Trade Liberalization and Organizational Choice*

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Abstract

We embed a simple incomplete-contracts model of organization design in a standard two-country, perfectly-competitive trade model to examine how the liberalization of product and factor markets affects the ownership structure of firms. In our model, managers decide whether or not to integrate their firms, trading off the pecuniary benefits of coordinating production decisions with the private benefits of operating in their preferred ways. The price of output is a crucial determinant of this choice, since it affects the size of the pecuniary benefits. In particular, non-integration is chosen at “low” and “high” prices, while integration occurs only at moderate prices. Organizational choices also depend on the terms of trade in supplier markets, which affect the division of surplus between managers. We obtain three main results. First, joint product and factor market integration leads to the convergence of organization design across countries. Second, even in the absence of factor movements, the price changes triggered by liberalization of product markets can lead to significant organizational restructuring within countries. Third, the removal of barriers to factor mobility can induce further organizational changes, sometimes adversely affecting consumers, which suggests a potential complementarity between trade policy and corporate governance policy.

JEL classifications: D23, F13, F23.

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1 Introduction

Recent decades have witnessed drastic reductions in barriers to commodity trade and factor mobility around the world. Whether the result of liberalization policies—exemplified by the creation of more than three hundred regional trade agreements and by successive rounds of multilateral trade negotiations—or falling transport costs, the transformation of economic life has been dramatic. In particular, there is evidence that falling barriers in product and factor markets have contributed significantly to widespread organizational restructuring such as mergers and outsourcing.¹ Yet the mechanisms by which trade liberalization can be a determinant of organizational change are not well understood, and the effect of such restructuring on prices, quantities, and welfare remains understudied.

In this paper, we embed a simple model of organization design in a two-country perfectly competitive trade model to examine the impact of trade liberalization on the ownership structure of firms.² We describe a setting in which trade is the result of differences in factor endowments between countries, where the factors of production are supplier firms run by managers. Our analysis of organizational choices builds on the literature pioneered Grossman and Hart (1986) and Hart and Moore (1990), who identify a firm’s boundaries with the extent of decision rights over assets and/or operational decisions. In line with this literature, we view organizational choices as being driven by trade-offs between the usual pecuniary costs and benefits, such as profits, and private non contractable costs and benefits, such as managerial effort, working conditions, corporate culture, or leadership vision.

In our basic model of organization design, production requires the cooperation of two types of suppliers, which can either be integrated or engage in arm’s-length relations (non-integration). As in some recent models of firm boundaries, in particular Hart and Holmström (2002), the production technology essentially involves the adoption of standards. Output is highest when the two suppliers coordinate, i.e., take similar decisions. However, managers have opposing preferences about the direction they ought to go, and find it costly to accommodate the other’s approach. Under non-integration, managers make their decisions separately, and this may lead to inefficient production. Integration solves this problem by bringing in an additional party, called headquarters (HQ), which is motivated by monetary compensation to maximize the enterprise’s output and hence enforces common standards between suppliers. However, integration is also

¹For example, the restructuring of US automakers’ relations with their suppliers in the 1980s has been attributed largely to increased competition from Japanese imports and to some extent to the entry of foreign manufacturers into US supplier markets (see Dyer, 1996). Various studies have also found strong correlations between the creation of regional trade agreements and levels of M&A activities within as well as across member countries (e.g., Breinlich (2006) on the Canada-United States Free Trade Agreement; European Commission (1996) on the EU Single Market; Chudnovsky (2000) on the Mercosur customs union in Latin America). Other studies have stressed the impact of trade liberalization on the reallocation of resources across individual plants and firms (e.g., Pavcnik, 2002; Trefler, 2004).

²Throughout the paper, we will use the term “trade liberalization” to refer to both freer trade in goods and increased factor mobility.
costly, not simply because the decisions it imposes will be costly to the managers, but also because HQ’s relative lack of expertise or its own operating costs will reduce output.

In this setting, the price of output is a crucial determinant of firms’ organizational choices. In particular, non-integration is chosen at “low” and “high” prices: at low prices, managers do not value the increase in output brought by integration since they are not compensated sufficiently for the high costs they have to bear; at very high prices, managers value output so much that they are willing to concede in order to achieve coordination. Therefore vertical integration only occurs at intermediate prices. The ownership structure of firms will also be affected by the terms of trade in the supplier markets, which determine the division of surplus between managers. Relative to non-integration, integration is more flexible in its ability of to distribute surplus between suppliers, and will therefore tend to be adopted when the supplier market strongly favors one side or the other.

We first consider the effects of the removal of both barriers to commodity trade and factor mobility. Our analysis shows that the joint liberalization of product and factor markets leads to international convergence of organizational choices, i.e., a tendency of industries to be characterized by the same ownership structure across countries. We then consider the effects of the successive liberalization of product and factor markets and obtain two main results. First, even in the absence of factor mobility, freer trade triggers price changes that can lead to major organizational changes within countries. Second, the removal of barriers to factor mobility, following the liberalization of product markets, can lead to further restructuring by affecting the terms of trade in the supplier markets. We show that these organizational changes can adversely affect consumers, suggesting a potential complementarity between corporate governance policies and trade policies.

Our paper contributes to a recent literature which has examined firms’ organizational choices in a global economy. Most of this literature focuses on how organizational design can explain the observed patterns of trade in intermediate goods between countries. Much less attention has been devoted to how organizations respond to falling trade barriers in the markets for final goods. The paper that is most closely related to ours is Antras (2003), which embeds an incomplete-contracts model of organizational design in a standard two-country international trade model. However, there trade is costless and factor prices are equalized across countries from the outset, so there is no discussion of how firms’ boundaries are affected by the liberalization of product and factor markets, which is the focus of our analysis.\footnote{Antras (2003) is more concerned with location decisions of multinational firms and with intra-firms trade patterns. Other papers that have looked at organizational choices in an international context are Antras and Helpman (2004) and Grossman and Helpman (2004), who describe North/South models in which heterogeneous firms in the North choose their modes of organization and the location of their subsidiaries or suppliers. In these papers, organizational choices are not embedded in an international trade model, and there is no analysis of product and factor market integration. McLaren (2000) and Grossman and Helpman (2002) describe general equilibrium models of an industry in which “globalization” can affect the choice between integration and outsourcing through its effects on search costs.} Nor to our knowledge has the previous...
literature pointed out the potential negative effects on consumer welfare—even absent market power—of globalization-induced reorganization of production.

In the next section, we describe organizational choices in a closed economy. Section 3 extends the model to two countries and examines the effects of product and factor market integration on suppliers’ decision to vertically integrate or engage in arm’s-length relations. Section 4 looks at the effects of trade liberalizations on consumers’ welfare. Finally, Section 5 concludes discussing the empirical implications of our theoretical model.

