the model is flexible enough to reflect a wide range of country experiences with liberalization, while revealing the kinds of conditions under which the different outcomes are most likely to prevail.

A Appendix: Proofs of Propositions

A.1 The Pareto Distribution and the Closed-Form Solutions to the Autarky and Trade Equilibria

The cumulative distribution function of a Pareto(b,k) random variable is given by:

$$1-\left(\frac{b}{x}\right)^k.$$

The parameter $b>0$ is the minimum value that this random variable can take, while k regulates dispersion (see Casella and Berger [12], p. 628). This paper assumes that $1/a$, which is labor productivity, has the Pareto distribution. It is straightforward to show that marginal cost, a, has the following cumulative distribution function:

$$G(a)=(ba)^k, \tag{A.1}$$

for $0<a\leq 1/b$. It is also useful to define the following integral: $V(y)\equiv\int_0^y a^{1-\varepsilon}dG(a)$.[24] Using the functional form for $G(a)$, $V(a)$ becomes:

$$V(a)=\frac{b^k k}{k-(\varepsilon-1)}a^{k-(\varepsilon-1)}, \tag{A.2}$$

under the regularity condition that $k>\varepsilon-1$. For $k=\varepsilon-1$, $V(a)=b^k k\ln a$. The integral defining $V(y)$ does not converge when $k<\varepsilon-1$.

A.1.1 Autarky Closed-Form Solution

Combining the equilibrium conditions (5) and (6) with the functional forms (A.1) and (A.2), the cutoff a_A is:

$$a_A(f)=\left(\frac{(1-\alpha)\beta(k-(\varepsilon-1))L}{nb^k k\left(1-(1-\alpha)\beta\frac{\varepsilon-1}{k}\right)}\frac{1}{f}\right)^{\frac{1}{k}}\equiv\left(\frac{\Gamma}{f}\right)^{\frac{1}{k}}, \tag{A.3}$$

and the price level is:

$$\begin{aligned}P_A(f) &= \left[n\alpha^{\varepsilon-1}\int_0^{a_A(f)}a^{1-\varepsilon}dG(a)\right]^{\frac{\beta}{1-\varepsilon}}=\left[n\alpha^{\varepsilon-1}\frac{b^k k}{k-(\varepsilon-1)}\left(\frac{\Gamma}{f}\right)^{\frac{k-(\varepsilon-1)}{k}}\right]^{\frac{\beta}{1-\varepsilon}} \\ &\propto f^{\frac{\beta}{\varepsilon-1}\frac{k-(\varepsilon-1)}{k}},\end{aligned} \tag{A.4}$$

where "$\propto$" stands for "proportional to."

[24] It turns out that in the Dixit-Stiglitz framework of monopolistic competition and CES utility, the integral $V(y)$ is useful for writing the price indices and the total profits in the economy where the distribution of a is $G(a)$.

A.1.2 Trade Closed-Form Solution

Combining equilibrium conditions (7)-(9) with the functional forms (A.1) and (A.2), the cutoffs in the South are:

$$a_D^S(f) = \left[\frac{1}{f}\frac{\mathsf{A}}{\mathsf{B}+\mathsf{C}(f)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\right]^{\frac{1}{k}}$$

and

$$a_X^S(f) = \left[\frac{1}{f_X}\left(\mathsf{F}+\frac{\mathsf{DA}}{\mathsf{B}(f)^{-\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\mathsf{C}}\right)\right]^{\frac{1}{k}},$$

while the price level in the South is equal to:

$$\begin{aligned} P_T^S(f) &= \left[n^S\alpha^{\varepsilon-1}\int_0^{a_D(f)} a^{1-\varepsilon}dG(a) + n^N\left(\frac{\alpha}{\tau}\right)^{\varepsilon-1}\int_0^{a_X^N(f)} a^{1-\varepsilon}dG(a)\right]^{\frac{\beta}{1-\varepsilon}} \\ &= \left[n^S\alpha^{\varepsilon-1}\frac{b^k k}{k-(\varepsilon-1)}\left(1+\frac{n^N}{n^S}\left(\frac{f_S}{f_X}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}\right)a_D(f)^{k-(\varepsilon-1)}\right]^{\frac{\beta}{1-\varepsilon}}, \quad \text{(A.5)}\end{aligned}$$

where A, B, C, D, and F are positive constants given by:

$\mathsf{A} = \frac{(1-\alpha)\beta(k-(\varepsilon-1))}{b^k}\left\{\left[k-(1-\alpha)\beta(\varepsilon-1)\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+k\frac{n^S}{n^N}\right]\frac{L^S}{n^S}+(1-\alpha)\beta(\varepsilon-1)\frac{L^N}{n^N}\right\}$,

$\mathsf{B} = [k-(1-\alpha)\beta(\varepsilon-1)]\left\{[k-(1-\alpha)\beta(\varepsilon-1)]\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+k\frac{n^S}{n^N}\right\}$,

$\mathsf{C} = \left(\frac{1}{f_X}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}\left\{[k-(1-\alpha)\beta(\varepsilon-1)]k\frac{n^N}{n^S}\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{1}{\tau^k}\left[k^2-((1-\alpha)\beta(\varepsilon-1))^2\right]\right\}$,

$\mathsf{D} = \frac{(1-\alpha)\beta(\varepsilon-1)\frac{1}{\tau^k}\left(\frac{1}{f_X}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}{[k-(1-\alpha)\beta(\varepsilon-1)]\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+k\frac{n^S}{n^N}}$, and $\mathsf{F} = \frac{(1-\alpha)\beta\frac{k-(\varepsilon-1)}{b^k}\frac{L^N}{n^N}}{[k-(1-\alpha)\beta(\varepsilon-1)]\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+k\frac{n^S}{n^N}}$.

From these expressions, it follows that $\frac{da_D^S}{df}<0$ and $\frac{da_X^S}{df}>0$.

A.2 Proofs

Proof of Lemma 1: Comparing directly, $a_A(f) > a_D(f)$ if and only if $\Gamma > \frac{\mathsf{A}}{\mathsf{B}+\mathsf{C}(f)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}$. Plugging in the values of A, B, and C and rearranging leads to the sufficient condition for $a_A(f) > a_D(f)$ spelled out in the lemma. The conditions for this inequality to hold stated in the lemma follow immediately.■

Proof of Proposition 1:

Autarky: In autarky, the Preference Curve can be expressed in closed form. The entrepreneur characterized by marginal cost a has real profit equal to $\frac{\pi_A(a,f)}{P_A(f)} = \frac{f[a_A(f)]^{\varepsilon-1}a^{1-\varepsilon}-f}{P_A(f)}$. Equations (A.3) and (A.4) in turn imply that the real profit is proportional to:

$\frac{\pi_A(a,f)}{P_A(f)} \propto \frac{\Gamma^{\frac{\varepsilon-1}{k}} f^{\frac{k-(\varepsilon-1)}{k}} a^{1-\varepsilon} - f}{f^{\beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}}} = \Gamma^{\frac{\varepsilon-1}{k}} a^{1-\varepsilon} f^{\frac{k-(\varepsilon-1)}{k} - \beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}} - f^{1-\beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}}$.

It is straightforward to take the first order condition with respect to f:

$\left(\frac{k-(\varepsilon-1)}{k} - \beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}\right)\Gamma^{\frac{\varepsilon-1}{k}} a^{1-\varepsilon} f^{\frac{k-(\varepsilon-1)}{k} - \beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)} - 1} = \left(1 - \beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}\right) f^{-\beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}}$.

