THE ORGANIZATION OF FIRMS IN A GLOBAL ECONOMY

EDITED BY ELHANAN HELPMAN,
DALIA MARIN, AND THIERRY VERDIER

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Edited by

Elhanan Helpman
Dalia Marin
Thierry Verdier

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Preface

This book was conceived by the Centre for Economic Policy Research (CEPR) in its International Trade program. The editors invited chapters from individual scholars in order to present a canvas of modern research on international trade. Financial support was provided by the Volkswagen Foundation, both for the preparation of the chapters and for a conference in which they were presented, which took place in Munich in February 2007. We are grateful to the CEPR and the Volkswagen Foundation for making this project possible.

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Contents

Introduction

International trade has been an integral part of economics from the beginning. The subject has changed dramatically over the years, however. While the Ricardian doctrine of comparative advantage dominated the field in the nineteenth century and the beginning of the twentieth, the Heckscher-Ohlin approach—which focuses on differences across countries in factor endowments rather than differences in technology—dominated the field in the twentieth century until the late 1970s. The field was transformed in the 1980s with the introduction of what was dubbed the "new" trade theory, which incorporated monopolistic competition and product differentiation, as well as economies of scale and other forms of imperfect competition, into trade theory. These efforts were aimed at developing a theory that would better fit some of the stylized facts that were unveiled at that time. Importantly, the core of the new trade theory was incorporated into a Heckscher-Ohlin framework, producing a rich model in which trade is driven by factor endowments together with product differentiation and monopolistic competition.

Since the development of the new trade theory, scholars have made major advances in understanding trade flows. Most research had concentrated on sectoral trade flows and the factor content of trade. However, in the 1990s, new firm-level datasets became available, which provide a magnified view of trade structure within industries. What emerged from studying these datasets is a new appreciation of the importance of heterogeneity across firms within industries, such as the relationship between firm characteristics and participation in foreign trade and investment. The new trade theory could not explain these patterns. Neither could it explain the growing internationalization of production nor the changing forms of the organization of production and distribution around the globe. It therefore became evident that a new approach was needed. This need triggered an exciting research program that again revolutionized trade theory, better aligning it with the data.

The new new trade theory evolved along two distinct lines, which have since been integrated: it can handle differences in productivity across firms within industries and it allows firms to choose their organizational form. In combination, these extensions yield rich models that predict which firms choose to serve only the domestic market, which export, which engage in horizontal foreign direct investment, which integrate, which outsource, and which—within each of these categories—choose to offshore.

The collection of chapters in this volume consists of original studies in the spirit of this new approach to international trade and foreign direct investment. It is highly representative of the modern work in this field.

In Chapter 1, Antràs and Helpman study the impact of contractual frictions on the organization of firms and their sourcing strategies. Novel features of their theoretical model are the varying degrees of contractibility of headquarter services and intermediate inputs and the varying degrees of contractibility across countries. As in their previous work, firms form in North but they can source intermediate inputs in North or South. Final-good producers and their suppliers make relationship-specific investments that are only partially contractible. Firms differ by productivity and therefore have different incentives to choose organizational forms, described by ownership structure and supplier location. The authors analyze the impact of the quality of the contracting institutions on the prevalence of four organizational forms: integration in North, outsourcing in North, FDI in South, and outsourcing in South. Importantly, they find that the impact of an improvement in the contractibility of an input on the choice between integration and outsourcing depends on the input; better contractibility of headquarter services encourages outsourcing, while better contractibility of intermediate inputs encourages integration. As a result, an improvement in South's contracting institutions increases offshoring, but whether the expansion of offshoring is biased toward FDI or toward outsourcing depends on whether the easing of contractual frictions disproportionately affects headquarter services or intermediate inputs.

In Chapter 2, Nunn and Trefler examine empirically some of the implications of the Antràs-Helpman model, as well as the implications of earlier work along similar lines. Using detailed U.S. data on imports from 210 countries, they show that, consistent with the theory, the share of intrafirm trade is higher in sectors with higher headquarter intensity, as measured by either physical or human capital intensity. They also find that a larger dispersion in the productivity of firms leads to higher shares of intrafirm trade, and that this effect is stronger in more headquarter-intensive sectors.

The evidence on these issues is very strong. Nunn and Trefler also find evidence for the impact of contractibility on the share of intrafirm trade. They construct an index of the interaction between the relationship-specificity of industries and the overall contracting environment of the countries from which the United States imports and they estimate its impact on the share of intrafirm trade. According to the theory, this impact should be positive in high headquarter-intensive sectors. Indeed, this is what they find in the data, except that the relevant coefficients are not very precisely estimated. In summary, this chapter provides evidence in support of the new view of the international organization of production.