2 The Model

We describe a standard specific-factor trade model between two countries, Home and Foreign (denoted with a “*”), in which trade is the result of differences in the endowments of specific factors.

In order to discuss the links between trade liberalization and firms’ organizational choices, in this section, we describe the building blocks of our analytical model in its closed-economy version. The analysis of the effects of the integration of good and factor markets is carried out in the following two sections.

2.1 Setup

In each economy, there are \( I + 1 \) sectors/goods, denoted by 0 and \( i \), \( i = 1, \ldots, I \); good 0 is a numeraire. The representative consumer’s utility (which is the same in Home and Foreign) can be written as

\[
    u(c_0, \ldots, c_I) = c_0 + \sum_{i=1}^{I} u_i(c_i),
\]

where \( c_0 \) represents the consumption of the numeraire good, and \( c_i \) represents consumption of the other goods. The utility functions \( u_i(\cdot) \) are twice differentiable, increasing, strictly concave, and satisfy the Inada conditions \( \lim_{c_i \to 0} u_i'(c_i) = \infty \) and \( \lim_{c_i \to \infty} u_i'(c_i) = 0 \). Domestic demand for each good \( i \) can then be expressed as a function of price alone, \( D_i(p_i) \).

Production of goods \( i = 1, \ldots, I \) requires the cooperation of two types of input supplier, denoted \( A \) and \( B_i \). \( B_i \) suppliers generate no value without being matched with an \( A \). Many interpretations of the \( A \) and \( B \) firms are possible. For example, \( A \) firms may represent widely used inputs, such as energy or various business services (e.g., IT, retailing, logistics), which can be used to produce basic consumer goods or can be combined with other inputs (\( B_i \) suppliers) to produce more complex goods. The crucial feature of the organizational choice model described below is that production inputs are run by managers, who trade off the pecuniary benefits of
coordinating their decisions with the private benefits of making these decisions in their preferred way.

The A suppliers differ from the B_i suppliers in that they can also engage in stand-alone production of the numeraire good 0. The A suppliers differ in their good-0 productivity: there is a continuous distribution of A suppliers, F(\alpha), where \alpha represents the number of units of the numeraire good that can be produced by an A firm.

All goods are sold under conditions of perfect competition. The good 0 is always traded freely across the two countries. We choose units so that the international market-clearing and domestic price of good 0 are both equal to unity, and we will assume that aggregate supply of A’s is large enough to sustain production of a positive amount of this good.

2.2 Equilibrium in the factor market

In the supplier market, there is a large number of A firms and B firms. Normalize the measure of A firms to unity, and denote by n_i the measure of B_i firms; let \sum_{i=1}^{I} n_i = n_B < 1. We will consider equilibria with full employment of factors, i.e., the sum of A and B firms used in the production of the I+1 goods equals the total endowment of firms in the economy. The Appendix discusses conditions (Assumption 2) on consumer preferences to ensure that such an equilibrium exists.

An equilibrium in the supplier market consists of matches between each B_i firm and an A firm, along with a surplus allocation among all the managers. Such an allocation must be stable, in the sense that no \((A, B_i)\) pair can form an enterprise that generates payoffs to each manager that exceed their equilibrium levels.

By construction, A firms are the long side of the market. This implies that some of the A agents must remain unmatched and produce the numeraire good. We assume that all A’s are equally productive when matched with one of the B_i’s; thus any unmatched A with an opportunity cost below that of a matched A can offer the matched A’s partner more than she is currently receiving. It follows that all matched A’s receive the same equilibrium surplus, regardless of which industry i they are in.

This equilibrium surplus, \hat{\alpha}, is the solution to

\[ F(\alpha) = n_B. \]  \hfill (2)

As shown in Section 2.3.3 below, \hat{\alpha} plays a crucial role in organizational choices, since it determines the terms of trade in the supplier market. Notice that in equilibrium only the A firms with the lowest opportunity cost will be matched with B_i firms to produce the i-goods, while more

\footnote{Notice that this is the relevant equilibrium condition only if A firms are the long side of the market. In turn, this requires that all B_i firms obtain a positive surplus after paying \hat{\alpha} to their A suppliers. The aforementioned restrictions on the demand functions guarantee that this condition is satisfied.}
productive $A$ firms will produce good $0$.\footnote{It should be stressed that in our model, unlike in existing models of firm heterogeneity (e.g., Melitz, 2003; Helpman \textit{et al.}, 2004), differences have only indirect effects on trade patterns, through their impact on the terms of trade in supplier markets.}

\subsection*{2.3 Individual firms}

The basic model of the firm draws on Legros and Newman (2006). As discussed above, goods $i = 1, \ldots, I$, are produced by firms composed of an $A$ supplier and a $B_i$ supplier. For each supplier, a non-contractible decision is rendered indicating the way in which production is to be carried out. Denote the $A$ and $B_i$ decisions respectively by $a \in [0,1]$ and $b_i \in [0,1]$. For efficient production, it does not matter which particular decisions are chosen, as long as there is coordination between the two suppliers. More precisely, the enterprise will succeed with a probability proportional to $1 - (a - b_i)^2$, in which case it generates a unit of output; otherwise it fails, yielding 0. Output realizations are independent across firms.

Overseeing each supplier firm is a risk-neutral manager, who bears a private cost of the decision made in his unit. The $A$ manager’s utility is $y_A - (1 - a)^2$, while the $B_i$ manager’s utility is $y_i - b_i^2$, where $y_A, y_i \geq 0$ are their respective incomes; thus the managers disagree about the direction in which decisions should go. Since the primary function of managers is to implement decisions and convince their units to agree, they continue to bear the cost of decisions even if they don’t make them.

While decisions themselves are not contractible, the right to make them can be contractually reassigned. Revenues generated by the firm are also contractible, which allows monetary incentives to be created.