Rearranging yields the closed form expression for the autarky Preference Curve $f_A(a)$ when the solution is interior ($f_A(a) \in (\underline{f}, \overline{f})$):

$$f_A(a) = \Gamma a^{-k}\left[\frac{1 - \beta\frac{k-(\varepsilon-1)}{k(\varepsilon-1)}}{\frac{k-(\varepsilon-1)}{k}\left(1 - \frac{\beta}{(\varepsilon-1)}\right)}\right]^{\frac{k}{1-\varepsilon}}. \tag{A.6}$$

The proposition holds, that is, the Preference Curve is decreasing in a, as long as the ratio in the square brackets is positive. A sufficient condition for that is $\beta \leq \varepsilon - 1$. Straightforward algebra can be used to establish that the Second-Order Condition (SOC) also holds as long as $\beta \leq \varepsilon - 1$. Conditions characterizing corner solutions simply follow from monotonicity of the Preference Curve. For consistency, we set $f_A(a) = \underline{f}$ for entrepreneurs who never produce, i.e. $a > a_A(\underline{f})$.

Trade: Under trade, the more complicated functional forms for $a_D(f)$ and $P_T(f)$ make the proof more involved, because they do not admit a closed-form solution for the Preference Curve. It is therefore not possible to derive an explicit restriction on parameter values (i.e. β) for the proposition to hold. Moreover, in the trade case, the decision to export is endogenous: some entrepreneurs might prefer entry barrier levels such that they export, while others, on the contrary, might prefer a level of f for which they produce only for the domestic market. Therefore, the proof proceeds in two parts. First, we show that for firms that always, or never, export, the SOC is satisfied and the Preference Curve is downward-sloping when β is sufficiently small. And second, we analyze the consequences of the endogenous decision to enter export markets on each firm's preferred value of f, and show that the Preference Curve is non-increasing everywhere.

Define by $f_{DX}(a)$ the preferred domestic entry barrier of the firm that maximizes both domestic and export profits, and by $f_D(a)$ the level of domestic entry barrier that maximizes domestic profits only:

$$f_{DX}(a) = \arg\max_f \frac{\pi_D(a,f) + \pi_X(a,f)}{P_T(f)} \text{ and } f_D(a) = \arg\max_f \frac{\pi_D(a,f)}{P_T(f)} \tag{A.7}$$

for any $a \in (0, a_D(\underline{f})]$. Note that entrepreneurs such that $a > a_D(\underline{f})$ never produce.

We now establish that the two curves $f_{DX}(a)$ and $f_D(a)$ in $(A.7)$ are well-defined, continuous, continuously differentiable and downward-sloping. When interior, the preferred values $f_{DX}(a)$ and $f_D(a)$ are defined implicitly by first-order conditions $\frac{\partial}{\partial f}\frac{\pi_D(a,f)+\pi_X(a,f)}{P_T(f)} =$

0 and $\frac{\partial}{\partial f}\frac{\pi_D(a,f)}{P_T(f)} = 0$, respectively. To establish the SOC and prove that the curves are downward-sloping, one must take the second derivative of the expression for real profits under trade and show that it is negative at the optimum for sufficiently small β (i.e. take the limit as β goes to zero). Computing second derivatives of real wealth with respect to f is quite involved. However, because real wealth is twice continuously differentiable with respect to $(a,f) \in \left(0,\frac{1}{b}\right) \times \left[\underline{f},\overline{f}\right]$, uniformly with respect to β, we can permute the limit and derivative operations. Yet, when β goes to zero, real wealth also goes to zero, so that the higher order terms become important. The constants A through F behave as follows:
$\lim_{\beta\to 0}\frac{1}{\beta}\mathsf{A} = \frac{(1-\alpha)(k-(\varepsilon-1))}{b^k}\left[\left(k+k\frac{n^S}{n^N}\right)\frac{L^S}{n^S}\right]$, $\lim_{\beta\to 0}\mathsf{B} = k^2\left[\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}} + \frac{n^S}{n^N}\right]$,
$\lim_{\beta\to 0}\mathsf{C} = k^2\frac{n^N}{n^S}\left(\frac{1}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}$, $\lim_{\beta\to 0}\frac{1}{\beta}\mathsf{D} = \frac{(1-\alpha)\frac{\varepsilon-1}{k}\frac{1}{\tau^k}\left(\frac{1}{f_X}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}{\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{n^S}{n^N}}$,
and $\lim_{\beta\to 0}\frac{1}{\beta}\mathsf{F} = \frac{(1-\alpha)\frac{k-(\varepsilon-1)}{kb^k}\frac{L^N}{n^N}}{\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{n^S}{n^N}}$.
Thus, by continuity, the thresholds $a_D(f)$ and $a_X(f)$ satisfy:

$$\lim_{\beta\to 0}\frac{1}{\beta^{\frac{1}{k}}}a_D(f) = \left[\frac{1}{f}\frac{\frac{(1-\alpha)(k-(\varepsilon-1))}{b^k}\left[\left(k+k\frac{n^S}{n^N}\right)\frac{L^S}{n^S}\right]}{k^2\left[\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{n^S}{n^N}\right]+k^2\frac{n^N}{n^S}\left(\frac{1}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}f^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\right]^{\frac{1}{k}},$$

and $\lim_{\beta\to 0}\frac{1}{\beta^{\frac{1}{k}}}a_X(f) = \left[\frac{1}{f_X}\frac{(1-\alpha)\frac{k-(\varepsilon-1)}{kb^k}\frac{L^N}{n^N}}{\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{n^S}{n^N}}\right]^{\frac{1}{k}}$, and the price satisfies $\lim_{\beta\to 0}\frac{1}{P_T(f)} = 1$.
The limit value of $\frac{1}{\beta^{\frac{1}{k}}}a_X(f)$ does not depend on f, nor does price level $P_T(f)$. As mentioned in the text, when β is small enough, the general equilibrium effect of raising f on the domestic price level and the export cutoff becomes unimportant. Therefore, for the purpose of this proof, we can restrict attention to nominal domestic profits, since for sufficiently small β, export profits and price levels are not sensitive to f. We thus have

$$\lim_{\beta\to 0}\frac{1}{\beta^{\frac{\varepsilon-1}{k}}}fa_D^{\varepsilon-1}(f)\,a^{1-\varepsilon} = \left\{\frac{\frac{(1-\alpha)(k-(\varepsilon-1))}{kb^k}\left[\left(1+\frac{n^S}{n^N}\right)\frac{L^S}{n^S}\right]}{\left[\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{n^S}{n^N}\right]f^{-\frac{k-(\varepsilon-1)}{\varepsilon-1}}+\frac{n^N}{n^S}\left(\frac{1}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\right\}^{\frac{\varepsilon-1}{k}}a^{1-\varepsilon}.$$

