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International Delocalisation of Production in Central and Eastern Europe: Outsourcing versus FDI

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Contents

Introduction

In the recent months the debate on the international outsourcing of economic activities has been high on the agenda of policymakers. The debate is particularly hot in the United States, where IT tasks are being outsourced to countries like China or India, and in the European Union, where there are fears of job relocations taking place in the countries of Central and Eastern Europe, now that they have acquired full membership.

The story goes that it is no longer manufacturing that is feeling the pressure of foreign competition, but also jobs in the services sector are now migrating. Although international outsourcing of material inputs is still far more quantitatively important than services, the current wave of anxiety in advanced economies is mostly about international outsourcing of services. There is a sense in which services outsourcing is qualitatively different from material outsourcing since the latter implies migration of professional jobs from rich to poorer countries.

In the past, service sectors have been considered impervious to international competition. Over the course of the 20th century, companies reorganized industrial production into even more complex layers of designers, subcontractors, assemblers and logistic specialists, but by and large companies have mostly continued to manufacture close to where their goods are consumed. They have then grown internationally by producing overseas, for new costumers, the same goods they produce and sell at home: products have become global but production has not. A new reorganization that occurs in recent times starts involving white collar work. This is due to various reasons. First, the spread of internet, along with cheap

and abundant telecommunications, allows handing over more white collar work to specialized suppliers, in the same way as manufacturers are doing already. A growing number of suppliers offer corporate human resources services, credit-card processing, or information technology work.

Second, as transport costs fall, globalization starts separating the geography of production and consumption, with firms producing goods and services in one country and shipping them to their customers in another.

Over the past ten year, countries like Mexico, Brazil, the Czech Republic, and most notably China have emerged as important manufacturing hubs for television, cars, computers and other goods which are then consumed in America, Japan and Europe. Such offshore production is central to the strategies of some of the world's most powerful business. Over the next ten years, Russia, China and particularly India will emerge as important hubs for producing services such as software engineering, insurance and market research. As business take advantage of declining shipping costs and abundant and cheap telecommunications bandwidth, the reorganization of work that is already occurring is likely to advance even faster. Rich country manufacturers have already invested hundreds of billions of dollars in building factories in China to make clothes, computers, cars and other consumer goods. In the next few years, they are expected to invest hundreds of billions more to shift the production of cars, chemicals, plastics into business services.

A study of McKinsey Global Institute points out that possible shifts in global employment can occur in various service industries: for instance, already 16% of all the work done by the world IT services industry is carried out remotely, away from where those

services are consumed. This opens up huge opportunities, but it also inspires fear of job losses, rather then hope of growth. The decision of companies to source some steps of the production process abroad has also certainly an impact on the labor market at home.

In this work my intention is not to deal with this issue, but it is noteworthy pointing out that this fear arises from several pieces of evidence that document a rising of this phenomenon involving both manufacturers and services. For example, Yeats (2001) estimates that 30% of OECD exports of machinery and transport equipment comprised parts and components in 1995, and 26% in 1978. This share is highest in the United States, increasing from 36% to 40% in that period, but Europe registered a growth of trade in intermediates in those sectors, from 26% in 1978 to 28% in 1995.

Also the survey work of Feenstra (1998) registers this phenomenon of integration of trade flows and disintegration of production activities world wide, both in the US and in the European Union. Indeed, as Feenstra claims, "the rising integration of world markets has brought with it a disintegration of the production process, in which manufacturing or services activities done abroad are combined with those performed at home". The result of this process has been defined as fragmentation of production.

A production process is fragmented when it is split up into two or more stages that can be undertaken in different locations but lead to the same final product. The decision to locate abroad phases of the production process is generally driven by the exploitation of some kind of comparative advantages can be found in the country chosen, such as lower level of labor cost.

The literature describes this phenomenon using different definitions, like delocalization of production, vertical specialization, outsourcing, etc. This is because in the real world international fragmentation of production takes place in many ways, even though the main fact behind this phenomenon is that different countries contribute to the production of the same final good. In particular, as Hummels et al. (2001) claim, fragmentation of production occurs when: a good is realized through two or more sequential stages; the value added chain in the production of goods is split into two or more countries; a subset of imported inputs employed in at least one country is embodied in exported goods. Fragmentation can be led by many reasons but it has also some implications in the countries involved in this phenomenon. Firstly, it affects the composition of trade among countries, and this is why outsourcing is often measured employing trade data: Feenstra and Hanson (1997) express imported inputs within each industry in relative terms with the total intermediate input purchases, whereas Hummels et al. (2001) compute the share of imported inputs into gross production within each industry. Indeed, international disintegration of production causes intra-industry trade flows between countries where are de-localised phases of production. This fact in turn shapes the pattern of international specialization, and it also involves some organizational aspects of the production process.

In reality, international fragmentation of production can be realized through a wide range of firms' organizational strategies. It depends on which functions are delocalized abroad. For instance, it may involve distribution and retail services, store of raw materials or production of some intermediates. Another relevant decision determines whether the activities localized abroad have to be carried out within the boundaries of the firm or exter-

nalized and handled by local suppliers. As explained in the first chapter, the combination of these two strands of decisional processes lead to different internationalization strategies.

In particular, this work focuses on two different way of organizing production process, i.e. outsourcing and foreign direct investment. A firm that needs intermediate products can choose to produce its inputs in a wholly owned subsidiary or contracting out the production of components to local suppliers.

Starting from the OLI paradigm proposed by Dunning (1977, 1981), the first chapter reviews theoretical models that formalize the trade off between internalizing all phases of production and outsourcing some of them to subcontractors. In particular, it focuses on recent models that have applied elements of contract theory to international trade theory, formalizing all the possible ways in which production can be organized (for instance, Grossman and Helpman 2002, 2004 and 2003). They introduce incomplete contracts to study ownership decision, i.e. whether firms should own plants producing intermediates or not. Indeed, they take into account that the eventual relationship with the suppliers is plagued by contractual difficulties, linked to the uncertain legal framework of the host country.

Following this strand of literature Chapter 2 presents a model in which the foreign final goods producers have to decide how to invest abroad, precisely in low wage countries. The trade-off arises between lower costs could be borne through outsourcing, and the contract incompleteness they might avoid if they produce their required inputs through a FDI.

The aim of the second chapter is twofold. First, it tries to explore the link between the production strategies of the final producers and the degree of contractual difficulties that can be found in the host country. Secondly, despite the previous works that deals with this issue, it tries to shed some light on how this connection influences the establishment of linkages between the final producers and the local suppliers. In fact, institutional, legal and political factors can affect investors' choice regarding whether contracting out some stages of the production process to local suppliers or setting up a subsidiary.

As Weder (2001) argues, institutional conditions are "the rules of the game that allows the correct functioning of a market economy [], defending in particular property and contract rights from violation by third parties as well as by the state. For instance, corruption, discretionary action of bureaucrats, unpredictable changes in rules and policies, unreliable judiciaries are all means by which the state can de facto expropriate private agents".

Many works have explored the role of institutional uncertainty on FDI inflows, in particular in the case of transition economies[1]. In their process of transformation, greater emphasis has to be attributed to the state's role in securing the necessary conditions for the efficient operation of the market: in particular, these conditions are related to the protection of civil and property rights and to an effective regulatory environment. For this reason, I consider the impact of the state of the legal system in a host country on foreign firm's preference for FDI versus outsourcing. This comes from the fact that there is a basic trade-off in contracting out one or more phases of production process to local suppliers. On the one

[1] See for instance Abed and Davoodi (2000), Smarzynska (1999) and Smarzynska and Wei (2000).

hand they can be more efficient and pledge greater flexibility through lower fixed costs than a FDI. On the other hand, doing outsourcing raises problems linked to contract enforcement, especially in developing or less industrialized countries, where the legal system is not well effective.