Managers can remain non-integrated, in which case they retain control over their respective decisions. The success probability in this case is $1 - (a - b_i)^2$. Alternatively, they can integrate by engaging the service of a headquarters (HQ), which has the power to decide $a$ and $b_i$. HQ is motivated only by monetary considerations, maximizing the income of the integrated firm $y^H$—and incurs no costs from the decisions $a$ and $b_i$; however, involving it entails a cost modeled as a reduction $\sigma$ in the success probability. For simplicity, we will assume this cost to be the same for all $i$ sectors. We can think of $\sigma$ as linked to a moral hazard problem: since HQ has control over both suppliers resources, it may also have opportunities to divert those resources into other activities (including private benefits, other divisions, or pet projects).\footnote{For instance, suppose that after output is realized, there is a probability $\sigma$ that HQ has a chance to divert whatever output there is to an alternative use valued at $\delta$ times its market value, where $\sigma < \delta < 1$. If output is diverted, it does not reach the market, and the verifiable information is the same as if the firm had failed. Managers could prevent diversion by offering a share $\delta$ to HQ, leaving $(1 - \delta)$ of the revenue to be shared between the managers, but since $\delta > \sigma$, it is actually better for them to give HQ a zero share of market revenue and let him divert when he is able, so that successfully produced output reaches consumers only $(1 - \sigma)$ of the time.} Alternatively, the integration cost might arise from direct costs of communication, additional management personnel, or losses from delegating decisions from $A$ and $B_i$ to staff who are not experts.
this case, HQ takes a fraction of the revenue, leaving the residual for the managers to share; this approach would alter the notation slightly but would not affect our results.

To summarize, each firm’s expected output is \((1 - (a - b_i)^2)(1 - \sigma I)\), where \(I\) is the integration indicator function, equal to unity if there is integration, and zero otherwise.

Before production, \(B_i\) managers match with \(A\) managers, at which time they sign contracts \((s, I)\), where \(s \in [0, 1]\) is the share of managerial revenue accruing to manager \(A\), with \(1 - s\) going to \(B_i\) (in case of failure each receives zero).

For each match \((A,B_i)\), total revenue in case of success is given by the product market price, \(p_i\), which is taken as given by firms when they take their decisions and sign their contracts. After contract signing, managers (or HQ) make their production decisions, output is realized, product is sold, and revenue shares are distributed.

### 2.3.1 Integration

With integration, HQ receives an expected surplus proportional to \((1 - (a - b_i)^2)p_i\) and therefore makes decisions for both activities in order to maximize expected revenue of the integrated firm, that is, chooses \(a = b_i\). Among the choices in which \(a = b_i\), the Pareto-dominant one is that in which \(a = b_i = 1/2\), and we assume HQ implements this choice. The cost to each manager is then \(\frac{1}{4}\), and the payoffs to the \(A\) and \(B\) managers are

\[
\begin{align*}
    u^I_A(s, p_i) &= (1 - \sigma)sp_i - \frac{1}{4} \\
    u^I_B(s, p_i) &= (1 - \sigma)(1 - s)p_i - \frac{1}{4}.
\end{align*}
\]

Total managerial welfare under integration is

\[
W^I_i(p_i) = (1 - \sigma)p_i - \frac{1}{2}
\]

and is fully transferable via adjustments in \(s\).

### 2.3.2 Non-integration

Under non-integration, each manager retains control of his activity. The decisions chosen are the (unique) Nash equilibrium of the game with payoffs \((1 - (a - b_i)^2)sp_i - (1 - a)^2\) for \(A\) and \((1 - (a - b_i)^2)(1 - s)p_i - b_i^2\) for \(B\), which are

\[
\left(a^N_i, b_i^N\right) = \left(\frac{1 + (1 - s)p_i}{p_i}, \frac{1 - s}{p_i}\right).
\]
The resulting expected output is

\[ Q_i^N(p_i) = 1 - \frac{1}{(1 + p_i)^2}, \tag{6} \]

which is independent of \( s \).

Output increases with the price: as \( p_i \) becomes larger, the revenue motive becomes more important for managers and this pushes them to better coordinate. Indeed, \( Q_i^N(0) = 0 \), and \( Q_i^N(p_i) \) approaches 1 as \( p_i \) becomes unbounded. Thus, as long as \( \sigma > 0 \), there exists a price \( \tilde{p}_i \) at which output supplied to the product market under integration is equal to that supplied under non-integration: \( \tilde{p}_i \) is the unique solution to

\[ \sigma = \frac{1}{(1 + p_i)^2}, \tag{7} \]

that is, \( \tilde{p} = \sqrt{\sigma} - 1 \). Non-integration output is smaller than integration output for \( p_i < \tilde{p} \) and larger for \( p_i > \tilde{p} \).

Unlike output, the equilibrium payoffs under non-integration depend on \( s \). They are given by

\[ u_A^N(s, p_i) = \left( 1 - \frac{1}{(1 + p_i)^2} \right) sp_i - s^2 \left( \frac{p_i}{1 + p_i} \right)^2, \tag{8} \]

\[ u_B^N(s, p_i) = \left( 1 - \frac{1}{(1 + p_i)^2} \right) (1 - s)p_i - (1 - s)^2 \left( \frac{p_i}{1 + p_i} \right)^2. \tag{9} \]

Observe that each manager’s payoff is an increasing function of his share. Varying \( s \), one obtains the Pareto frontier for non-integration. It is straightforward to verify that this frontier is strictly concave and that the total managerial payoff is \( W_i^N(s, p_i) = Q_i^N(p_i)p_i - (s^2 + (1 - s)^2) \left( \frac{p_i}{1 + p_i} \right)^2 \) is maximized at \( s = 1/2 \); it is minimized at \( s = 0 \) and \( s = 1 \), where we have

\[ W_i^N(0, p_i) = W_i^N(1, p_i) = \frac{p_i^2}{1 + p_i}. \tag{10} \]

### 2.3.3 Choice of Organizational Form

To determine the choice of organization that the managers make, we must combine the integration and non-integration frontiers to derive their overall Pareto frontier. The relative positions of the two frontiers depend on the price \( p_i \). When it is close to zero, non-integration dominates integration: to verify this, notice from (3)-(4) and (8)-(9) that when \( p_i = 0 \) integration yields negative payoffs, while non-integration payoffs are bounded below by 0. The same is true for \( p_i \) sufficiently large: to see this, it is enough to compare the minimum non-integration surplus, \( \frac{p_i^2}{1 + p_i} \), with the integration surplus \( p_i(1 - \sigma) - \frac{1}{2} \); for a sufficiently large \( p_i \), the latter is smaller
as long as $\sigma$ is positive. Finally, observe that with $s = 1/2$, $W^N(\frac{1}{2}, p_i) > W^I(p_i)$ for all $p_i$; thus integration never dominates non-integration.

Figure 1 depicts the situation for intermediate ranges of prices, in which neither integration nor non-integration dominates globally. Rather, the organization that managers choose depend on where they locate along the Pareto frontier, i.e., on the terms of trade in the supplier market.

Comparison of (5) with (10) reveals that the two frontiers will “overlap” as in Figure 1 on an interval of prices $[\underline{p}, \overline{p}]$. In what follows, we will assume that $\sigma$ is smaller than an upper bound $\bar{\sigma} > 0$ to guarantee that this interval is non-empty.