The term $\{...\}^{\frac{\varepsilon-1}{k}}$, denoted by $\Pi(f)$, is increasing and concave in f, so that
(i) $\frac{\partial^2}{\partial f^2}\lim_{\beta\to 0}\frac{1}{\beta^{\frac{\varepsilon-1}{k}}}fa_D^{\varepsilon-1}(f)\,a^{1-\varepsilon} = a^{1-\varepsilon}\Pi''(f) < 0$
and (ii) $\frac{\partial^2}{\partial f\partial a}\lim_{\beta\to 0}\frac{1}{\beta^{\frac{\varepsilon-1}{k}}}fa_D^{\varepsilon-1}(f)\,a^{1-\varepsilon} = (1-\varepsilon)\,a^{-\varepsilon}\Pi'(f) < 0$.
Because $fa_D^{\varepsilon-1}(f)\,a^{1-\varepsilon}$ is twice differentiable with respect to (a,f) uniformly with respect to β, (i) implies that $\lim_{\beta\to 0}\frac{1}{\beta^{\frac{\varepsilon-1}{k}}}\frac{\partial^2}{\partial f^2}fa_D^{\varepsilon-1}(f)\,a^{1-\varepsilon} < 0$ and (ii) implies that
$\lim_{\beta\to 0}\frac{1}{\beta^{\frac{\varepsilon-1}{k}}}\frac{\partial^2}{\partial f\partial a}fa_D^{\varepsilon-1}(f)\,a^{1-\varepsilon} < 0$, so that when β is sufficiently small, the derivative of

nominal domestic profits (which is equal to $\frac{\partial}{\partial f} f a_D^{\varepsilon-1}(f) a^{1-\varepsilon} - 1$) is decreasing in (a, f), and the same properties hold for the first-order condition of real domestic profits and the first-order condition of real total profits. Thus, for every $a \in \left(0, \frac{1}{b}\right)$, there exists β small enough so that when the solution is interior, the first-order condition is also sufficient, and the curves are locally downward-sloping. Furthermore, $f_{DX}(a) = \underline{f}$ (resp. $f_D(a) = \underline{f}$) if and only if $\frac{\partial}{\partial f} \frac{\pi_D(a,\underline{f})+\pi_X(a,\underline{f})}{P_T(\underline{f})} \leq 0$ (resp. $\frac{\partial}{\partial f} \frac{\pi_D(a,\underline{f})}{P_T(\underline{f})} \leq 0$) and $f_{DX}(a) = \overline{f}$ (resp. $f_D(a) = \overline{f}$) if and only if $\frac{\partial}{\partial f} \frac{\pi_D(a,\overline{f})+\pi_X(a,\overline{f})}{P_T(\overline{f})} \geq 0$ (resp. $\frac{\partial}{\partial f} \frac{\pi_D(a,\overline{f})+\pi_X(a,\overline{f})}{P_T(\overline{f})} \geq 0$). Therefore, for the curve $f_{DX}(.)$ (resp. $f_D(.)$), the solutions are interior on a compact set. Thus, there exists β^{pref}, such that for any $\beta < \beta^{pref}$, the curves $f_D(.)$ and $f_{DX}(.)$ are well-defined, continuous, continuously differentiable, and downward-sloping.

The profit-maximizing level of f is decreasing in a for firms that always, as well as never, export. To complete the proof, it remains to show that the endogenous export market entry decision does not alter the result that the Preference Curve is decreasing. The curve $a_X(f)$ is continuous and upward sloping, and the curves $f_D(a)$ and $f_{DX}(a)$ are continuous and downward-sloping and therefore each one intersects with $a_X(f)$ only once.[25] Let's denote such intersections $\underline{a}$ and $\bar{a}$ respectively (see Appendix Figure A1). For every $a \geq \bar{a}$, $a \geq a_X(f_{DX}(a))$, so that a does not export under regime $f_{DX}(a)$ and therefore the Preference Curve is defined by $f_T(a) = f_D(a)$. Similarly, for every $a \leq \underline{a}$, $f_T(a) = f_{DX}(a)$.

We now have to compare $\underline{a}$ and $\bar{a}$. First, suppose that $\underline{a} > \bar{a}$, and consider an entrepreneur with $a \in (\bar{a}; \underline{a})$. Any firm with $a > \bar{a}$ does not export under regime $f_{DX}(a)$ and hence prefers $f_D(a)$ to $f_{DX}(a)$. However, since $a < \underline{a}$, firm a exports under regime $f_D(a)$, which implies that a prefers $f_{DX}(a)$ to $f_D(a)$. Since $f_D(a) \neq f_{DX}(a)$, this is a contradiction, ruling out the possibility that $f_D(a)$ cuts $a_X(f)$ at a point above the intersection of $a_X(f)$ and $f_{DX}(a)$. It must be the case that $\underline{a} \leq \bar{a}$, as depicted in Appendix Figure A1.

When $\underline{a} < \bar{a}$, for every $a \in (\underline{a}; \bar{a})$ increasing $a_X(f)$ implies that $f_{DX}(a) \geq f_{DX}(\underline{a}) \geq f_D(\bar{a}) \geq f_D(a)$. Having shown above that for all $a > \bar{a}$, the firm prefers not to export – $f_T(a) = f_D(a)$ – and that for all $a < \underline{a}$, the firm prefers to export – $f_T(a) = f_{DX}(a)$, it remains to prove that in the interval $a \in (\underline{a}; \bar{a})$ firms' preferences between f_{DX} and f_D switch only once as we increase a.[26] A firm with marginal cost a prefers f_{DX} to f_D if and only if $\frac{\pi_D(a,f_{DX}(a))+\pi_X(a,f_{DX}(a))}{P_T(f_{DX}(a))} - \frac{\pi_D(a,f_D(a))}{P_T(f_D(a))} > 0$. Applying the envelope theorem to this difference, the following inequality holds:

$\frac{d}{da}\left[\frac{\pi_D(a,f_{DX}(a))+\pi_X(a,f_{DX}(a))}{P_T(f_{DX}(a))} - \frac{\pi_D(a,f_D(a))}{P_T(f_D(a))}\right] =$

[25] Since $a_X(f)$ is increasing in f, its inverse $a_X^{-1}(a)$ is also increasing in a.

[26] If this were not the case, the Preference Curve would be non-monotonic in this interval.

$\frac{\partial}{\partial a}\left[\frac{\pi_D(a,f_{DX}(a))+\pi_X(a,f_{DX}(a))}{P_T(f_{DX}(a))}-\frac{\pi_D(a,f_D(a))}{P_T(f_D(a))}\right]<\frac{\partial}{\partial a}\left[\frac{\pi_D(a,f_{DX}(a))}{P_T(f_{DX}(a))}-\frac{\pi_D(a,f_D(a))}{P_T(f_D(a))}\right]<0.$

The left-most inequality follows from the fact that $\frac{\partial}{\partial a}\left[\frac{\pi_X(a,f_{DX}(a))}{P_T(f_{DX}(a))}\right]$ is negative. The right-most inequality follows because real domestic profits $\frac{\pi_D(a,f)}{P_T(f)}$ have a negative cross-partial derivative in a and f (for β small enough) and $f_{DX}(a) \geq f_D(a)$. Thus, the inequality above implies that if for some $a \in (\underline{a}; \bar{a})$, entrepreneur a prefers $f_{DX}(a)$ to $f_D(a)$, then all entrepreneurs with $a' < a$ also prefer $f_{DX}(a')$ to $f_D(a')$. Define a^* to be the marginal cost of the firm that is indifferent between its profits under f_{DX} and f_D:

$$a^* = \sup\left\{a \in (\underline{a}; \bar{a}),\ \frac{\pi_D(a,f_{DX}(a))+\pi_X(a,f_{DX}(a))}{P_T(f_{DX}(a))} \geq \frac{\pi_D(a,f_D(a))}{P_T(f_D(a))}\right\}. \tag{A.8}$$

In the interval $[\bar{a}; \underline{a}]$, the Preference Curve is defined by $f_T(a) = f_{DX}(a)$ for $a < a^*$ and $f_T(a) = f_D(a)$ otherwise. Note that $f_{DX}(a^*) \geq f_D(a^*)$ so that the Preference Curve is globally decreasing. Finally, when $\underline{a} = \bar{a}$, the Preference Curve is continuous in a and defined by $f_T(a) = f_{DX}(a)$ for $a \leq \underline{a}$, and $f_T(a) = f_D(a)$ otherwise. In this case, the Preference Curve is continuous.