The institutional parameter included in the model can comprise a wide range of aspects. This is witnessed by the fact that there has been an upsurge of databases that try to measure different facets of governance and institutional quality. International organizations like the World Bank have devoted even greater attention and resources to the analysis of this issue, evaluating many features, as the rule of law, government effectiveness, regulatory burden and corruption.

Chapter 3 tries to apply the model developed in Chapter 2 to the case of four Central and Eastern Countries. Three of them have already entered the European Union (Czech Republic, Hungary and Poland), while Romania is expected to accede in 2007. The choice of these countries is motivated by various reasons.

First of all, during the nineties they have become recipients of a huge flow of investments from the EU. Their geographical and cultural proximity to the industrialized Western European countries, as well their comparative advantage especially in terms of labor costs savings, made them a natural destinations of FDI and trade flows.

Secondly, the transition process experienced by the Central and Eastern European Countries (CEECs) demonstrates how institutional upgrading involves various aspects that are linked to each other, ranging from political, economic, financial and regulatory matters. The EBRD (European Bank for Reconstruction and Development) Transition Reports

demonstrates that these interconnections, as transition indicators record, are assessments of reforms developments regarding market and trade, enterprises, infrastructure, etc.

Before entering the details of the econometric analysis that tests some implications of the model, Chapter three clarifies this issue. A paragraph deals with the measurement of the legal enforcement, and the need of taking into account various aspects that have contributed to the transition process of the CEECs. In particular, it is discussed the role played by some external anchors, i.e. the accession to international treaties and the perspective of joining the EU, in enhancing their institutional framework.

In this context, another measurement issue has been taken into account, namely how to measure outsourcing. Following other empirical works that try to quantify the phenomenon of fragmentation of production , processing trade, .i.e. goods which are recorded at customs offices for inward processing, seemed the most appropriate way proxy the phenomenon, given the lack of data at firm level. Such trade has increased enormously, particularly for particular types of production that are mostly labor intensive, and hence it has been used to proxy international fragmentation of production in the econometric test.

The latter has been run according to the two main objectives of the model. Firstly, it is employed to verify some regularities concerning with the industry equilibrium of the downstream sector where foreign firms operate; secondly, it explores how institutional upgrading affects the presence of foreign firms in the host country and the amount of outsourcing.

Hence, this last objective considers the economic impact of an improvement of law enforcement on the host country. In reality, what we could expect is that outsourcing can guarantee greater benefits than FDI given that it involves more directly local firms.

From this point of view, among the institutional facets contributing to discriminate between the choice of installing a wholly owned subsidiary and contracting out some stages of production, the main issue is related to the property rights protection.

In reality, property rights protection is a prominent item on the international policy agenda, as it has been proved by the introduction of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) under the World Trade Organization (WTO). Most developed countries agreed to adopt certain minimal levels of Intellectual Property Rights (IPR) protection, whereas developing countries went along with the TRIPS agreement. They fear that, strengthening their IPR legislation, the losses resulting from this action can overcome its benefits, as in the model presented in Chapter 2. This is due to the fact that IPR protection tries to balance the need of a society to encourage innovations of technologies and products, on the one hand, whereas on the other hand, diffusion and use of these items. It means that IPR protection spurs innovation and then can have a positive impact on growth prospects also via trade and foreign investment flows, which in turn translate into faster rates of economic development. However, there is an obvious tension between invention and dissemination: in the poorer countries the benefits due to spurring inventories are fewer than the costs coming from the protection and hence restriction of circulation of new products and technology.

Then, the model presented in Chapter 2 shows that production strategies of final producers are sensitive to the law enforcement, but the way the latter influences the host country economy is not clear. In this ultimate phase of analysis property rights protection plays a relevant role, since an improvement of it is expected to increase fragmentation of

production, but at the same time it restricts technology transfer in the host country, and the final outcome for the local economy is controversial.

In order to overcome this ambiguity, it is appropriate test the main results of the model with data, as it has been done in Chapter 3.

Chapter 1
The internationalization of the firms

1.1 Introduction

Firms exist in order to organize the production and distribution of goods and services. In the absence of firms, production and distribution would be organized largely through arm's length transactions that are contractual relationship between independent firms, as for example licensing, subcontracting and franchising agreements. Many of these transactions are handled within the firm. The extent to which a firm internalizes any of those transactions depends upon its ability to achieve economies of scale in production and distribution, and its ability to achieve coordination economies coming from the use of complementary assets (productive, commercial, financial and so forth) through a direct control.

Most firms starts by serving national and sub-national markets. They build upon the competitive advantages gained at home to serve international markets, either via export or by investing to produce abroad. The latter, that identifies international production, includes all activities organized and controlled by transnational corporations within host economies that contribute to the value of the firm's output, including the creation of both goods and services, intermediate and final products. The choice between exporting or international production depends on a firm's assessment of its competitive advantages, the gains to be made from a particular location, and the potential gains from internalizing cross-border activities within the organizational structure of the firm.

The aim of this chapter is to introduce an issue generally faced by firms operating in several countries, i.e. the possible ways in which its production activities can be organised. To do this, the following section briefly outlines the wide variety of internationalization strategies a multinational can choose, depending on various motives that lead a firm to enter a foreign market and on different types of economic activities to delocalise.

However, the model developed in the following chapter and its empirical counterpart presented in chapter 3 concentrate on two particular strategies, i.e. foreign direct investment (FDI) and outsourcing[2]. They do not fully describe all the possible alternatives of organizing production that multinationals can choose, but theoretical models are by definition a simplification of reality, and those presented in section 4 as well as that one developed in the following chapter are useful for understanding complexity of forces and variables influencing the internationalization decision of firms.

Indeed, they also try to formalise some stylised facts presented in the section 3, that considers several pieces of evidence documenting the rising of international fragmentation of production involving more than one country through international outsourcing.

1.2 Some internationalization strategies

Firms engaged in international production need strategies and organizational structures that are suited to this form of economic activity. Strategies of organizing the cross-border production of goods and services involve choices about the international location of different

[2] In this work I took into account only material outsourcing, i.e. outsourcing of material inputs and not services. This specification is important since the theoretical model developed in the following chapter could not necessary apply to the case of services, and hence also its empirical counterpart includes only manufacturing industries. For a wide treatment of the subject see Amiti and Wei (2004).

activities, as well as the degree of integration among various entities that are under the common governance of the firm. The range of possible strategies and structures has grown over time, in relation to major changes in international economic, technological and policy environment. In particular, the decision of a firm to extend its economic interests and activities abroad can be seen as the result of a combination of location and governance decisions. The interaction of these two choices holds when a firm tries to gain access either to foreign markets (market-seeking) and to production factors not available at home, like natural resources, raw materials, technological, innovatory and created assets like patents (resource-seeking). Market seeking firms are aimed at exploiting the host country's market and eventually neighbor countries'markets. The size and growth prospects of the market, the existence of physical barriers, the level of transport costs, and the host country's economic policies (including for instance the degree of protection for domestic production) can induce a MNE either to simply export its products or to organize production in foreign markets. In turn, the latter can imply an investment in those markets by building a plant or engaging in contractual arrangements with a local agent. Instead, resource-seeking firms are attracted by the abundance, cost and quality of natural as well as human resources.

In both cases the location decision is based on a comparison of delivered costs, depending on the relative production costs of a domestic and foreign location, of tariff and non-tariff barriers to trade.

A second largely independent decision is whether a hierarchical control on the main functions within the firm is more efficient than market transactions to organize the interde-

pendencies between agents located abroad and at home. The following figures represent the decision-tree of a firm that highlights very diverse forms of internazionalization strategies.