Recall from Section 2.2 that, for the factor market to be in equilibrium, all $A$ firms matched with a $B_i$ firm must receive a surplus equal to $\hat{\alpha}$. Consider an $A$ firm partnered with a $B_i$ firm when the product price is $p_i$. To facilitate the characterization of equilibrium, we make the following restriction on the surplus of $A$ firms when matched with a $B_i$ firm:

Assumption 1 The distribution $F(\cdot)$ satisfies $\hat{\alpha} \equiv F^{-1}(n_B) \leq \frac{1}{2} W^N(\frac{1}{2}, \overline{p})$.

This assumption ensures that $A$’s get less than half of the surplus from producing good $i$ for any price at which integration is not dominated as an organizational choice (i.e., in Figure 1, the surplus allocation will lie above the 45°-line).

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7These are the solutions to the (quadratic) equation $W^N(0, p) = W^I(p)$, i.e., $\frac{p^2}{1+p} = p(1-\sigma) - \frac{1}{2}$. 

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From (8), there is a unique value of the output share, \( s(\hat{\alpha}, p_i) \) that generates a payoff equal to \( \hat{\alpha} \) for \( A \) under non-integration; it is easy to verify that \( s(\hat{\alpha}, p_i) \) is increasing in \( \alpha \) and decreasing in \( p_i \). If the payoff that remains for \( B_i \), namely \( W^N(s(\hat{\alpha}, p_i), p_i) - \hat{\alpha} \), exceeds \( W^I(p_i) - \hat{\alpha} \), the firm chooses non-integration. If instead \( W^N(s(\hat{\alpha}, p_i), p_i) < W^I(p_i) \), the firm integrates.

It can be shown that there are at most two solutions to the equation \( W^N(s(\hat{\alpha}, p_i), p_i) = W^I(p_i) \) (from Footnote 7 this is clearly true for \( \hat{\alpha} = 0 \), but it extends to the general case). Call them \( \underline{p}(\hat{\alpha}) \) and \( \overline{p}(\hat{\alpha}) \). Integration is chosen when \( p_i \in (\underline{p}(\hat{\alpha}), \overline{p}(\hat{\alpha})) \). In Figure 1, \( B_i \) is indifferent between the two ownership structures if \( A \) gets \( u_1 \), but strictly prefers integration if \( A \) gets \( u_0 \). Thus, if \( \hat{\alpha} \) were to be equal to \( u_1 \), the product price prevailing would be \( \underline{p}(\hat{\alpha}) \). If \( \hat{\alpha} \) were to fall to \( u_0 \), then this price would be strictly in the interior of \( (\underline{p}(\hat{\alpha}), \overline{p}(\hat{\alpha})) \). It follows that, for values of \( \hat{\alpha} \) that correspond to frontier points above the 45°-line, the set of prices at which integration is preferred is strictly larger (in the set inclusion sense) when \( \hat{\alpha} \) falls. Thus we have (proof in Appendix):

**Lemma 1** Under Assumption 1, (i) There exist at most two solutions \( p(\hat{\alpha}) \) and \( \overline{p}(\hat{\alpha}) \) to the equation \( W^N(s(\hat{\alpha}, p_i), p_i) = W^I(p_i) \). (ii) \( p(\hat{\alpha}) \) is increasing, \( \overline{p}(\hat{\alpha}) \) is decreasing, and \( \hat{\alpha} \in [p(\hat{\alpha}), \overline{p}(\hat{\alpha})] \subset [\underline{p}, \overline{p}] \) whenever \([\underline{p}(\hat{\alpha}), \overline{p}(\hat{\alpha})]\) is nonempty.

Thus, when \( A \)'s share is not too large, a fall in \( \hat{\alpha} \) becomes a force for integration, and, starting in a neighborhood of an \( \underline{p}(\hat{\alpha}) \), an increase in price leads to a switch from non-integration to integration.

Relaxing Assumption 1 would not change the main results of our analysis (Propositions 1-4 below), but would enrich the set of comparative static results: if \( \hat{\alpha} \) were to exceed the critical threshold identified in Assumption 1, declines in \( \hat{\alpha} \) would first push toward non-integration (starting below the 45°-line), then toward integration (once the 45°-line has been crossed). We leave description of this case to a future draft.

There is a nonmonotonicity of managers’ organizational preference in price. At low prices, despite integration’s better output performance, revenue is still small enough that the managers (in particular the manager of \( B_i \) firms) are more concerned with their private benefits, i.e., they prefer to enjoy the “quiet life”. At high prices, non-integration performs well enough in the output dimension that they do not want to incur the cost \( \sigma \) of HQ. Only for intermediate prices do managers prefer integration. In this range, the \( B_i \) manager knows that revenue is large enough that he will be induced to bear a large private cost to match the self-indulgent \( A \) manager, who obtains little income from the firm (\( s \) is close to zero when the \( A \)'s share of surplus is small) and therefore chooses \( a \) close to 1. \( B_i \) prefers the relatively high output and moderate private cost that he incurs under integration.8

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8Our specific functional forms are not critical to this kind of outcome: similar results obtain if the managers have a standard partnership problem, where total net revenue is \( Pf(a, b) \) and the non-contractible cost functions \( C_A(a) \) and \( C_B(b) \) are increasing in \( a \) and \( b \). For details, see Legros-Newman (2006).
2.4 Industry Equilibrium and the OAS curve

Industry equilibrium comprises a general equilibrium of the supplier market and product market. In the product markets, the large number of firms implies that the industry supplies are equal to the expected value of output with probability one given the product price; equilibrium requires that the price adjust so that the demand equal the supply.

To derive industry supply, suppose that a fraction $\theta_i$ of firms are integrated in industry $i$, with the remaining $1 - \theta_i$ are non-integrated. Total supply at price $p_i$ is then

$$s(p_i, \theta_i) = \theta_i(1 - \sigma) + (1 - \theta_i) \left(1 - \left(1 + \frac{1}{p_i}\right)^2\right).$$

(11)

Now $\theta_i$ itself is a correspondence that depends on the price $p_i$ and $\hat{\alpha}$. Recall that we have defined $n_i$ to be the measure of $B_i$ suppliers. When $p_i < \bar{p}(\hat{\alpha})$, $\theta_i = 0$ and total supply is just the output when all $n_i$ firms choose non-integration.$^9$ At $p_i = \bar{p}(\hat{\alpha})$, $\theta_i$ can vary between 0 and $n_i$, since managers are indifferent between the two forms of organization. Because $\underline{p}(\hat{\alpha}) < \bar{p}(\hat{\alpha})$, output is greater with integration, and as $\theta_i$ increases total supply increases. When $\theta_i = n_i$, output is $(1 - \sigma)n_i$ and stays at this level for all $p_i \in (\bar{p}(\hat{\alpha}), \bar{p}(\hat{\alpha}))$. At $p_i = \bar{p}(\hat{\alpha})$, managers are again indifferent between the two ownership structures and $\theta_i$ can decrease from $n_i$ to 0 continuously; because $\bar{p} < \bar{p}(\hat{\alpha})$, output is greater the smaller is $\theta_i$. Finally for $p_i > \bar{p}(\hat{\alpha})$, all firms remain non-integrated and output increases with $p_i$. Of course, when $[\underline{p}(\hat{\alpha}), \bar{p}(\hat{\alpha})]$ is empty, managers always choose non-integration and $\theta_i \equiv 0$. Write $S(p_i, \hat{\alpha})$ for the supply correspondence, the Organizationally Augmented Supply (OAS) curve.