To summarize, we have shown that the Preference Curve is well-defined, downward-sloping and there exists $a^* \in \left(0, a_D\left(\underline{f}\right)\right)$, such that the Preference Curve is continuous and continuously differentiable over $(0, a^*)$ and $\left(a^*, a_D\left(\underline{f}\right)\right)$. By convention, we set $f_T(a) = \underline{f}$ for $a > a_D\left(\underline{f}\right)$ so that the properties of the Preference Curve extend to $\left(0, \frac{1}{b}\right)$.■

Proof of Proposition 2:

Before proving Proposition 2, we state and prove two useful lemmas. Lemma 2 establishes a one-to-one mapping between the pivotal voter as traditionally defined by her wealth level, and the pivotal voter defined by her productivity level. Lemma 3 is the cornerstone of the proof of the proposition.

Lemma 2 *The pivotal voter defined in terms of marginal cost $p_r(f)$ by* (16) *corresponds uniquely to the pivotal voter defined in terms of wealth by* (12).■

Proof of Lemma 2: Since non-producers have zero wealth, they have no votes, and $w_r(p_r(f), f) > 0$ for every $f \in \left[\underline{f}, \overline{f}\right]$. When $w(a, f) > 0$, there is a monotonically decreasing mapping between wealth and marginal cost a. Thus, the pivotal voter is equivalently defined by either her wealth or her productivity level.■

Lemma 3 *Let $u(a)$ be a positive function of a, and $v(a)$ a decreasing one, such that $\int u(a)\, v(a)\, da$, $\int u(a)\, da$, and $\int v(a)\, da$ are well defined. If for some $p \in (0, +\infty)$*

$$\int_0^p u(a)\, da = \int_p^{+\infty} u(a)\, da, \tag{A.9}$$

then

$$\int_0^p u(a)\, v(a)\, da > \int_p^{+\infty} u(a)\, v(a)\, da. \blacksquare \tag{A.10}$$

Proof of Lemma 3: Since $v(.)$ is decreasing and $u(.)$ is positive:
$\int_0^p u(a)\, v(a)\, da > v(p) \int_0^p u(a)\, da$ and $\int_p^\infty u(a)\, v(a)\, da < v(p) \int_p^\infty u(a)\, da$.
Equation (A.9) gives $v(p) \int_0^p u(a)\, da = v(p) \int_p^{+\infty} u(a)\, da$. Combining these two observations,
$\int_p^\infty u(a)\, v(a)\, da < v(p) \int_p^{+\infty} u(a)\, da = v(p) \int_0^p u(a)\, da < \int_0^p u(a)\, v(a)\, da. \blacksquare$

Turning to the proof of Proposition 2, the Political Curve is decreasing if for any $f_h > f_l$, $p_r(f_h) < p_r(f_l)$. Since by definition $p_r(f_l)$ is given implicitly by

$$\int_0^{p_r(f_l)} \lambda(w_r(a, f_l))\, dG(a) = \int_{p_r(f_l)}^{1/b} \lambda(w_r(a, f_l))\, dG(a),$$

$p_r(f_h) < p_r(f_l)$ if and only if under the wealth distribution induced by f_h, $p_r(f_l)$ is no longer the pivotal voter and moreover,

$$\int_0^{p_r(f_l)} \lambda(w_r(a, f_h))\, dG(a) > \int_{p_r(f_l)}^{1/b} \lambda(w_r(a, f_h))\, dG(a).$$

Dividing and multiplying both sides of this expression by $\lambda(w_r(a, f_l))$, it becomes:

$$\int_0^{p_r(f_l)} \frac{\lambda(w_r(a, f_h))}{\lambda(w_r(a, f_l))} \lambda(w_r(a, f_l))\, dG(a) > \int_{p_r(f_l)}^{1/b} \frac{\lambda(w_r(a, f_h))}{\lambda(w_r(a, f_l))} \lambda(w_r(a, f_l))\, dG(a).$$

By Lemma 3, with $u(a)\, da = \lambda(w_r(a, f_l))\, dG(a)$ and $v(a) = \frac{\lambda(w_r(a,f_h))}{\lambda(w_r(a,f_l))}$, this condition is satisfied as long as $v(a)$ is decreasing for any $f_h > f_l$. Thus, all we have to do is verify that under autarky and trade the function $v(.)$ is decreasing in a when $\lambda(w) = w^\lambda$. In this case, a necessary and sufficient condition for $v(.)$ to be decreasing is that the wealth ratio $w_r(a, f_h)/w_r(a, f_l)$ is itself decreasing for any $f_h > f_l$. Under both autarky and trade, we proceed directly by differentiating this wealth ratio with respect to a and signing the derivative.

Autarky: The wealth ratio is $\frac{f_h}{f_l} \frac{a_A^{\varepsilon-1}(f_h) a^{1-\varepsilon} - 1}{a_A^{\varepsilon-1}(f_l) a^{1-\varepsilon} - 1}$. This ratio is decreasing if and only if $a_A(f_l) - a_A(f_h) > 0$, which is true for any $f_h > f_l$.

Trade (I): When an entrepreneur with marginal cost a does not export under either f_l or f_h, the wealth ratio is $\frac{f_h}{f_l} \frac{a_D^{\varepsilon-1}(f_h) a^{1-\varepsilon} - 1}{a_D^{\varepsilon-1}(f_l) a^{1-\varepsilon} - 1}$. It is decreasing if and only if $a_D(f_l) - a_D(f_h) > 0$, which is true for any $f_h > f_l$.

Trade (II): When an entrepreneur with marginal cost a exports only under f_h, the wealth ratio is $\frac{f_h}{f_l} \frac{a_D^{\varepsilon-1}(f_h) a^{1-\varepsilon} - 1 + \frac{f_X}{f_h} a_X^{\varepsilon-1}(f) a^{1-\varepsilon} - \frac{f_X}{f_h}}{a_D^{\varepsilon-1}(f_l) a^{1-\varepsilon} - 1}$. Then a necessary and sufficient condition

for the wealth ratio to be decreasing is that
$a_D^{\varepsilon-1}(f_l) - a_D^{\varepsilon-1}(f_h) + \frac{f_X}{f_h}\left[a_D^{\varepsilon-1}(f_l) - a_X^{\varepsilon-1}(f_h)\right] > 0$.
Since $a_D(f_l) > a_D(f_h) > a_X(f_h)$ for any $f_h > f_l$, this is always true.