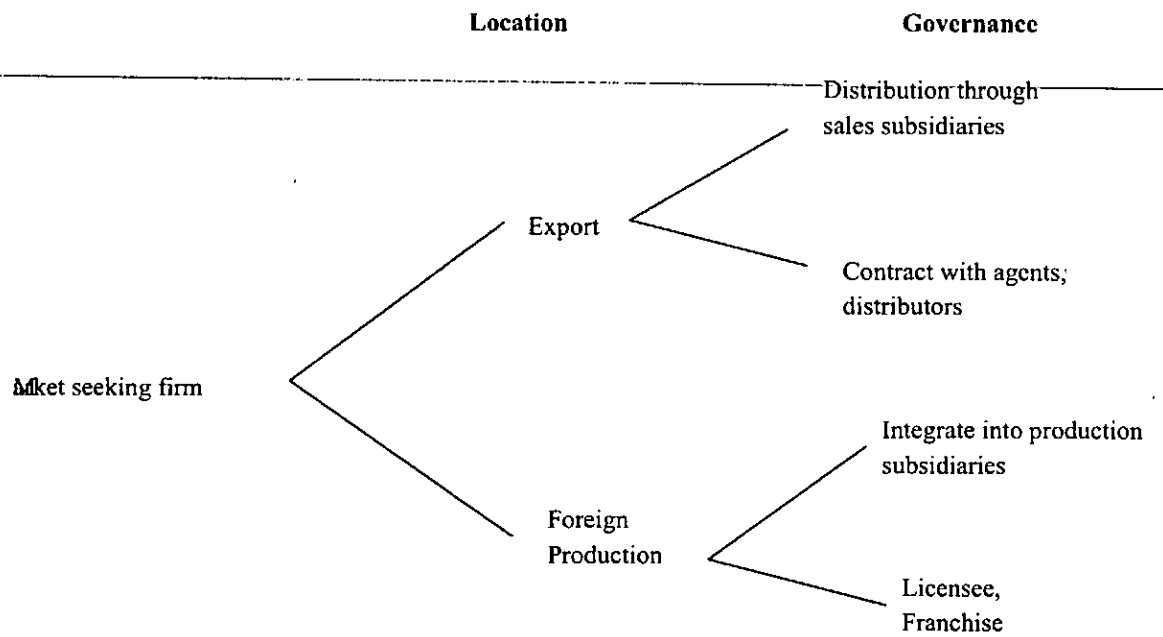

Figure 1.1. Decision-tree of a market-seeking firm (*Source: Hennart, 2000*)

Figures 1.1 and 1.2 show that, once a foreign location is optimal, whether international coordination will take place within the firm (whether a multinational will emerge) or through the market can be explained by the relative costs of using firm or market governance to organize that specific interdependency.

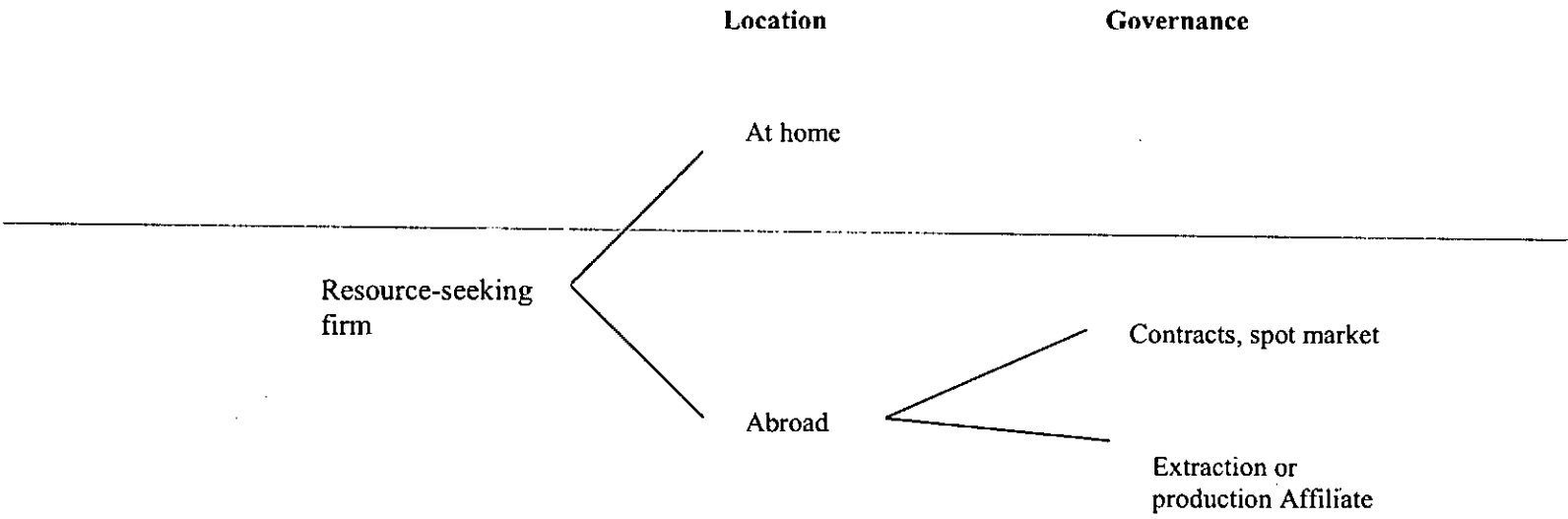

Figure 1.2. Decision-tree of a resource-seeking firm (*Source: Hennart, 2000*)

International interdependencies can be of many types due to various reasons. For example, knowledge and reputation developed in one country can have productive uses in another, products manufactured in one country may require complementary marketing services in another, i.e. different modes of international organization of a firm come from which kind of functional activities are localised abroad.

Economic theory has focused on particular types of internationalization strategies. The transaction costs approach to the multinationationals (MNE) compares the cost of providing some goods or services through the local market with those arising when the same activities are arranged within the firm (through a subsidiary or foreign affiliate).

International exchange can involve a pecualiar type of input, knowledge, as know-how developed in one country can be useful in others. The basic problem of the transfer of knowledge is therefore whether can be organized within the firm or through a contractual relationship. This decision has to take into account the information asymmetry between buyers and sellers since the buyer of know-how may not have complete information about the exact characteristics of the invention and is thus likely to underpay for it. The patent system offers one solution to this information asymmetry: by giving owners of knowledge a monopoly in its use, patents encourage them to disclose it, thus reducing information asymmetry between buyers and sellers. However, the efficiency of a patent system depends on the ability of patents to describe the invention and the power and willingness of public authorities to establish and enforce monopoly rights on the invention. Hence, patent systems have clear limitations due to the difficulty of writing the tacit knowledge implied by the invention of a new product and to the imperfect enforcement of patent rights (Hennart, 1982). Indeed, by taking a patent, inventors are disclosing their know-how to potential buyers but also to potential imitators. Hence, inventors who fear that their rights will not be protected will keep their inventions secret, internalising the market for their knowledge by vertically integrating into the manufacture of products incorporating their know-how. Arm's length transfer of knowledge through licensing (i.e granting of permission, in return for a licensing fee, to use a technology[3]) tends to be more prevalent when patents rights are easy to establish and to defend (Davies, 1997; Davidson and McFetridge, 1984), while transfer within the firm is preferably chosen when knowledge is difficult to codify into

[3] Some definitions are drawn from Alan Deardorff's on line Glossary of International Economics http://www-personal.umich.edu/~alandear/glossary/

patents and easy to copy. In the last case, the resulting lack of of protection will incite firm not to disclose information about their know-how. Hence, according to Hennart (1982), the initiative to establish a MNE implies internalization of markets for know-how.