The supply curve for a typical industry in which $\underline{p}(\hat{\alpha}) < \bar{p}(\hat{\alpha})$ is represented in Figure 2. The dotted curve corresponds to what the industry supply would be if no firms were integrated.

Given an equilibrium return of $A$ equal to $\hat{\alpha}$, an equilibrium in the product market of good $i$ is a price and a quantity that equate supply and demand: $D_i(p_i) = S(p_i, \hat{\alpha})$. There are three distinct types of industry equilibria, depending on where along the supply curve the equilibrium price occurs: those in which firms integrate (I), the mixed equilibria in which some firms integrate and others do not (M), and a pure non-integration equilibrium (N).

There are two comparative statics of the industry supply that are worth noting for our analysis of trade liberalization in the next two sections. First, as shown in Section 2.3.3, the “integration region” (the vertical segment labeled I in the Figure, consisting of the price range $(\underline{p}(\hat{\alpha}), \bar{p}(\hat{\alpha}))$), expands as $\hat{\alpha}$ falls and contracts as $\hat{\alpha}$ rises. Hence a fall in the surplus of $A$ firms is a force for integration. This implies that countries with a lower $\hat{\alpha}$ will also be characterized by a broader integration region. Second, an increase in $n_i$ leads the OAS curve for good $i$ to shift.

$^9$If $p_i$ is very low, then $A$’s would not be able to obtain $\hat{\alpha}$ in partnership with a $B_i$; in this case, full employment of the $B_i$’s could not be part of an equilibrium. The demand restrictions discussed in the Appendix rule out the possibility that such low prices would obtain in equilibrium, so we ignore prices in this range in what follows.
to the right. This implies that if a country has a larger measure of $B_i$ firms, its supply curve in that sector will be positioned to the right of the other country’s supply curve.

Finally, the economy is in equilibrium when each industry is in equilibrium relative to the (common) $A$-surplus $\hat{\alpha}$. Our assumptions ensure that such an equilibrium always exists.

3 Trade Liberalization

In the analysis presented in the previous section we have focused on equilibria in product and factor markets in a closed economy setting. This is equivalent to a scenario in which there exist prohibitive barriers to trade in goods and factor mobility between Home and Foreign. In this section, we examine the organizational changes triggered by a move from autarky to free trade, leading to the full integration of product and factor markets.\(^\text{10}\)

We assume that the two countries have identical demands and identical technologies in the production of all goods $i = 1, \ldots, I$. In our model, trade is the result of endowment differences between the two countries, i.e., differences in the measure of $B_i$ suppliers. In particular, we order the goods so that $n_i < n_i^*$ for $i \in \{1, \ldots, m\}$ and $n_i > n_i^*$ for $i \in \{m + 1, \ldots, I\}$. Ours is thus a specific-factor trade model, in which $A$ firms are the mobile factor and $B_i$ firms represent the specific factors. The main difference with the standard formulation of this model (e.g., Mussa,\(^\text{10}\))

\(^{10}\)We could easily extend our analysis to consider intermediate cases, in which trade barriers are positive but not prohibitive, and market integration is thus incomplete.
is that all factors are supplier firms “run” by managers, who care about non-pecuniary effects of production decisions.

Let us consider first the effect of product market integration. Home country’s imports can be written as $M_i(p_i, \hat{\alpha}) = D_i(p_i) - S(p_i, \hat{\alpha})$, while its exports are given by $X_i(p_i, \hat{\alpha}) = S(p_i, \hat{\alpha}) - D_i(p_i)$. World product markets for goods $i \in \{1, \ldots, m\}$, clear when

$$M_i(p_i, \hat{\alpha}) = X^*_i(p_i, \hat{\alpha^*});$$  \hspace{1cm} (12)

symmetrically, the market-clearing condition for goods $i \in \{1 + m, \ldots, I\}$ can be written as

$$M^*_i(p_i, \hat{\alpha^*}) = X_i(p_i, \hat{\alpha}).$$  \hspace{1cm} (13)

From the above conditions, we can derive the free trade equilibrium price of each good $i$, denoted by $p^*_i$. The Home country’s trade balance condition requires

$$\sum_{i=1}^{m} p^w_i M_i(p^w_i) - \sum_{i=m+1}^{I} p^w_i X_i(p^w_i) + R_0 = 0,$$  \hspace{1cm} (14)

where $R_0$ denotes the net transfer of the numeraire good to settle the trade balance. A similar condition must hold for the Foreign country. As a result of removal of trade barriers, we obtain price convergence across countries in all sectors.

Consider next the effect of the removal of barriers to factor mobility. The equilibrium condition in the integrated supplier market can be written as

$$F^*(\alpha) + F^*(\alpha) = n_B + n^*_B,$$  \hspace{1cm} (15)

which yields an equilibrium return equal to $\alpha^w$ for all $A$ firms matched with $B$ firms. Hence factor liberalization leads to the convergence in suppliers’ terms of trade across countries. In turn, this implies that the “integration region” $(\underline{\theta}(\alpha^w), \overline{\theta}(\alpha^w))$ will also be the same for the two countries.

It follows that joint liberalization of product and factor markets necessarily leads to the same organizational choices being made in the Home and Foreign countries in all industries $i \in \{1, \ldots, I\}$:

**Proposition 1** Product and factor market integration leads to the convergence of firms’ ownership structure across countries.

This result implies, for example, that we should observe convergence of organizational choices within industries across members of the European Union (EU), which have have eliminated barriers to both commodity trade and factor mobility. The specific ownership structure to
which an industry converges—with firms being vertically integrated or engaging in arm’s length relations—will vary from sector to sector, depending on supply and demand conditions.