Trade (III): When an entrepreneur with marginal cost a exports under f_l, she also exports under f_h. Thus, the wealth ratio is defined by $\frac{f_h a_D^{\varepsilon-1}(f_h) a^{1-\varepsilon} - f_h + f_X a_X^{\varepsilon-1}(f_h) a^{1-\varepsilon} - f_X}{f_l a_D^{\varepsilon-1}(f_l) a^{1-\varepsilon} - f_l + f_X a_X^{\varepsilon-1}(f_l) a^{1-\varepsilon} - f_X}$. Differentiating with respect to a and rearranging, the condition for the wealth ratio to be decreasing in a is
$\frac{f_h a_D^{\varepsilon-1}(f_h) + f_X a_X^{\varepsilon-1}(f_h)}{f_h a_D^{\varepsilon-1}(f_h) a^{1-\varepsilon} - f_h + f_X a_X^{\varepsilon-1}(f_h) a^{1-\varepsilon} - f_X} > \frac{f_l a_D^{\varepsilon-1}(f_l) + f_X a_X^{\varepsilon-1}(f_l)}{f_l a_D^{\varepsilon-1}(f_l) a^{1-\varepsilon} - f_l + f_X a_X^{\varepsilon-1}(f_l) a^{1-\varepsilon} - f_X}$.
A sufficient (and necessary) condition for such inequality to hold for all $f_h > f_l$ is that the function $\frac{f a_D^{\varepsilon-1}(f) + f_X a_X^{\varepsilon-1}(f)}{f a_D^{\varepsilon-1}(f) a^{1-\varepsilon} - f + f_X a_X^{\varepsilon-1}(f) a^{1-\varepsilon} - f_X}$ is increasing in f. By taking the derivative with respect to f and rearranging, the necessary and sufficient condition for this to hold is:
$a_D^{\varepsilon-1}(f)\left\{f - (f + f_X)\left[1 + (\varepsilon-1)\frac{a_D'(f)}{a_D(f)}\right]\right\} + f_X a_X^{\varepsilon-1}(f)\left\{1 - (\varepsilon-1)(f + f_X)\frac{a_X'(f)}{a_X(f)}\right\} > 0$
The sufficient conditions for the above inequality to hold are:
(i) $a_D^{\varepsilon-1}(f)\left\{f - (f + f_X)\left[1 + (\varepsilon-1)\frac{a_D'(f)}{a_D(f)}\right]\right\} > 0$;
and (ii) $(\varepsilon-1)(f + f_X)\frac{a_X'(f)}{a_X(f)} < 1$.
Computing the explicit value of $\frac{a_D'(f)}{a_D(f)}$ and rearranging, (i) reduces to:
$\left(1 + \frac{f}{f_X}\right)\frac{\varepsilon-1}{k} + \frac{f}{f_X}\frac{\mathsf{C} f^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}{\mathsf{B}} > 1$. Plugging the expressions for B and C, condition (i) becomes
$\left(1 + \frac{f}{f_X} + \frac{k}{\varepsilon-1}\left(\frac{f}{f_X}\right)^{\frac{k}{\varepsilon-1}} \frac{\frac{n^N}{n^S}\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}} + \frac{1}{\tau^k}\left(1 + \frac{\beta}{\varepsilon}\frac{\varepsilon-1}{k}\right)}{\left(1 - \frac{\beta}{\varepsilon}\frac{\varepsilon-1}{k}\right)\tau^k\left(\frac{f_X}{f^N}\right)^{\frac{k-(\varepsilon-1)}{\varepsilon-1}} + \frac{n^S}{n^N}}\right)\frac{\varepsilon-1}{k} \geq 1.$
The expression on the left-hand side is increasing in β, so that if this condition is satisfied for $\beta = 0$, it holds for any $\beta \in [0,1]$. Similarly, it is increasing in f, and thus if it is satisfied for $f = \underline{f}$, it holds for any $f \in [\underline{f}, \overline{f}]$. Setting $\beta = 0$, $f = \underline{f}$, and rearranging leads to (17) in the statement of the proposition:
$\left(1 + \frac{\underline{f}}{f_X}\right)\frac{\varepsilon-1}{k} + \left(\frac{\underline{f}}{f_X}\right)^{\frac{k}{\varepsilon-1}}\frac{1}{\tau^k}\frac{n^N}{n^S} \geq 1.$
Furthermore, when β is sufficiently small, $a_X'(f)/a_X(f)$ goes to zero uniformly with respect to f, so that (ii) eventually holds for every f and a sufficiently small value of β. Therefore, the proposition holds for the exporting firms if $\left(1 + \frac{\underline{f}}{f_X}\right)\frac{\varepsilon-1}{k} + \left(\frac{\underline{f}}{f_X}\right)^{\frac{k}{\varepsilon-1}}\frac{1}{\tau^k}\frac{n^N}{n^S} \geq 1$ and β is small enough.■

Proof of Proposition 3:

Existence: If $p_r(\overline{f}) \leq f_r^{(-1)}(\overline{f})$, then $(\overline{f}, p_r(\overline{f}))$ is one such point (left curve in Figure 2). Symmetrically, if $p_r(\underline{f}) \geq f_r^{(-1)}(\underline{f})$, then $(\underline{f}, p_r(\underline{f}))$ is one such point (right curve in Figure 2). Otherwise, it is the case that $p_r(\overline{f}) > f_r^{(-1)}(\overline{f})$ and $p_r(\underline{f}) < f_r^{(-1)}(\underline{f})$. We know that the Political Curve is continuous, while the Preference Curve is continuous (in autarky) and piecewise continuous (under the trade regime). Thus, continuity in autarky implies that the Political and Preference Curves intersect at some $(f, p_A(f))$ (middle curve in Figure 2). Under trade, consider an entrepreneur with productivity a^* as defined by $(A.8)$. The Preference Curve is continuous over $\left(0, \frac{1}{b}\right)$ except in a^*. Nevertheless, if $a^* < p_T[f_D(a^*)]$, then continuity of $f_D(a)$ implies that the two curves intersect in some $f \in \left[\underline{f}, f_D(a^*)\right]$. Similarly, if $a^* > p_T[f_{DX}(a^*)]$, then continuity of $f_{DX}(a)$ implies that the two curves intersect in some $f \in \left[f_{DX}(a^*), \overline{f}\right]$. Note that if $a^* \in [p_T(f_{DX}(a^*)), p_T(f_D(a^*))]$, then there exist at least two equilibria.

Stability: We prove stability by first stating two lemmas, one that rules out cycling equilibria, and another that shows corner solution equilibria to be stable.

Lemma 4 ***(no cycling):*** *The function $\Phi_r(.)$ is increasing so that for any $f \in \left[\underline{f}, \overline{f}\right]$, the sequence $\{\Phi_r^n(f)\}_{n\geq 1}$ is monotonic.*■

Proof of Lemma 4: $f_r(.)$ and $p_r(.)$ are both decreasing functions, so that $\Phi_r(.)$ is increasing.■

The previous lemma shows that there cannot be cycling. The sequence $\{\Phi_r^n(f)\}_{n\geq 1}$ is monotonic and as we imposed that f is bounded above (and f is bounded below), the sequence converges. Either it converges to an interior solution, and such solution is stable, or it converges to the boundaries. The latter case is addressed below:

Lemma 5 ***(corner solutions):*** *If the Political Curve intersects the Preference Curve in either $\underline{f}$ or $\overline{f}$, then the resulting equilibrium is stable.*■