International exchange can also entail reputation, and trademarks are the legal instruments establishing property rights in reputation. Trademarks are valuable intangible assets as they reduce customer search costs, but the ability of a firm to exploit its reputation abroad depends on the extent to which trademarks are protected from unauthorized imitation (counterfeiting). A firm that owns a trademark can exploit it by itself producing goods and services bearing its trademark, or by drawing franchising contracts[4] to rent the use of its trademark to local enterpreneurs. Reputation comes from the fact that a franchise agreement usually involves a company which has been highly successful with a product or service deciding to authorize other businesses to use their concepts in other geographic locations.

The efficiency of franchising depends on the extent to which trademarks are protected from counterfeiting in order to protect the value of the trademark. However, also franchisees can exploit and reduce the value of the trademark, as they can maximise their income by reducing the quality of the goods sold under the trademark. One way of avoiding a franchisee's incentive to underinvest in the quality standards is to transform him into an employee, internalising the distribution (or production) of the goods (or services) sold into the foreign markets. Hence the choice between franchising independent owners and establishing company-owned outlets will depend on the comparison of two types of cost:

[4] A franchise is a type of business in which a company is authorized to sell another company's goods or services in a specific area in exchange for a franchise fee.

that of monitoring employees to guarantee their level of effort and that of specifying and enforcing a minimum level of quality by contract. It results that franchising contracts prevail if 1) it is relatively easy to write contract specifying a certain level of quality and whose violation can be detected and proved to third parties and 2) it is relatively costly to monitor employees. Hennart (1982) argues that franchising contracts are well widespread among low value added services like hotels, employment agencies, car rentals, whereas international interdependencies are likely to be organised within a MNE in case of high skilled services sectors, like banking, advertising, and management consulting.

Interdependencies involving raw materials and components arise when it is optimal locating in different countries some stages of value-added chain: for instance, the optimal location of component manufacture differs from that of assembly or when raw materials are placed in a different country than processing plants. Many of the international interdependencies involving raw materials and components are handled by international spot markets or by long term procurement contracts. In some cases, however, organization of these interdependencies within a MNE is more efficient. The foreign investment of integrated oil companies into crude oil represents an example: economic theory suggests that such backward vertical integration will be chosen whenever markets for raw materials and intermediate inputs are characterized by high transaction costs between the eventual contractual parties. Physical asset specificities, high transportation costs, government barriers are reasons for which spot markets are likely to fail. In these cases a negotiating party should undertake transaction-specific investments, fearing that the more flexible party will opportunistically renegotiate the terms of trade after investments have been made (Williamson,

1985). One possible way to protect themselves is to write a contract fixing the terms and conditions of the trade over a period of time corresponding to the life of the plant. Indeed, the most severe shortcoming of contracts is that they often fail under conditions of high uncertainty. As the degree of uncertainty increases, specifying ex ante all possible contingencies and the contractual changes to be made in each case becomes increasingly difficult. Instead, leaving contracts incomplete allows parties to exploit each other. Ultimately, maximum efficiency is reached through contractual relationships when uncertainty is low: when transaction specific investments are large contracts must have such duration that the risk of unforeseen events becomes very large and hence contracts provide only a limited proteciton (Franz, Sternberg and Strongman, 1986). As in other cases, an alternative to contracts is given by vertical integration, namely a foreign direct investment when the transaction between buyers and sellers of raw materials crosses national borders. This theoretical framework provides an explanation of the pattern of vertical integration in many domestic industries, for example between automobile assemblers and part manufacturers, or between coal mines and electric power plants. The same logic applies to foreign backward investments by MNEs, since they are vertical investments that cross borders. These considerations allow to find an explanation for the presence of MNEs in the case of raw materials and components: internalization based on these motivations puts into evidence that the expansion of MNEs can proceed in terms of internalization of the markets rather than the exploitation of particular advantages. For example, Hennart (1988) points out that US steel companies which have vertically integrated into iron ore mining use specialist compa-

nies to run their iron ore operations, because they do not have much experience, and hence zero advantages, in this kind of production activities.

The international expansion of firms to take over the distribution of their products can be explained by the difficulty of coordinating the behaviour of buyers and sellers of distribution services when markets for these services are narrow and when their quality is difficult to measure.

Distribution is often subject to high economies of scale and scope as effective distribution sometimes requires substantial manufacturer-specific investments. However, a distributor may be reluctant to make such investments, fearing that, once they are made, the manufacturer will opportunistically renegotiate the contract by threatening to sign a new contract with another distributor. This fear may induce the distributor to commit fewer resources than would be optimal. In this case well defined contracts that specify exclusive distribution rights may provide a valid solution. However, the more uncertain the environment and the longer the time needed to recover its transaction specific investments, the greater the probability that such a long term contract will break down. In this context, vertical integration of manufacturers into distribution seems to be the most efficient solution given that it guarantees a control over distribution services requiring large and specific investments (Klein et al, 1990). This last aspect is also important when consumers are not able to separate the contributions of manufacturers and distributors in evaluating the satisfaction of a given product. The problem is similar to that experienced in franchising and arises when both the distributors and the manufacturers affect the quality of the good or service offered on the market. Vertical integration is generally chosen when manufacturers

cannot easily define and enforce contractual rules to prevent distributors reducing product quality as being perceived by the consumers. The trade-off is mainly based on the need to have distributors that make the required level of investment and the cost of managing company-owned distribution facilities. The cost rises if there are economies of scope in distribution and if it is difficult to monitor the behaviour of employees.

A firm that decides to enter foreign markets has also to consider whether standing alone (through a wholly owned affiliate) or finding a local partner to join its foreign investment (joint venture). The need to joint venture seems particularly strong when the foreign affiliate represents a diversification activity for the parent, and hence the parent needs industry-specific knowledge or distribution facilities; or when the MNE has little information of the market that is going to enter, and hence it needs a country-specific knowledge; finally, when it needs resources controlled by local firms. Hennart (1991) considers the choice made by Japanese MNEs between partial and full ownership of their US subsidiaries. According to his work Japanese investors prefer to create joint ventures with local partners when they have little experience in the US market or when the industry they are going to operate in the USA is different from that of the parent. However, a study by Gomes-Casseres (1987) conducted over some US MNEs reveals that advertising intensity, international experience and high familiarity with the host country lead to full ownership. R&D intensity has an ambiguous role in this context as, if it is associated with diversification, i.e. foreign investment is not in the core business of the parent firm, it leads to a joint venture, whereas if the subsidiary operates in the parent's main product line, R&D intensity is a factor in favor of full ownership.

From these considerations it emerges that MNEs can reduce uncertainty deriving from the organization of cross-border interdependencies once the latter involve knowledge, reputation, components, distribution services and information of the foreign markets. It holds especially when governments of host countries limit MNEs operations. However, other internationalization strategies can offer more flexibility and require less investment than that of mantaining a direct control over affiliates. Hence, a full understanding of the expansion of MNEs requires a comparison of the costs of organizing interdependencies within firms and those of doing it in markets, i.e. through contracts with local firms. The choice of institutional forms is very large, but all these strategies involve the evaluation of a trade off between the cost of measuring intermediate outputs (market transaction costs) and that of motivating and directing employees located abroad (internal organization costs).