In the remaining of this section, we will examine the impact of the successive removal of barriers to commodity trade and factor mobility on organizational choices. This sequencing will allow us to separate the effects of the liberalization of goods markets from those induced by factor market liberalization. This sequencing also reflects the experience of many regional trade agreements, in which policies aimed at improving factor mobility have followed the removal of tariff and non-tariff barriers to commodity trade. A stark example is provided by the process of European integration: free trade in goods among EU member countries was achieved in 1968, with the the creation of the EEC customs union; free mobility of capital and labor was only introduced in 1992, with the establishment of the Single European Market.\footnote{Similar patterns can be observed at the multilateral level: since the creation of the General Agreement on Tariffs and Trade (GATT) in 1947, successive rounds of multilateral trade negotiation have led to the progressive liberalization of product markets; the removal of barriers to factor mobility has only recently become part of the agenda (e.g., the GATS and TRIMs agreements negotiated during the Uruguay Round).}

### 3.1 Product Market Liberalization

To isolate the effects of product market liberalization on organizational choices, we will first focus on trading economies characterized by the same conditions in the supplier markets (i.e., $\hat{\alpha} = \hat{\alpha}^*$). The role of factor market differences is considered in the Section 3.2 below.

Figure 3 depicts the autarky and free trade equilibria in a product markets $i \in \{1, \ldots, m\}$, in which Home imports from Foreign. Consider first the left panel of the Figure, which depicts the Home country’s market. The intersection between the demand curve, $D_i = D(p_i)$, and the supply curve, $S_i = S(p_i, \hat{\alpha})$, determines the equilibrium autarky price, which is denoted by $\hat{p}_i$. The graph on the right panel of Figure 3 depicts Foreign country’s market. Notice that, since Foreign has a larger measure of $B_i$ firms, its supply curve is positioned to the right of that of the Home country. Given the assumption of identical demands, this implies a lower autarky price, i.e., $\hat{p}_i^* < \hat{p}_i$.

In the middle panel of Figure 3, we have drawn export supply and import demand functions in the world market for good $i$. From condition (12) above, we can derive the equilibrium price under free trade, $p_i^w$. The move from autarky to free trade results in a price fall from $\hat{p}_i$ to $p_i^w$ in Home, and a price increase from $\hat{p}_i^*$ to $p_i^w$ in Foreign.

Notice that, in the case of two countries characterized by the same terms of trade in the factor markets ($\alpha = \alpha^*$), the range of prices for which firms will choose integration or non-integration is the same. This implies that price convergence also results in convergence in organizational choices. In the case depicted in Figure 3, both countries move from non-integration to integration. We can state the following result:
Figure 3: Liberalization of product markets
Proposition 2  Even in the absence of factor movements, product market liberalization triggers price changes that can lead to major organizational restructuring within countries.

Surprisingly, the previous literature on firms’ organizational choices in a global economy has not examined the effects of product market integration on organization design. The analysis carried out in this section points out that, even in the absence of factor movements, the liberalization of goods markets could trigger waves of mergers and divestitures within the trading economies. This result is in line with the aforementioned empirical studies showing that the tariff reductions associated with the creation of free trade areas and customs unions have had significant effects on M&A activities in the member countries (e.g., Breinlich, 2006).

3.2 Factor Market Liberalization

We now turn to examine how organizational choices are affected by the liberalization in factor markets. To isolate the effects of factor mobility, we assume that product markets are already integrated, i.e., all goods are traded at the prices determined by (12)-(13) above.

Consider first trading economies characterized by similar factor markets. This is the scenario depicted in Figure 3, in which the range at which integration occurs is the same in the two countries, i.e., \( \hat{\alpha} = \hat{\alpha}^* \). This implies that in both countries integration will be the prevailing form of firm organization in industry \( i \) when prices are in the range \( (\bar{p}(\hat{\alpha}), \bar{p}(\hat{\alpha})) \), while non-integration will be chosen at all other prices. Since under free trade \( p_i = p_i^* = p_i^{\infty} \), in this case, factor markets integration will have no impact on organizational choices. Therefore, once product markets are integrated, we should expect factor market liberalization to have little effect on organizational choices in trading economies characterized by similar factor markets (e.g., France and Germany).

Consider next a scenario in which Home and Foreign differ in terms of their factor markets (e.g., West and East Europe). For simplicity, assume that the total endowment of \( B \) firms is the same in the two countries (i.e., \( n_B = n_B^* \)), but the Home country’s productivity distribution of \( A \) suppliers in the numeraire sector strictly stochastically dominates the corresponding distribution for the Foreign country, i.e., \( F(\alpha) > F^*(\alpha) \), whenever \( F \) and \( F^* \) are not both 0 or 1.

Figure 4 below can be used to illustrate factor market equilibria when there is no factor mobility, and when factors can freely move across countries. In the no-mobility case, \( A \) suppliers in the Home country obtain a higher surplus when matched with \( B \)’s than do matched \( A \)’s in the Foreign country, i.e., \( \hat{\alpha} > \hat{\alpha}^* \). Following the removal of barriers to factor mobility, the integrated matching market will clear when condition (15) above is satisfied. The equilibrium return to all \( A \) firms matched with \( B \) firms will be given by \( \alpha^w \), with \( \hat{\alpha}^* < \alpha^w < \hat{\alpha} \). Notice that the convergence in factor prices can be achieved through (i) the relocation of some \( A \) firms from Foreign to Home, (ii) the relocation of some \( B \) firms from Home to Foreign, or (iii) a combination
of both.\footnote{An example of channel (i) would be the relocation of some high tech firms from the US to India, to exploit lower costs of IT services there; an example of channel (ii) could instead be provided by the relocation of Indian IT suppliers to the United States, to take advantage of higher returns.} In Figure 4, channel (i) is captured by the distribution function $\frac{1}{2}(F(\alpha) + F^*(\alpha))$, while channel (ii) is captured by shifts in the $n_B$ and $n_B^*$ functions.