Proof of Lemma 5: Let's consider $\left(\overline{f}, \tilde{p}\right)$ such an intersection point. Define by $p_r^{(-1)}(p)$ the entry barrier level that yields p as the pivotal voter. We know that there exists a firm preferring $\overline{f}$, $f_r^{(-1)}\left(\overline{f}\right)$, such that $p_r^{(-1)}\left[f_r^{(-1)}\left(\overline{f}\right)\right] < \overline{f}$. This is because the function $f_r(p)$ is horizontal at $\overline{f}$: there are multiple values of p such that $f_r(p) = \overline{f}$. Since the Preference and Political Curves intersect at $\left(\overline{f}, \tilde{p}\right)$, there exist values of p close enough to, and above, $\tilde{p}$, such that $f_r(p) = \overline{f}$ and $p_r^{(-1)}(p) < \overline{f}$. Hence, set $\rho = \frac{1}{2}\left|\overline{f} - p_r^{(-1)}\left[f_r^{(-1)}\left(\overline{f}\right)\right]\right|$, and take any $\tilde{f} \in \left(\overline{f} - \rho; \overline{f}\right)$. Since $\tilde{f} > p_r^{(-1)}\left[f_r^{(-1)}\left(\overline{f}\right)\right]$, it follows that $p_r\left(\tilde{f}\right) < f_r^{(-1)}\left(\overline{f}\right)$, and $f_r\left[p_r\left(\tilde{f}\right)\right] = \overline{f}$. Convergence to $\left(\overline{f}, \tilde{p}\right)$ occurs after the first iteration: $\Phi\left(\tilde{f}\right) = \overline{f}$. The same argument holds for an intersection of the type $\left(\underline{f}, p_r\left(\underline{f}\right)\right)$.■

Coming back to the proof of the main proposition, if there exists a corner-solution equilibrium, Lemma 5 shows that it is stable. If a corner-solution equilibrium does not exist, the equilibrium must be interior, and Lemma 4 shows that it is not a cycling one. An equilibrium is stable if and only if the Political Curve crosses the Preference Curve from above. Consider the autarky and trade cases separately.

Autarky: If there are two intersections, then, by continuity, one is a stable equilibrium. Suppose now that there is only one intersection $(f, p_A(f))$, with $f \in (\underline{f}, \overline{f})$. The absence of corner solutions implies that $p_A(\overline{f}) > f_A^{(-1)}(\overline{f})$ and $p_A(\underline{f}) < f_A^{(-1)}(\underline{f})$. Because the Preference Curve is downward-sloping, $f_A^{(-1)}(\overline{f}) < f_A^{(-1)}(\underline{f})$. This implies that $\overline{f} > f_A(p_A(\overline{f}))$ and $\underline{f} < f_A(p_A(\underline{f}))$, so that the Political Curve cuts the Preference Curve from above.

Trade: The difference with the autarky case is that the Preference Curve exhibits a discontinuity in a^* defined by $(A.8)$. Nevertheless, the problem is identical to the autarky one for each of the segments $(0, a^*)$ and $\left(a^*, \frac{1}{b}\right)$. Similarly to the argument for existence above, if $a^* > p_T[f_{DX}(a^*)]$, then $\overline{f} > f_T(p_T(\overline{f}))$ and $f_{DX}(a^*) < f_T(p_T(f_{DX}(a^*)))$, so that the Political Curve cuts the Preference Curve from above on segment $(0, a^*)$. Symmetrically, if $a^* < p_T[f_D(a^*)]$, then we have $\underline{f} < f_T(p_T(\underline{f}))$ and $f_D(a^*) > f_T(p_T(f_D(a^*)))$ so that the Political Curve cuts the Preference Curve from above on segment $\left(a^*, \frac{1}{b}\right)$. Similarly to the existence result, if $a^* \in [p_T[f_{DX}(a^*)], p_T[f_D(a^*)]]$, then there exist at least two stable equilibria.

The proof of this proposition also reveals why we chose to constrain the range of feasible fixed costs to a bounded interval $[\underline{f}, \overline{f}]$. The upper bound $\overline{f}$ must be finite to ensure at that there is at least one non-degenerate equilibrium. Otherwise, it would be possible for both Political and Preference curves to diverge around 0: the entrepreneur with $a = 0$ prefers an infinite barrier entry level, and with an infinite barrier entry level, only the most productive entrepreneur can produce, and the pivotal voter then converges to $a = 0$. The restriction then allows us to abstract from considering such a degenerate solution. As discussed in the main text, $\underline{f}$ must be bounded from below to ensure that the model is well-behaved.■

Proof of Proposition 4:

To prove the proposition, we follow the same argument as in Proposition 2 and apply Lemma 3. The autarky pivotal voter is defined by

$\int_0^{p_A} \lambda(w_A(a, f))\, dG(a) = \int_{p_A}^{1/b} \lambda(w_A(a, f))\, dG(a)$.

The proposition holds, $p_T < p_A$, as long as

$\int_0^{p_A} \lambda(w_T(a, f))\, dG(a) > \int_{p_A}^{1/b} \lambda(w_T(a, f))\, dG(a)$, which is the same as

$\int_0^{p_A} \frac{\lambda(w_T(a,f))}{\lambda(w_A(a,f))} \lambda(w_A(a, f))\, dG(a) > \int_{p_A}^{1/b} \frac{\lambda(w_T(a,f))}{\lambda(w_A(a,f))} \lambda(w_A(a, f))\, dG(a)$.

Thus, we now simply apply Lemma 3, with $u(a)da = \lambda(w_A(a, f))\, dG(a)$, and $v(a) = \frac{\lambda(w_T(a,f))}{\lambda(w_A(a,f))}$. When $\lambda(w) = w^{\lambda}$, all that is left to show is that the wealth ratio $\frac{w_T(a,f)}{w_A(a,f)}$ is decreasing. If a firm with marginal cost a does not export under trade, $\frac{w_T(a,f)}{w_A(a,f)} =$

$\frac{a_D^{\varepsilon-1}a^{1-\varepsilon}-1}{a_A^{\varepsilon-1}a^{1-\varepsilon}-1}$. Differentiating this wealth ratio with respect to a, it is straightforward to establish that $v(.)$ is decreasing as long as $a_A > a_D$. For an exporting firm, $\frac{w_T(a,f)}{w_A(a,f)} = \frac{a_D^{\varepsilon-1}a^{1-\varepsilon}-1+\frac{f_X}{f}a_X^{\varepsilon-1}a^{1-\varepsilon}-\frac{f_X}{f}}{a_A^{\varepsilon-1}a^{1-\varepsilon}-1}$. Differentiating with respect to a, $v(a)$ is decreasing as long as $\left(a_A^{\varepsilon-1}-a_D^{\varepsilon-1}\right)+\frac{f_X}{f}\left(a_A^{\varepsilon-1}-a_X^{\varepsilon-1}\right)>0$. Since $a_X < a_D$ by assumption, this condition is once again satisfied as long as $a_A > a_D$. This condition is familiar, as it is simply the Melitz effect, and it holds as long as the conditions in Lemma 1 are satisfied.■

Proof of Proposition 5:

The Preference Curve is defined in autarky by $f_A(a) = \arg\max_f \left\{\frac{\pi_A(a,f)}{P_A(f)}\right\}$, and under trade by $f_T(a) = \arg\max_f \left\{\frac{\pi_D(a,f)+\pi_X(a,f)}{P_T(f)}\right\}$. The value of f affects (i) domestic profits ($\pi_A(a,f)$ or $\pi_D(a,f)$); (ii) export profits $\pi_X(a,f)$; and (iii) the price levels ($P_A(f)$ or $P_T(f)$). The proof of Proposition 1 establishes that the general equilibrium effects of f on (ii) and (iii) become arbitrarily small for small β. Thus, we can restrict attention to the comparison of the values of f that maximize nominal domestic profits: $\tilde{f}_A(a) = \arg\max_f\{\pi_A(a,f)\}$ and $\tilde{f}_T(a) = \arg\max_f\{\pi_D(a,f)\}$, since $\left|\tilde{f}_A(a) - f_A(a)\right|$ and $\left|\tilde{f}_T(a) - f_T(a)\right|$ go to zero as β becomes small.