1.3 Facts and Issues on outsourcing

The internal operations undertaken by a firm can be organized in many different ways, where the extreme cases are represented by the vertical integration, i.e. all the activities are carried out within the firm, and outsourcing, that means contracting out some phases of the production to external suppliers. From an empirical point of view there has been observed a dramatic change in the nature of international trade as production processes increasingly involve a sequential, vertical trading chain across many countries (Hummels et al. 2001), and accompanied with an increasing share of international production that takes place through outsourcing. Feenstra (1998) starts from the evidence suggested by some U.S. companies, like Mattel and Nike that outsource a large part of their activities from the

conception of their product to their final delivery. Many of these companies use imports as a means to shift the lowest-cost parts of the production process abroad. Such a trend can be observed especially for some sectors, like the textile, apparel and footwear industries for various OECD countries. In particular, due to the lack of data at firm level, Feenstra considers the ratio of imported to domestic inputs, as it suggests that some products are imported at increasingly advanced stages of processing. It means that firms may have substituting away from these processing activities at home. Until recently, trade theory has not sought to explain why Intel, which makes semiconductors, would use wholly-owned subsidiaries in China and Costa Rica to assemble its microchips, while Dell and Mattel subcontract production to outside firms in many countries. Nor has it tried to account for why Dell would control who buys what from whom along its supply chain, while Mattel grants the suppliers that make its dolls finding sources for materials. The theoretical models presented in this chapter try to investigate why this phenomenon is occurring, and what is the relationship between foreign direct investment and subcontracting. In particular, what are the determinants that shape these different modes of organizing the production process?

Some case studies proposed by Barba Navaretti and Venables (2004) can emphasize the link of this issue with the real world.

Ikea, the Swedish retailer of home furnishing, offers well-designed items at very competitive prices. Its strength comes from its design capability associated with a wide retail and distribution network that guarantees a considerable presence of its products on the main foreign markets. So far, Ikea's strategy has been to concentrate activities related to design and engineering of the products in the home country, whereas all the manufacturing

tasks are performed by subcontractors placed in countries with low labor costs and with close proximity to raw materials. Independent local suppliers must adapt to the specifications required by the multinational, and this implies a so called relation specific investment aimed at the production of fully tailored components. However, recently Ikea has opened a manufacturing subsidiary that has acquired the control of several previously independent Eastern European producers. The reason of this change of strategy could probably be found in the difficulty risen in monitoring the manufacturing tasks provided by the local suppliers in a context in which contracts cannot cover all the contingencies that could occur in an arm's length relationship.

Another factual situation involves Pirelli's investment choices, an Italian multinational manufacturing tyres and cables. This Italian firm's international strategy is to produce innovative tyres abroad through wholly-owned subsidiary, whereas innovative cables through foreign licensee. This differentiated production plan comes from the fact that innovative tyres are based on a revolutionary technology that has to be protected and hence not transferred to subcontractors, whereas innovative cables are produced under a basic technology that is widely available. We can say that for the latter product there is not fear of knowledge dissipation by the Italian multinational.

Finally, the last case cited by Barba Navaretti and Venables (2004) concerns with Rowntree, a British producer of chocolate and confectionary. In the 1920s this multinational decided to licensee the production of its items to a join venture in South Africa. There, the partnership worked until the local stakeholders started following divergent marketing strategies with respect to the multinational. The partnership ended up with the ac-

quisition of the major control by the Rowntree, given the need of bearing additional costs for monitoring employees and managers of the joint venture.

These case studies reveal the existence of concrete constraints in the contractual relationship with eventual economic partners, even though they can offer some cost advantages due to better information about local conditions or particular expertise in the activity. In the next section I discuss economic theories related to the internalization advantages owned by multinational firms, focusing in particular on some aspects further developed in the model proposed.

1.4 Selected models of Multinational Enterprise

Multinationals are "firms that engage in direct foreign investment, defined as investment in which the firm acquires a substantial controlling interest in a foreign firm or sets up a subsidiary in a foreign country"[5].

An interesting framework which classifies the different models of MNEs is provided by the so called OLI paradigm proposed by Dunning (1977, 1981). The main idea on the basis of this classification is to distinguish three main possible reasons under which a firm decides to enter a foreign market. If foreign multinational enterprises are exactly identical to domestic firms, they will not find convenient bearing the additional costs coming from expanding its business in another country. These can be communications and transport

[5] Markusen J.R "The Boundaries of Multinational Enterprises and the Theory of International Trade", *The Journal of Economic Perspectives*, Vol.9, No.2, 169-189 p.170.

costs, barriers due to a different regulatory framework, higher costs due to entering a new local business and government networks.

Because of the inherent disadvantages and high costs of foreign production, it is necessary to identify the reasons leading firms to "export" some of their functions abroad.

The multinational enterprise must arise due to the fact that it can gain additional advantages with respect to domestic firms, such as the exploitation of scale economies or the possibility to benefit from the comparative advantages endowed by the host country.

The OLI paradigm allows us to clarify and classify these advantages: *ownership advantages*, *location advantages* and *internalization advantages*.

A firm's ownership advantage arises when it has an exclusive access to a product or a production process, since no other firms are able to develop, for instance, the necessary technology. It could also be something intangible, like a trademark or reputation for quality, or a knowledge-based asset.

However, in all these forms the ownership advantage confers some valuable market power or cost saving that counter balance the disadvantages of doing business abroad.

A location advantage is due to the fact that installing a subsidiary or being involved in an arm's length relationship abroad can lead to more profitable business opportunities because of the host country characteristics. Although tariffs, quotas, transport costs and cheap production factors are the most obvious sources of location advantages, factors such as access to customers are also important.

Moreover, it also depends on the sectoral characteristics in which multinational enterprises operate: for instance, if they provide non tradable services, it seems necessary an on-site provision of them.

Finally, the multinational enterprise has an internalization advantage, which is something related to the critical issues arising in an arm's length relationship, like transaction costs and opportunistic behaviour of the contractual party.

This last aspect I deal with more in depth. In particular, I wish to focus on a key question that is to what extent a firm prefers to keep its functions internally or choose to rely on market relations.

A comprehensive theory of multinationals offers an analysis of the choice between internalisation and outsourcing, and from this perspective the theory of multinational firms is a sub-case of the theory of the boundaries of the firm, i.e. what is done internally and what is outsourced. In this literature review as well as in the model presented in this chapter I do not address specifically intermediate forms of internalisation, like joint ventures, that is the case in which foreign investors and local producer are involved in a joint ownership of assets. Even though this organizational form involves some specific issues discussed in several studies (especially from an empirical standpoint), most of these problems are similar to those entailed in the extreme alternatives between wholly-owned subsidiary and arm-length contracts (Grossman and Hart, 1986, Hart and Moore, 1990 and Hart, 1995).

The boundaries of the firm are determined by the interplay of two main contrasting forces. On the one hand, subcontracting to specialised suppliers lets the multinational firm allocate more efficiently the production factors relying on the market. On the other

hand, there is the difficulty that the firm encounters in coordinating and controlling the actions of local contractors. These problems arise not only for multinational but also for national firms, but it seems more stringent in the former case due to the greater difficulties in communication and control that a multinational may run into.

The idea that market relations could be replaced by the hierarchy within the firm goes back to Coase (1937). In that view the notion of transaction costs comes up from the inefficiencies related to the coordination and control over the production activities through the market system. The emphasis of the literature moved from problems of coordination to issues related to a necessary structure of incentives in a context governed by incomplete contracting and relation-specific investment (Williamson, 1979). Contractual failures may be due to incomplete information between foreign firms and local producers as well as proprietary knowledge embodied in intangible assets that cannot be easily defined and enforced, or costs associated with the monitoring of the operations of local agents. We can define them as a sort of market failures that may arise in the international operations of multinationals, and these aspects are determinant for the choice of the mode of entry in a foreign market. The main types of these market failures widely contemplated by the literature are three: *the agency costs*, *the dissipation of firm specific assets* and *the hold up problem*.