In our analysis of Section 2.4, we have shown that an increase in $\hat{\alpha}$ leads to a decrease in the range for which integration is the chosen organizational form. It follows that, in all sectors $i \in \{1, \ldots, I\}$, the range of prices for which integration is chosen is larger in the Home country, with $[p(\hat{\alpha}), p(\hat{\alpha}^*)] \subset [p(\hat{\alpha}^w), p(\hat{\alpha}^w)]$.\footnote{Notice, however, that under the assumption that the costs of setting up headquarters are the same in the two countries (i.e., $\sigma = \sigma^*$), the price for which integration and non-integration yield the same output, will be...}

Figure 4: Equilibria in the factor markets

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Figure 5 below shows the effects of the liberalization of factor markets in the product market for a good $i \in \{m + 1, \ldots, I\}$ in which the Home country is an exporter. The removal of barriers to factor mobility implies that the “integration range” expands in the Home country and is reduced in the Foreign country, until it coincides with $(p(\hat{\alpha}^w), p(\hat{\alpha}^w))$ in both countries. Factor mobility triggers substantial changes in ownership structure. For example, in the case depicted in Figure 5: before factor market liberalization, firms are non-integrated in both Home and Foreign; factor liberalization leads firms in both countries to switch to vertical integration. Notice that this restructuring is associated with a price increase (see discussion in the next Section).
Figure 5: Liberalization of factor markets (a)
Factor liberalization can also lead to a switch from outsourcing in other industries. Figure 6 below shows the effects of the liberalization of factor markets in a sector \( i \in \{1, \ldots, m\} \) in which the Home country is an importer. As in Figure 5, the removal of barriers to factor mobility implies that the “integration range” expands in the Home country and is reduced in the Foreign country. In this case, before factor market liberalization, firms are integrated in Home and non-integrated in Foreign; factor liberalization leads to mixed equilibria in both countries, in which some firms integrate and others do not.\(^{14}\)

We can thus state the following:

**Proposition 3** Following the integration of product markets, the liberalization of factor markets can lead to further organizational changes, by changing the terms of trade between suppliers.

Notice that the indeterminacy of the patterns of factor mobility (see Figure 4 above) implies that we cannot pin down firms’ location decisions and intra-firm trade patterns.\(^{15}\) However, our model delivers clearcut predictions about the organizational effects of trade liberalization, which are independent of the specific patterns of factor mobility.

## 4 Consumers and Organizational Choices

In the last section we have shown that factor integration can lead to changes in firms’ ownership structure, since it affects the division of surplus between managers of different supplier firms. In this section, we will examine the consequences of these changes from the point of view of consumers.

### 4.1 Effects of Factor Market Integration on Prices

In our model of organization design, consumers have an interest in firms’ ownership structure. To see this, consider again Figure 2 above and notice that we can distinguish two regions: one of “efficient integration” (the portion of the supply curve comprised between \( \hat{p}(\hat{\alpha}) \) and \( \tilde{p} \), in which firms that choose to be integrated produce more than what they would by remaining the same for the two countries \( \tilde{p} = \hat{p}^* \)).

\(^{14}\)In the case of Figure 6, the new world price, \( p_{w}^{\alpha_w} \), happens to coincide with \( p(\alpha_w) \), implying a mixed equilibrium in both countries. More generally, the organizational restructuring induced by factor liberalization will involve switches from an integration equilibrium to a non-integration equilibrium (or vice-versa).

\(^{15}\)To see this, consider an industry \( i \in \{1, \ldots, m\} \), in which the Home country is an importer before factor market liberalization. Figure 6 depicts a scenario in which convergence in factor prices does not involve the relocation of \( B_i \) firms. Suppose instead that some \( B_i \) firms do relocate as a result of factor liberalization. Graphically, this would lead the supply curve of Home to shift to the left, while Foreign’s supply curve will shift to the right. In turn, this would lead the Home country to import more of good \( i \) from Foreign (compared to the case in which \( B_i \) suppliers do not relocate). In the case of a sector \( i \in \{m + 1, \ldots, I\} \), the possible relocation of \( B_i \) firms could even imply that the Home country switches from being an exporter to being an importer.
Figure 6: Liberalization of factor markets (b)
non-integrated; and one of “inefficient integration” (the portion of the supply curve comprised between \( \hat{p} \) and \( \overline{p}(\hat{\alpha}) \), in which output is smaller under integration than it would be if firms were non-integrated. Thus in our setup changes in organization structure can have an impact on consumer surplus.

We can show that the impact on consumer welfare of the liberalization of factor markets will depend on pre-liberalization product prices. As shown in Figures 5-6 above, the liberalization of factor markets can trigger changes in ownership structure which lead to a fall in world supply and to a price increase. This is indeed the case if factor liberalization leads firms in the Home exporting country to switch to inefficient integration (the case depicted in Figure 5). For example, if \( \hat{p}_i^w \) is initially just above \( \overline{p}(\hat{\alpha}) \), then following liberalization, Home’s integration range expands, its supply falls as its firms merge, and the new equilibrium price must be higher than \( \hat{p}_i^w \). Alternatively, the price increase could occur in industries in which firms move away from efficient integration in the Foreign exporting country (the case depicted in Figure 6). For instance, if \( \hat{p}_i^w \) is initially just above \( \overline{p}(\hat{\alpha}^*) \), then following liberalization, Foreign’s integration range shrinks, its supply falls as its firms divest, and the new equilibrium price must again be higher than \( \hat{p}_i^w \).

Similarly, it is possible for factor liberalization to trigger organizational changes that lead to a price decrease: this is the case if free factor mobility leads firms in the exporting country to switch to efficient integration, or to move away from inefficient integration.

In some cases, factor market liberalization will not trigger any organizational changes, leaving aggregate quantities and prices unchanged. As an example, consider a sector \( i \) in which, before factor market liberalization, the world market-clearing price \( \hat{p}_i^w \) is within the Home country’s integration price range. Since this range expands after factor market integration, world supply remains unchanged at this price, and thus \( \hat{p}_i^w \) remains the equilibrium price.

**Proposition 4** Factor market integration leads to

A price increase in sector \( i \) if

\[
\overline{p}(\hat{\alpha}^*) < \hat{p}_i^w < \overline{p}(\hat{\alpha}^w), \ i \in \{1, \ldots, m\};
\]

or

\[
\overline{p}(\hat{\alpha}) < \hat{p}_i^w < \overline{p}(\hat{\alpha}^w), \ i \in \{m + 1, \ldots, I\}.
\]

A price decrease in sector \( i \) if

\[
\overline{p}(\hat{\alpha}^w) < \hat{p}_i^w < \overline{p}(\hat{\alpha}^*), \ i \in \{1, \ldots, m\};
\]

or

\[
\overline{p}(\hat{\alpha}^w) < \hat{p}_i^w < \overline{p}(\hat{\alpha}), \ i \in \{m + 1, \ldots, I\}.
\]

No price change if

\[
\hat{p}_i^w \in (\overline{p}(\hat{\alpha}), \overline{p}(\hat{\alpha}^*));
\]

\[
\hat{p}_i^w < \overline{p}(\hat{\alpha}^*);
\]
Though systematic evidence corresponding to the effects of organizational changes on product prices does not yet appear to have been assembled, there is at least some indicative evidence of phenomena corresponding to price increases following reorganization that we have discussed. In particular, there are numerous accounts of falls in product quality resulting (especially) from cross-border reorganization (see discussion below). Our model can be easily reinterpreted to explain such accounts. One can interpret the “quantity” produced by a firm as quality under money-back guarantees or threat of lost repeat business: the good either delivers the consumer a positive value with probability \( Q_N(p_i) \) (under non-integration, else \( Q_I(p_i) \)) or nothing. Low success probability corresponds to low quality. Thus instead of \( Q_N(p_i) n_i \) goods delivered with probability 1, we have \( n_i \) goods of quality \( Q_N(p_i) \).