Direct calculation gives $\tilde{f}_A(a) = \Gamma\left(\frac{k-(\varepsilon-1)}{k}\right)^{\frac{k}{\varepsilon-1}} a^{-k}$, and $\tilde{f}_T(a) = \frac{\mathsf{A}}{\mathsf{B}+\mathsf{C}\left[\tilde{f}_T(a)\right]^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\left(\frac{\mathsf{B}}{\mathsf{B}+\mathsf{C}\left[\tilde{f}_T(a)\right]^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\right)^{\frac{k}{\varepsilon-1}}\left(\frac{k-(\varepsilon-1)}{k}\right)^{\frac{k}{\varepsilon-1}} a^{-k}$. It is immediate that $\tilde{f}_T(a) < \tilde{f}_A(a)$ if and only if $\frac{\mathsf{A}}{\mathsf{B}+\mathsf{C}\left[\tilde{f}_T(a)\right]^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\left(\frac{\mathsf{B}}{\mathsf{B}+\mathsf{C}\left[\tilde{f}_T(a)\right]^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}}\right)^{\frac{k}{\varepsilon-1}} < \Gamma$. A sufficient condition for this to hold is that $\frac{\mathsf{A}}{\mathsf{B}+\mathsf{C}\left[\tilde{f}_T(a)\right]^{\frac{k-(\varepsilon-1)}{\varepsilon-1}}} < \Gamma$, which is the same as the Melitz effect in Lemma 1.■

Proof of Proposition 6:

Let $f_T^{(-1)}(f_A)$ be the firm which prefers f_A under the trade regime. Since $f_T^{(-1)}(f_A) > p_T(f_A)$, and $f_T(.)$ is decreasing, we know that $f_A < f_T[p_T(f_A)] = \Phi_T(f_A)$. Applying $\Phi_T(.)$ sequentially, for any $n > 1$,

$$f_A < \Phi_T(f_A) < \Phi_T^2(f_A) < ... < \Phi_T^n(f_A).$$

Taking the limit, and defining $f_T = \lim_{n\to\infty}\Phi_T^n[f_A]$, f_A belongs to the basin of attraction of (f_T, p_T) and the inequality above implies that $f_A < f_T$.■

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Figure 1: Profits in Autarky and under Trade