The first concerns with asymmetric information problems arising in the contractual relationship between foreign firms and local agents. The agency costs are associated with the need of monitoring employees and motivating managers, since they have not ever the same objectives of the foreign firm. This is the case of Rowntree, the British producer

of chocolate and confectionary that had to bear additional costs aimed at keeping under control the local producers' business strategy. The classic modelling of this trade-off is the principal agent problem, that can be encountered in many situations, even though in this context we refer to the sales and distribution tasks. Horstmann and Markusen (1996) have set up a model in which the multinational cannot distinguish whether a low level of sales is attributable to low effort of the local sale agent or to a bad state of the market economy. Obviously, the sale agent perfectly knows the reason of the eventual reduction in sales, and this asymmetry may be coped with through an incentive scheme that increases effort of the sales agent, but such scheme can also create inefficiency. Then, the choice of the foreign firm is to internalize all the functions, or whether to bear the agency costs arising from the need of inducing the local agent to supply effort.

Dissipation of intangible assets is at the core of analysis of internalization of firms developed by Rugman (1985, 1986), Horstmann and Markusen (1987), Eithier and Markusen (1996) and Markusen (2001). Local production may involve application of some specific assets, and the firm may wish to keep these assets internal to itself, rather than transferring them to local agents. Property rights over intangible assets are hard to define and to enforce, so local producers can steal ideas and technologies. This fact drove the decision of Pirelli not to transfer to local suppliers the production of innovative tyres. In other circumstances intangible assets are the know-how required to performs the activities: in this case it may be simply too costly to transfer to third parties the knowledge stock of the multinationals (often embodied in the MNE's employees).

The intangible assets of the MNE may consist mainly either in the superior knowledge and expertise related to a particular production process or product, or in the reputation associated with the brand of the multinational. Eithier and Markusen (1996) have developed a model in which the critical issue is dissipation of knowledge. Indeed, the last can be transferred through use to the local licensee that may terminate the deal with the multinational and set up its own production unit, becoming a direct competitor of the foreign firm. In this case, the problem for the multinational is to design an optimal licensing contract in a way that it can prevent defection by the licensee. However, the cost associated with the optimal contract relates to the need of rents sharing with the licensee.

Horstmann and Markusen (1987) consider reputation as the intangible asset that can be deteriorated in a contractual relationship. If quality of products is not observable before purchase, the licensee might gain from the reputation of the multinational. To avoid free riding behaviour the multinational is obliged to transfer some rents to the licensee. These additional costs could induce the multinational to install a wholly-owned subsidiary if quality of products can be better monitored internalizing sales and distribution functions.

The hold up problem affected the investment decision of Ikea, the Swedish multinational, which decided to acquire the whole control over its previously independent Eastern European producers. The main aspect regards the impossibility of writing complete contracts that should define the level of investment in customization aimed at producing goods and services with specific characteristics not easily verifiable by third parties or a Court. This means that these contracts cannot contemplate all the contingencies that could arise in a contractual relationship between the multinational and the local producer. The relation-

specific investment may induce the local supplier to undertake a suboptimal level of investment, anticipating the fact that the MNE will deny the due payment claiming that some contingencies uncovered by the contract have occurred. In order to cope with this problem the multinational has to transfer a share of the sales surplus to the local supplier, reducing the profitability of the contractual relationship. The net outcome for the contracting parties depend on their own bargaining power, modelled through a Nash bargaining.

This issue involves a sort of opportunistic behaviour arising in a contractual relationship that requires a relation-specific investment and it was first studied by Williamson (1979), Grout (1984), Grossman and Hart (1986) and Hart and Moore (1990). The first application of the hold up problem to the analysis of FDI was introduced by Eithier (1986) who modelled the internalization issue on the basis of transaction costs and incomplete contracts. Internalization is seen as the unique organizational form that can rule out uncertainty linked to contingencies not covered by the contract. Instead, according to Grossman and Hart (1986) as well as to Hart and Moore (1990) the hold up problem cannot be eliminated even within the boundaries of the firm, i.e. internalizing all the production activities. Ex-post bargaining will take place among the various entities of the firm (functions, divisions) involved in carrying out the relation-specific investment. Then, the hold up problem is affected by the allocation of ownership rights among the parties involved. This "property rights" approach comes from the fact that ownership gives the residual control over firms' assets (control over issues not provided in an arm's length contract). The optimal allocation of property rights should assign more assets and hence more bargaining power to the party whose investment had greater impact on the joint surplus from the transaction.

In general, the models involving the hold up problem illustrates how contractual incompleteness and relation-specific investment can induce a foreign firm to reject a contract with local suppliers. Exact outcomes depend on the parameters, and on the general set up of the problem.

So far we have looked at the relationship between two firms, but in the following subsection I consider a sub- case of these models that frame the hold up problem in an industry equilibrium framework, i.e. they evaluate how the organizational decision of the foreign firms can affect the number of the firms active in the industry and why some choose to outsource whether others to internalise.

1.4.1 The choice of Multinationals: Internalization versus Subcontracting under incomplete contracts

Among the issues regarding the theoretical literature of FDI, the model developed in this section tries to shed some light on how multinationals firms decide to organize their production and how this choice affects the industry in which they operate.

From the main theoretical studies dealing with this issue it emerges the trade-off between internalising all production activities and externalising some stages of production relying on contractual relationships with intermediate suppliers through outsourcing.

In fact, the range of the possible ways in which production is organised is composite: a firm producing a final good for which intermediate products are needed can choose to produce its inputs in-house (thus vertically integrating production), to outsource production of the same inputs to intermediate suppliers, themselves possibly located at home or in a

foreign country, or to de-localise altogether the production of inputs in a subisdiary located in a foreign country, through a so-called vertical FDI.

Even though Grossman et al. (2003) do not contemplate the alternative of outsourcing, and hence the role played by contract incompleteness to determine the choice of production strategies, it is worth citing their contribution that examines a wide array of integration strategies that can occur in multiple locations. According to this work, each firm in an industry must provide headquarter services from its home country, produce intermediate inputs, and assemble the intermediate goods into final products. Both production of intermediate goods and assembly are performed within the boundaries of the firm, but they can be placed in different locations: at home, in another "Northern" country, in the low-wage "South," or in several of these locations. They study the equilibrium choices of firms that depend on productivity levels and on some industry characteristics, such as the fixed costs of foreign subsidiaries, the cost of transporting intermediate and final goods,and the share of the consumer market that resides in the South. In an industry in which transportation of intermediate and final goods is costless, the relative size of fixed costs for foreign investment in intermediate goods and assembly determines the set of organizational strategies that are observed in equilibrium. Here, the relative sizes of the markets have no bearing on the equilibrium choices. Instead, if final goods are costly to transport, relative country size plays a role in determining the viable multinational strategies. Generally, the larger is the consumer market in the South, the greater is the fraction of firms that maintain subsidiaries there, not only for performing assembly but also for producing intermediate goods. Also,

the higher are transport costs for final goods, the greater is the fraction of firms that performs assembly in two or more locations.

Finally, firms with low productivity choose an integration strategy that minimize the fixed cost of operation, whereas firms with high productivity seek to minimize variable costs of serving the various markets.

One limitation of this analysis is that they take the boundaries of the firm as given, assuming that firms must produce their own intermediate goods and perform assembly in-house. In other recent works, like Grossman and Helpman, 2002, 2003 and 2004, it is studied how contracting problems interact to determine which activities are outsourced and which performed within a firms' corporate boundaries.

Another particular case has been investigated by Ottaviano and Turrini (2003), since they consider how contract incompleteness in outsourcing and transport cost can interact to affect the choice of supply mode of firms. In particular, they show that, for large markets, incomplete outsourcing contracts can account for the emergence of FDIs not only when trade costs are large, but also when trade costs are small (as pointed out by empirical observation). The reason is the positive effect that lower trade costs have on the ex-post bargaining position of MNEs with respect to local subcontractors.