As we have remarked, it is possible that in our model a Home export good produced under efficient non-integration prior to factor market liberalization would be produced, following liberalization, under (inefficient) integration. This is indeed the case depicted in Figure 5. The success probability falls (since aggregate output is falling), corresponding to a fall in quality. This finding is in line with evidence on the inefficiencies of the recent wave of M&A activities (e.g., Langebeek, 2003). For example, a recent survey of American, European, and Japanese executives, 50-60% of respondents admit that mergers were responsible for significant supply disruptions, product launch delays, and quality and service problems (Accenture, 2007).

The case of a move to inefficient outsourcing depicted by Figure 6 could instead be illustrated by the safety problems associated with American-designed toys assembled in China. For example, in August 2007 Mattel recalled 19 million Chinese-made toys from the world market because of safety fears relating to lead paint and small magnets that can be shaken loose and swallowed by children. The cause of these problems has been attributed to the fact that various tasks that were previously performed in factories owned and operated by Mattel had been outsourced to Chinese contractors and sub-contractors (The New York Times, August 15, 2007).

Notice that factor liberalization also leads to a more efficient allocation of A suppliers across countries, resulting in a beneficial increase in aggregate production of the numeraire good: in the Home country, the surplus derived by A firms in the production of \( i \) good falls from \( \tilde{\alpha} \) to \( \alpha^w \), leading some A suppliers to switch to the production of good 0; the opposite happens in the Foreign country. It can easily be shown that the overall effect is an increase in world production of the numeraire good, which is beneficial to consumers in both countries. This is because more efficient A firms from Home replace less efficient foreign firms. However, the increase in production may be quite small (depending on the distribution functions \( F \) and \( F^* \)—see Appendix), in which case the impact that factor liberalization has on consumer welfare depends mainly on its effects on the prices of the \( i \) goods. We can then state the following:

**Proposition 5** There exist preference parameters and distributions of A productivity such that factor market liberalization may reduce consumer welfare in both countries.
4.2 Low-stakes Managers and Governance

The model of firms' organizational design introduced in Section 2 is most descriptive of “family firms,” or other closely-held organizations in which the primary decision makers have high financial stakes. The model could easily be adjusted to describe “managerial firms,” in which the primary decision makers have low financial stakes. For instance, suppose suppliers receive only a small fraction $\lambda$ of the revenues, with the remainder accruing to outside shareholders who have no control over major organizational decisions. In this setting, it is straightforward to show that managers will decide to integrate when they receive revenue in $(\hat{p}(\hat{\alpha})/\lambda, \bar{p}(\hat{\alpha})/\lambda)$, which will correspond to a much broader range of product prices than in the case considered above (for which $\lambda$ was equal to 1). In turn, this will increase the range of prices for which the inefficient forms of integration and non-integration would be chosen by the managers.

Shareholders' interests will now diverge from those of their managers: typically, they will prefer higher output levels than their managers do. This is because shareholders are unconcerned with the managers' private costs, but value revenue (and since they are competitive, they have no interest in reducing output). In particular, their interests may be more aligned with those of consumers (who obviously favor high output) than with those of managers.\footnote{However, there are limits to this alliance of interests (see Legros and Newman, 2006).}

Now imagine a corporate governance policy that effectively gives shareholders greater control over organization design decisions (or compare countries with “good corporate governance” or “strong shareholder protection” to those without). Compared to the case in which managers with low financial stakes decide on the firms' ownership structure, integration will now be chosen for some prices below $\underline{p}(\hat{\alpha}/\lambda)$ and non-integration for some prices in $(\hat{\bar{p}}/\lambda, \bar{p}(\hat{\alpha})/\lambda)$, raising output. Generally these “hostile” takeovers and divestitures will occur at the expense of $B$ supplier firms. Under good corporate governance, the likelihood that factor liberalization leads to a price increase and to a loss in consumer welfare is then reduced.

Moreover, goods market liberalization now becomes more effective: it is clear that such liberalization can only be welfare enhancing in our model; however, the gains from trade liberalization would be larger still if organization were always chosen to maximize output rather than managerial welfare. In this sense, governance policy and trade policy can be complementary.

5 Conclusions

In this paper, we have embedded a simple model of organization design into a standard model of international trade between two large countries to examine the effects of the liberalization of product and factor markets on the boundary of firms. The main predictions of our theoretical
analysis is that the removal of barriers to commodity trade and factor mobility should lead to the convergence in firms’ organization design within an industry across countries. The specific type of ownership structure to which a liberalized industry will converge will depend on demand and supply conditions prevailing in that industry, as well as on the terms of trade in supplier markets, which determines the range of prices for which vertical integration is chosen over outsourcing.

The model suggests provide clear predictions in terms of firms’ organizational design: we should observe a tendency for supplier relations to have become more similar across countries in recent decades; this trend should be most apparent in trade exposed sectors; it should also be particularly evident within regional trade agreements such as the European Union, in which the integration of the member countries’ product and factor markets has been “deeper.” By constructing an index of vertical integration at the industry level along the lines of Acemoglu et al. (2005), it should be possible to assess the empirical of these predictions.

Appendix

A.1 Full Employment Equilibrium

To ensure existence of a full employment equilibrium for both Home and Foreign (and therefore for the integrated world economy), define $p_0(\alpha)$ to be the lowest price at which an $A$ can obtain the surplus $\alpha$ under non-integration: $W^N(1, p_0(\alpha)) = \frac{p_0(\alpha)^2}{1 + p_0(\alpha)} = \alpha$. Note this equation has a unique solution, increasing in $\alpha$. Thus, $p_0(\alpha) > p_0(\alpha^*)$. Moreover, the solution is independent of the sector, and it follows from Assumption 1 that $p_0(\alpha) < p(\alpha)$, so that Non-integration dominates Integration at $p_0(\alpha)$. We simply require that there is excess demand for good $i$ at $p_0(\alpha)$, so that the equilibrium price must exceed $p_0(\alpha)$ and there is full employment of $B_i$’s. For this let $V_i = \max\{n_i, n_i^*\}$. We then impose

Assumption 2 For all $i \in \{1, \ldots, I\}$, $u_i'(V_i Q^N(p_0(\alpha))) > p_0(\alpha)$.

A.2 Proofs of Lemma 1 and Proposition 5

[To be added.]
References