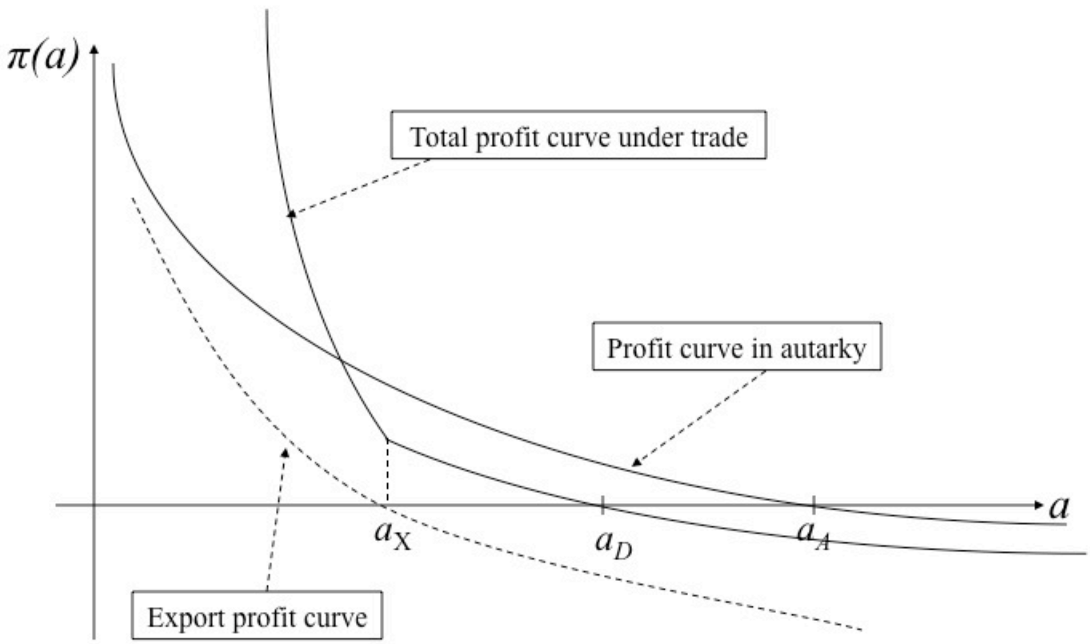


Figure 2: The Preference Curve, the Political Curve, and Possible Equilibria

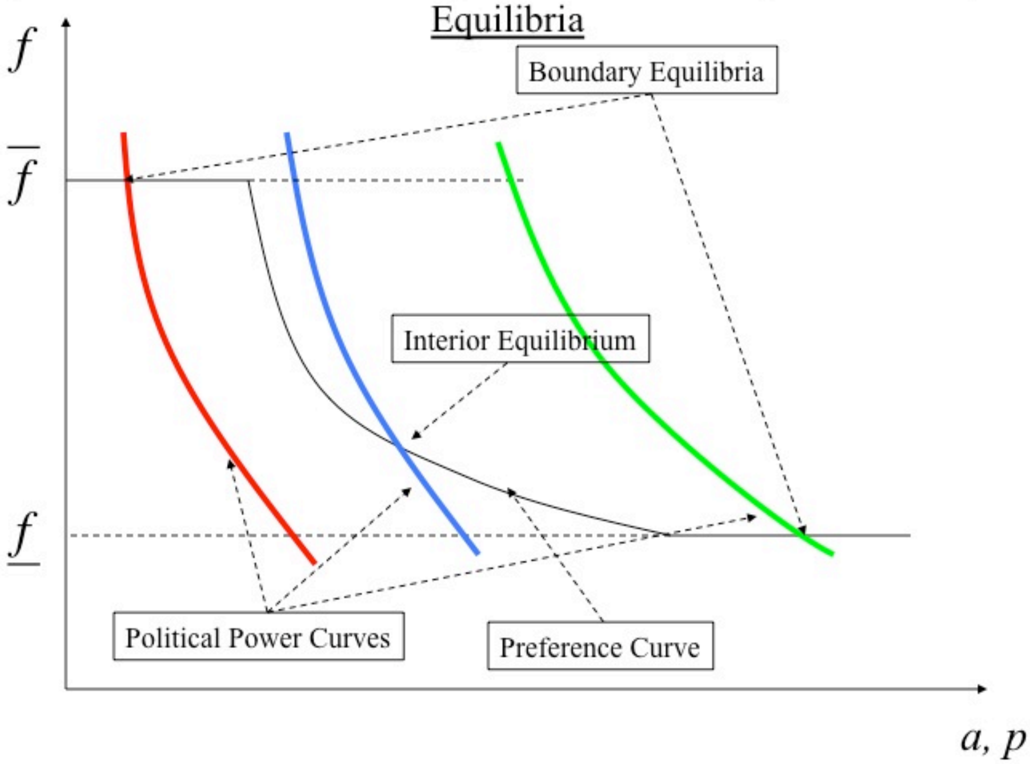


Figure 3: Profits as a Function of Marginal Cost for Two Different Values of *f*

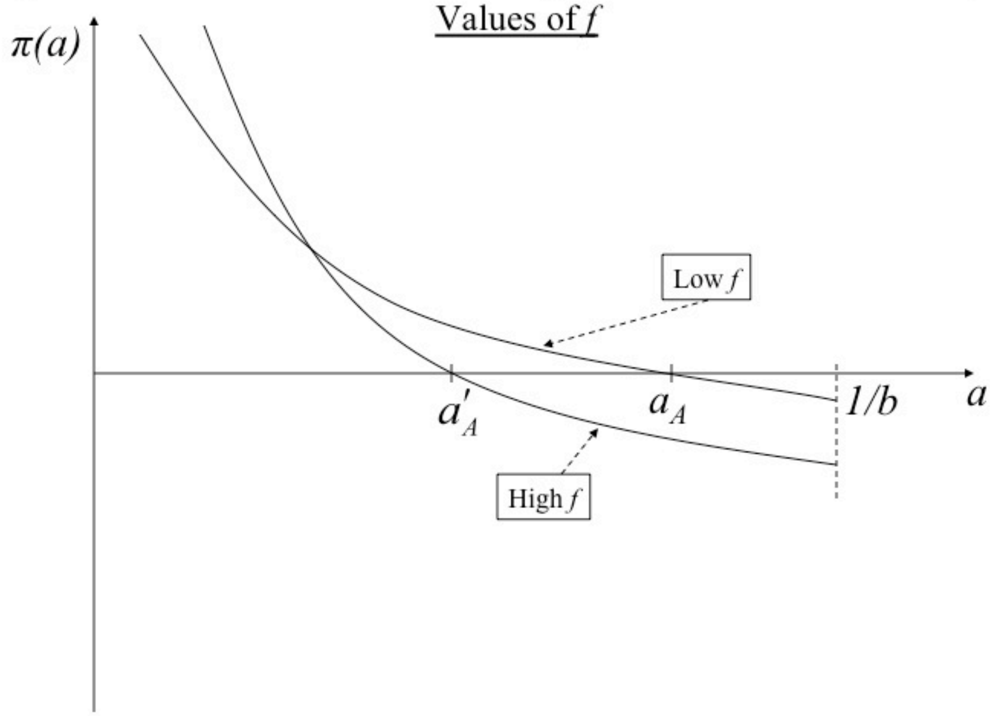


Figure 4: Comparing Institutions in Autarky and Trade

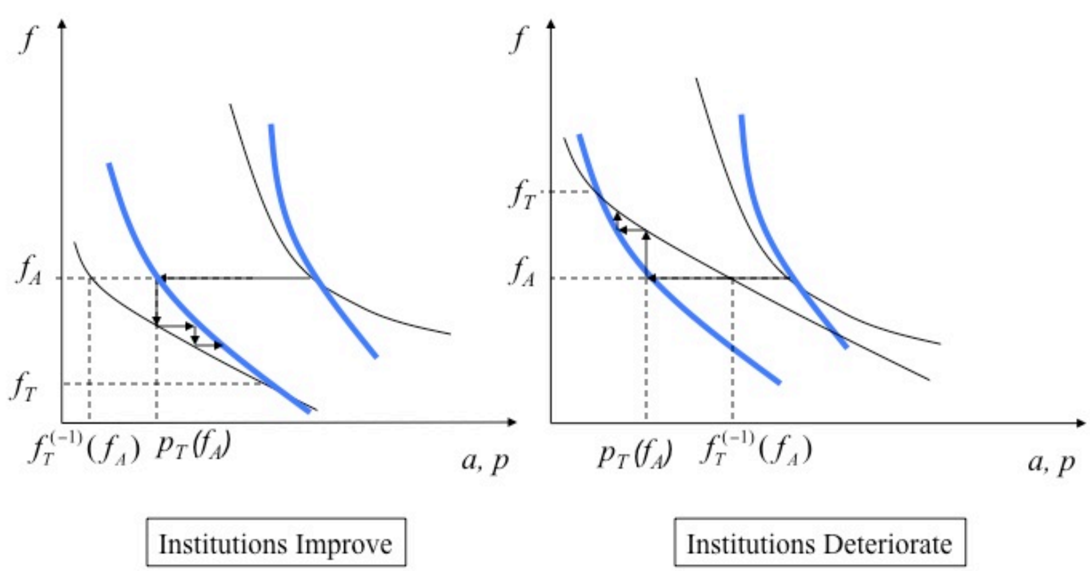
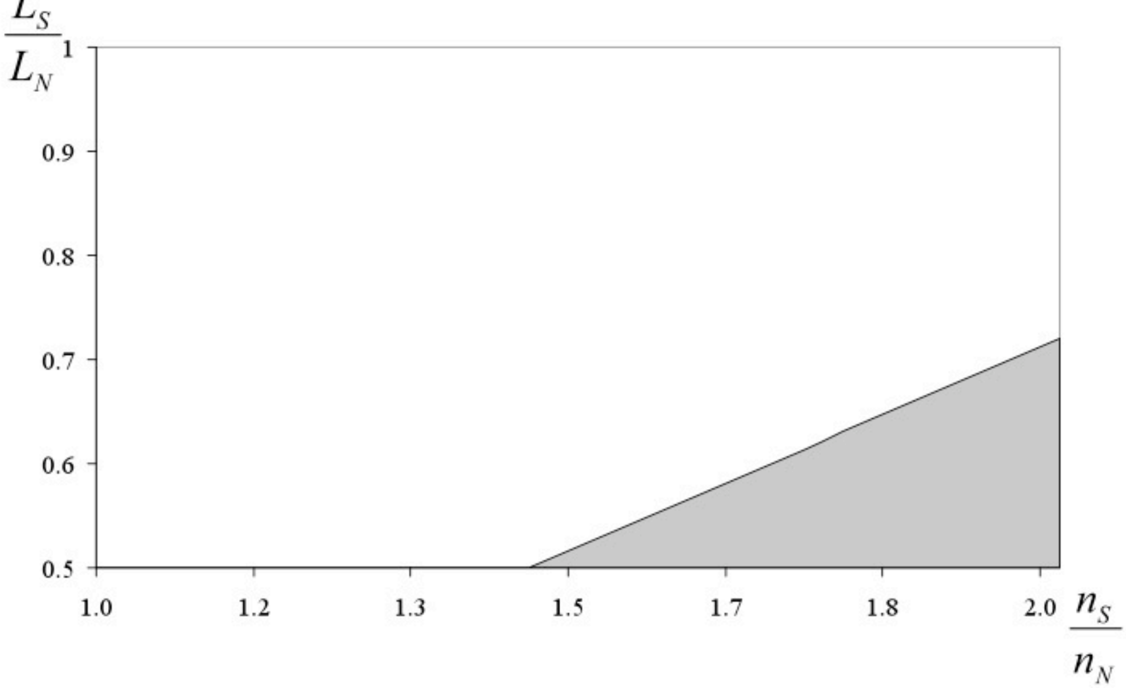


Figure 5: Ranges of Parameter Values Such that Institutions Deteriorate under Trade



Appendix Figure A1: Preference Curve under Trade