In Chapter 3, Ottaviano studies a two-country, North-South dynamic model of innovation and growth that combines endogenous quality ladders à la Taylor with hold-up problems à la Grossman and Helpman. In this model there are two activities, innovation and production; and two organizational decisions, the location of activities and an ownership structure. The location decision is driven by comparative advantage and wage differentials between North and South, while the ownership decision trades off diseconomies of scope from vertical integration, and hold-up frictions from outsourcing. These frictions vary across regions due to differences in the quality of enforcement institutions, and they vary across industries as a result of differences in their potential for technological improvements. The quality of enforcement institutions affects the ownership decision and consequently the return to innovation, R&D intensities, and growth. Ottaviano's analysis identifies a general equilibrium channel through which ownership structure affects the pattern of specialization and trade. Indeed, as long as innovation and production take place in different regions, there will be international payments of royalties, and the extent of these payments will depend on the ownership structure. A change in ownership impacts relative wages through these items in the balance of payments and consequently affects the location decision and the pattern of specialization and trade. The model illustrates a new mechanism through which comparative advantages and growth are jointly determined by international differences in contract enforcement institutions.

In Chapter 4, Costantini and Melitz build a model of firm-level adjustment to trade liberalization that jointly addresses firms' decisions to innovate and to enter the export market. The model reconciles conflicting results in the empirical literature concerning the direction of causation between export participation and productivity. They show how the pace and anticipation of trade liberalization can affect the perceived causal link between export status and productivity. Anticipated trade liberalization brings forward the decision to innovate relative to exporting, and a more abrupt pace of liberalization amplifies this effect. The authors build a model that features idiosyncratic firm uncertainty with respect to future productivity, and forward-looking decisions subject to sunk costs. The benefit of an innovation is a one-time jump in productivity, which leads to a sorting of firms into innovators and noninnovators, similar to the sorting of firms into exporters and nonexporters. As a result, exporting and innovation overlap across the productivity distribution with high-productivity firms doing both. The authors analyze the equilibrium transition from a stationary state with high trade costs to an environment with liberalized trade, and they examine scenarios that differ in the extent to which trade liberalization is anticipated and the speed at which trade costs decline. To perform this analysis, they develop a computational algorithm for solving dynamic models of the evolution of industries with a large number of firms.

In Chapter 5, Marin and Verdier develop a theory in which organizational choices determine productivity differences across business firms. Rather than employing the customary assumption of an exogenous distribution of productivity (e.g., in Chapter 1), their model features heterogeneity in productivity arising as a result of the endogenous allocation of power inside the corporation. The allocation of power depends in turn on a firm's organizational choice as well as on the amount of information collected by headquarters and middle managers. The authors show that in an equilibrium in which all firms adopt an organization that assigns "formal" power to the headquarters, there are firms in which middle managers end up having the "real" power. The latter arises when the headquarters are unsuccessful in identifying new projects and they decide, as a result, to follow the suggestions of their informed middle managers. The model has several novel features. First, the intensity of competition depends on whether headquarters or middle managers have power inside the corporation. In particular, competition is less intense when the headquarters delegate power to middle managers. Second, the model delivers new margins of trade adjustment: the monitoring margin and the organizational margin. Depending on which of these margins dominates, trade liberalization may lead to higher or lower productivity. In particular, trade liberalization may induce firms to adopt organizations that encourage the creation of new ideas that are less suitable for price and cost competition.

In Chapter 6, Feenstra and Ma study the impact of trade on entry and product availability in economies with multiproduct firms that vary by productivity level. Unlike most models of monopolistic competition, they assume that firms are "atoms," so that a firm does not face a constant demand elasticity despite the fact that the differentiated product comes in a continuum of varieties, and preferences for these varieties exhibit a constant elasticity of substitution. Because every firm produces a multiple of these varieties, it perceives a varying elasticity of demand. As a result, markups are endogenous and a firm that chooses the range of its brands endogenously trades off marginal profits from a new brand against the cannibalization of profits from inframarginal brands. In the resulting equilibrium, entry drives expected profits down to zero or close to zero. Naturally, after entry, only firms with high enough productivity stay in the industry. Interestingly, this environment exhibits an inverted U-shaped relationship between productivity and the number of brands a firm chooses to produce. The numerical simulations imply that trade does not have a large impact on the number of surviving firms; but it does drive out the least-productive firms, raise the range of brands produced by each of the remaining firms, and raise welfare.

Yeaple uses a simple framework for studying ways in which geographic characteristics and firm heterogeneity impact the assembly and sourcing strategies of multinational corporations. In Chapter 7, he develops a theoretical model that contains three main ingredients. First, there are two regions: a home region in which companies are headquartered, and a foreign region composed of many areas arrayed in a "hub and spokes" configuration. Transport costs exist both interregionally and intraregionally, and these costs are lowest between the "hub" and its "spokes." Second, a final good is assembled from a continuum of intermediate inputs, the production of which entails fixed and variable costs. In addition, there exist plant-specific fixed costs. Third, firms face heterogeneous product demand. These companies choose the locations of assembly lines and of the source for intermediate inputs. This framework provides a rich set of predictions about the location of multinational affiliates based on the geographic characteristics of the various areas, the sourcing of intermediate inputs, and the export of both final goods and intermediate inputs by foreign affiliates. In particular, it emphasizes the role of regional centrality as an important factor in explaining the export patterns of multinationals and their affiliates, both to related and unrelated parties. It provides a flexible and tractable framework for studying sourcing strategies when geographic features are important.