In the rest of the section I analyse more in depth contributions that are closer to the model presented in the following chapter, since they consider different organization strategies that are mainly affected by contract difficulties that can prevent outsourcing relationships.

Grossman and Helpman (2002)

In this article they have developed a multi-industry model in which differentiated final goods can be produced either by vertically firms or by pairs of specialized producers. In the latter case, one firm provides the production of intermediate goods, whereas the other assembles a variety of the consumer products. The choice of the final good producer whether outsourcing or not the components that he needs depends crucially on the trade-off between vertical integration and contracting out some stages of their production process. The disadvantages associated to the first alternative rely mainly on relatively high fixed and variable production costs, due to their lack of complete specialization and the extra governance costs depending on their extensive organizations. Instead, they assume that specialized firms may be able to produce at lower cost, but they are plagued by two main disadvantages. On the one hand, this type of organizational form implies costs arising from the search of a suitable partner for the final goods producer, as well as for the component producer. They model this search through a matching process, in which some firms are successful in finding their partners and others not.

On the other hand the eventual contractual relationship between the final goods producer and the intermediate goods supplier is affected by incomplete contracting. The latter arises from the fact that the specialized firms can observe the quality and the characteristics of an input, but these attributes cannot be verified by outside parties. This affects the contracting possibilities and creates a potential hold-up problem. The intuition behind the potential hold-up problem comes up from the exclusive dealing between the pair of specialized firms. On the one hand the components used for the production of the consumer

product are fully tailored; it means that cannot be sold to other final goods producers. Once a component producer specializes its production for a particular final good, these inputs have no value to other firms and the final producer can threaten to refuse delivery of the components unless the price is sufficiently low. The ex-post negotiation of the price implies a relatively weak bargaining position of the intermediate producer and, foreseeing this prospect the intermediate producer has insufficient incentives to produce the efficient quantity. The inefficiency resulting form the hold-up problem gives a reason for vertical integration.

The aim of this work is to identify the industry conditions that support vertical integration or outsourcing as the equilibrium mode of organization. They focus especially on three main channels: the efficiency pledged by the "technology" of the search function, the elasticity of substitution of final goods varieties and the distribution of bargaining power between intermediate and final goods producers. Among their findings, an improvement in the matching of specialized firms occurring in the search process can increase outsourcing activities. Moreover, a more elastic demand for final goods may favour either outsourcing or vertical integration, depending on the cost advantage assured by specialized producers and the distribution of bargaining power between them.

Finally they examine how the specificity of inputs affects the possibilities of arm's-length dealing. Indeed, the model predicts that more sensitive are manufacturing costs to the attributes of the intermediate goods, the more costly is the inefficiency arising from the partial specialization of components under incomplete contracting, causing as a result a reduction of outsourcing viability.

Grossman and Helpman (2004)

Despite the previous model, in this work Grossman and Helpman focus only on outsourcing activities, analysing the choice between outsourcing from the home country and from abroad, respectively. Their analysis is motivated by empirical evidence showing an upsurge of outsourcing activities worldwide that they highlight. They address the determinants of the location of sub-contracting activity developing a general equilibrium model in which firms in one industry must outsource a particular activity. Also in this framework subcontracting implies the production of intermediate goods that are fully tailored and hence they require particular expertise hold by local component suppliers. The final goods producers can seek partners in a technologically and legally advanced North, or they look in the low wage South. Like Grossman and Helpman (2002) there is a searching process as well as an incomplete contracting environment involving the eventual contractual parties but in this case they affect the equilibrium location of outsourcing activity.

Several possible determinants are taken into account. Among them, the size of the country can affect the thickness of its market: a firm prefers to search in a thicker market since it increases the possibilities to find a partner with appropriate skills.

Other factors influence the choice of the location of outsourcing activities, making search less costly, like good infrastructure for communication and transportation as well as the technology for search itself. They find that a uniform worldwide improvement in search and investment technologies does not influence the volume of outsourcing in a given location, but a disproportionate improvement in the search or investment in the South determines a shift in outsourcing activity from North to South.

Contracting environment also plays an important role in explaining localisation of outsourcing. As we could expect, all things being equal an improvement in the contracting possibilities in a country raises the relative profitability of outsourcing there. However if these changes occur globally, they tend to favour the North as the preferable location whether contracting out some stages of production (the same net result occurs when there are improvements in contracting in the North), whereas an improvement occurring in the South can raise or lower the volume of outsourcing in the South while raising outsourcing in the North. This unexpected outcome is due to the fact that increased competition in the product market that results from the broader search efforts of firms in the South causing the exit of some final producers in the North.

Antras and Helpman (2004)

This is a North-South model of international trade in which two decisional stages are featured: the final goods producers are located in the North and they have to decide both the ownership structure and the location for the production of inputs used for manufacturing consumer products. This framework leads four possible organizational forms as summarized in the following scheme:

	HOME	FOREIGN
INTEGRATION	Vertical integration	FDI
OUTSOURCING	Domestic outsourcing	Arm's length trade

Table 1.1. Antras and Helpman (2004)

These choices are driven by three lines of heterogeneity introduced in this model: sector heterogeneity, firms heterogeneity and countries heterogeneity. Sector in which final goods producers operate differ in their level of technology, and this industry- characteristic is captured by distinguishing between sectors with high headquarter intensity (high tech) and low headquarter intensity (low tech). While headquarter services can be produced only in the North (because the productivity advantage of the North is very large and only final good producers know how to produce them), manufactured components can be produced in both countries.

Firms heterogeneity comes from their different levels of productivity. According to a recent strand of literature (Melitz, 2003 and Helpman, Melitz and Yeaple, 2003) Antras and Helpman combine the effects of within sectoral heterogeneity on the decisions of firms to serve foreign markets with the structure of firms developed in Antras (2003). This last approach takes into account that, first, frictions of incomplete contracts results not only in an arm's length relationship but also within the boundaries of the firm, and second integration provides well defined property rights (Grossman and Hart, 1986). This well defined structure of the firms leads to a trade-off in choosing between integration and outsourcing. The former organisational forms provides benefits of ownership from vertical integration, while the latter gives benefits in terms of better incentives for the manufacturer under outsourcing.

Finally, countries heterogeneity regards the different organizational costs between the North and the South. In particular, components can be manufactured either in the North or

in the South: the former location gives an advantage in terms of fixed costs, whereas the latter allows variable costs saving.

The main results they obtain are in line with the main findings of the firms heterogeneity literature. First, they show that low productivity firms serve the domestic market, while the most productive firms serve also the foreign market. Second, among the firms that decide to invest abroad, the high productivity ones integrate (FDI), whereas the low productivity ones outsource. However, they set these results in a specific sectoral environment: these findings regards only firms operating in the high tech sector, in which all these types of organizational forms can occur, whereas within the low tech sector, only outsourcing (both in the North, if low productivity firm and in the South, if high productivity firm) is a viable organizational form.