Eaton, Eslava, Kugler, and Tybout develop new, stylized facts about export dynamics. In Chapter 8, they use rich transaction-level customs data from Colombia to study firm-specific export patterns, entry and exit into destination markets, and revenues from sales in these markets. They find that in a typical year, nearly half of Colombia's exporters did not export in the previous year. As a result, export sales are dominated by a small number of very large and stable exporters. Nevertheless, a fraction of the new exporters survive and rapidly expand their foreign sales. Over a period of less than a decade, the successful new exporters account for almost half of the total expansion of exports. Finally, exporters that add or drop markets follow certain geographic patterns. And the likelihood of survival in foreign markets depends on which markets are used as testing grounds for new exporters who wish to learn about their foreign-market potential.

In Chapter 9, Grossman and Helpman study a new reason for foreign sourcing: fair wage considerations. Their model features two types of workers, skilled and unskilled. While skilled workers can perform the tasks of the unskilled, there are tasks that only the skilled can perform. Every worker cares about relative pay in his own workplace. In particular, a worker is unhappy when paid a wage below his firm's average. As a result, firms compete for workers not only in terms of wages but also in terms of the employment mix, with the latter having productivity effects. This leads to equilibria in which otherwise identical firms may have different hiring practices, both in a closed and in an open economy. In this framework, offshoring may take place in situations in which it would not occur in the absence of relative wage concerns. Moreover, if the economic structure is such that offshoring takes place with and without relative wage concerns, the extent of offshoring is larger in the former case. In other words, relative wage concerns lead to more offshoring in order to ease the constraint they impose on the employment mix.

The final chapter, by Antràs, Garicano, and Rossi-Hansberg, discusses international offshoring in a model that focuses on host-country management skills and communication costs. These authors consider a general equilibrium North-South environment in which production requires time and knowledge, and agents with heterogeneous abilities form hierarchical teams. In this setup, low-skilled agents specialize in production while high-skilled agents specialize in management. Offshoring requires intermediate layers of local managers with "middle skills" in South in order to reduce the cost of transmitting knowledge within international teams. As a result, the distribution of skills in the host country plays an important role. Within-country communication costs are also an important determinant of international offshoring, because they affect the capacity of local managers to form local teams and therefore they also affect the opportunity cost of working for an international hierarchy. A major result of the analysis is that middle skills in the host country have a stronger impact on offshoring the worse is the host country's local communication technology. Using FDI inflows as a measure of offshoring and an index of the availability of communication technologies (constructed from data on telephone, computer, and Internet usage), the authors present suggestive cross-country evidence lending support to this prediction.

The themes of these chapters comprise the core of the new view of international trade and foreign direct investment, a view that has emerged over the last decade from studies of highly disaggregated datasets and new conceptualizations of the evolving patterns of international specialization. It is now understood that in the modern era, trade and investment are driven by business firms that differ from each other in technology and organizational form; that their sourcing strategies cross national borders and involve nontraditional forms of foreign direct investment; and that international trade has effected such fundamental changes in corporations as the move to flatter hierarchies, the decentralization of decision making, and the emergence of human capital as a stakeholder in firms. This new understanding has profound implications for the analysis of trade and investment policies and for the relationship between international trade and economic growth. Moreover, it provides a foundation for a better understanding of the relationship between trade, labor markets, and the distribution of income. Many of these issues will be explored in future research.

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Contractual Frictions and Global Sourcing

POL ANTRÀS AND ELHANAN HELPMAN

1.1 Introduction

Insights from neoclassical trade theory and new trade theory have improved our understanding of the structure of foreign trade and investment. Recent developments in the world economy have sparked, however, an increased interest in new theoretical approaches designed to better understand the evidence about firms that organize production on a global scale. These developments include the growing role of multinational corporations in the global economy,[1] their engagement in more complex integration strategies,[2] and the growing share of intermediate inputs in trade flows.[3]

Although traditional theories allow for trade in intermediate inputs and for the emergence of international production networks,[4] they cannot explain some newly observed phenomena.[5] First, while the traditional approaches assume that firms are (for the most part) symmetrically structured within industries, the data exhibit substantial within-industry heterogeneity, both in the size distribution of firms and in their participation in foreign trade.[6] Second, in developing global-sourcing strategies, firms decide on where to locate the production of different parts of their value chains and also on the extent of their control over these activities. Which activities should they locate in the home country and which should they offshore? If they choose to offshore, should they engage in foreign direct investment (FDI) and import intermediate inputs within their boundaries or should they outsource the production of intermediates to independent foreign suppliers? As is well known from the work of Coase (1937), Williamson (1975, 1985), and Grossman and Hart (1986), these questions cannot be answered in a complete-contracting framework of the type used in traditional theories of international trade.