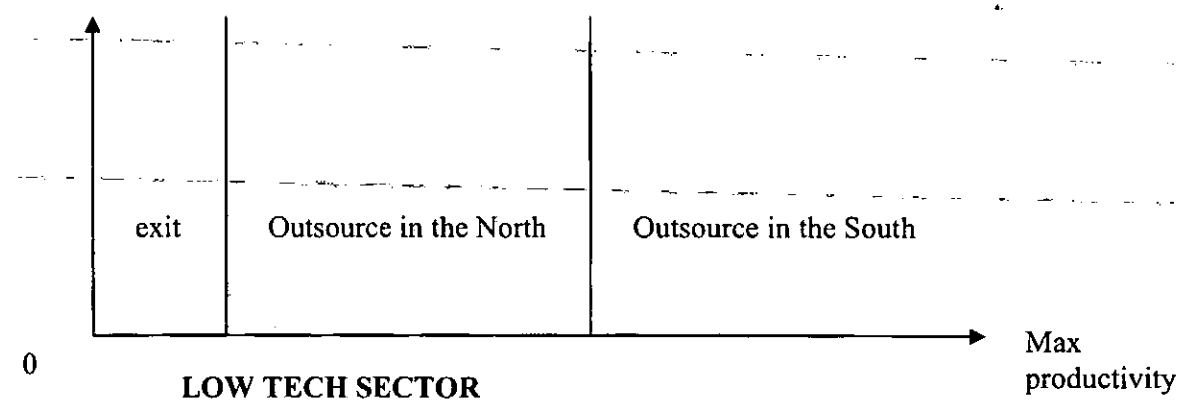

Figure 1.3 Antras and Helpman (2004)

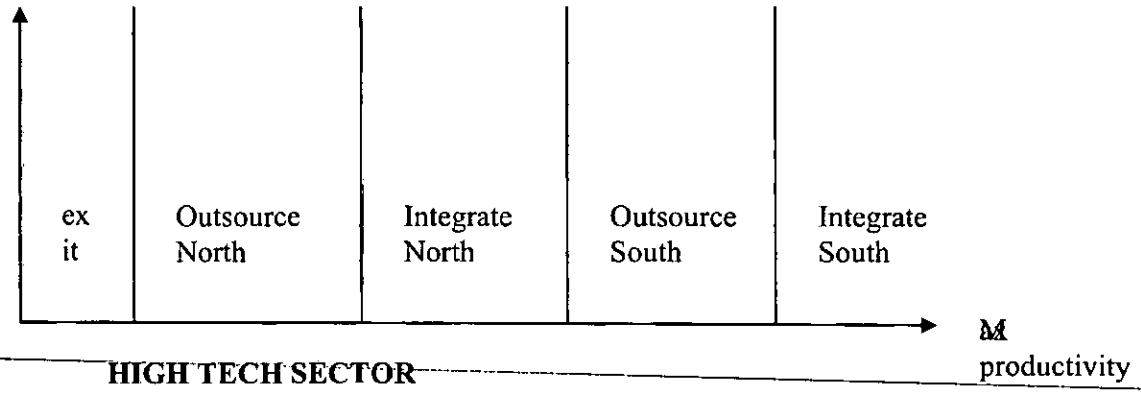

Figure 1.4. Antras and Helpman (2004)

Grossman and Helpman (2003)

Despite the previous model that endogenize both the ownership structure and the location decision, Grossman and Helpman assume that firms decide to invest abroad, and then they study the trade-off between FDI and outsourcing in a foreign country.

In order to isolate the latter trade-off among the different possible ways of organising production, they assume that the producers of final goods, located in a Northern region, find it convenient to buy inputs from a Southern region, since wages in the South are lower than wages in the North. In addition, Grossman and Helpman suppose the local suppliers in South to be more efficient with respect to a production unit eventually setup in the Southern region by the final producers through a vertical FDI. Even though this hypothesis seems to be in contrast with the traditional literature on FDI, trade models with fragmentation of production show that having a comparative advantage in a single production stage may allow a country to branch into international markets without any need to be an efficient producer of the entire product (Deardoff, 1998). However, the eventual relation-

ship with the suppliers is plagued with contractual difficulties, linked to the uncertain legal framework of the South, and therefore for the final producers a trade-off arises between the greater efficiency gained through outsourcing, and the contract incompleteness they might avoid if they produce their required inputs through a FDI. Then, the costs of outsourcing are twofold. On the one hand it involves costs related to the hold up problem in the relationship with the local suppliers; on the other hand there are costs associated with the need of matching with these local firms. Indeed each multinational has its own exact and firm-specific "component specification". Grossman and Helpman suppose there are infinitely many component specifications, located on the circumference (of unit length) of a circle. Hence, the n multinationals require different specifications that are uniformly distributed on this space. With these specifications, some foreign final producers are close to a component supplier, whereas others are far away. To tailor components to a multinational's exact specification has a cost that depends on this distance. Hence, since components are relation specific, the hold up problem means that payment for them is negotiated through a Nash bargain in which multinationals share with the local suppliers the revenues coming from the final goods'sales.

In this partial equilibrium model they focus on the industry equilibrium in which some final producers outsource their production of components and others manufacture their own components in foreign subsidiaries. They find that this equilibrium depends on some variables, like the industry size, the relative wage in the country that exports components as well as the degree of contract incompleteness governing the institutional framework of the Southern region.

Chapter 2
A model of entry: FDI versus International Outsourcing

2.1 Introduction

This chapter tries to develop a theoretical model that formalizes a trade-off faced by multinationals between outsourcing intermediates or producing them via FDI in a foreign country. According to this objective, I withdraw the general set up of the model developed by Grossman and Helpman (2003), provided in Paragraph 2.2, but, despite their work, the scope of this theoretical chapter goes beyond the characterization of the industry equilibrium.

Indeed, the aim of the model presented in this chapter is twofold.

First, it is analyzed how the degree of contract incompleteness affects the final producer's choice between FDI and outsourcing, and then the industry equilibrium in the downstream sector.

Second, the model tries to analyze to what extent this connection between firm's decision and incomplete contracting can influence the establishment of linkages between the final producers and the local suppliers. This allows us to take into account how changes in the institutional framework of the host country can affect the investment decisions of foreign firms and, consequently, the profitable opportunities of the local suppliers.

To this purpose, there have been introduced some refinements to the Grossman and Helpman (2003). On the one hand, I consider some degree of heterogeneity in the productivity of the final good producers. The hypothesis of a superior technology with which the local suppliers are endowed might hold with respect to some foreign producers, but not for others, which therefore, *ceteris paribus*, would opt for a FDI rather than outsourcing.

It is known that MNEs tend in general to have a superior production technology with respect to domestic firms, a finding which seems in contrast with one of the key hypothesis of Grossman and Helpman (2003). Since the issue of firms' heterogeneity and FDI has already been discussed in the literature (Helpman, Melitz and Yeaple, 2003), this model offers a way to generalize in this direction the Grossman and Helpman (2003) framework.

A second generalization I present is related to the sunk costs of starting-up the production facility if the FDI option is chosen. While the latter are absent in the Grossman and Helpman (2003) framework, they are however relevant for the considered trade-off, and hence they will be included in the determination of the industry equilibrium.

The refinements are presented in the next paragraph, where the basic setup of the model is analyzed. Paragraphs 2.3 and 2.4 consider the choice of doing outsourcing and FDI respectively, deriving the corresponding profits equations. Comparing the profits associated with the two options I derive the probability of doing outsourcing, as highlighted in paragraph 2.5, whereas paragraph 2.6 solves for the industry equilibrium, finding the equation of the equilibrium number of final producers. Since the latter, as well as the equation characterizing the probability of doing outsourcing, depends on the degree of contract incompleteness, paragraph 2.7 evaluates how the industry equilibrium changes if there is an

improvement in the legal framework of the recipient country. The following step is investigated in Paragraph 2.8, that is to what extent an enhancement in contract enforceability affects the profits of local suppliers, while paragraph 2.9 summarizes the main results of the model and address further developments.

2.2 The model

I consider a two-country (North and South), two-sectors economy. One sector produces an homogeneous good z, which is also used as an intermediate for the production of a differentiated, composite good y, whose n varieties are considered as imperfect substitutes in the eyes of consumers. While the z good is produced in both countries, the production of the differentiated good is only located in North. Due to differences in production costs, it is however cheaper for producers to source inputs (i.e. the z good) from the Southern country, since wages in South are lower than wages in North and normalised to 1. The producers of the final good (from here on, simply the producers) can thus decide whether to establish a plant for the production of intermediate inputs in the South (i.e. undertake a FDI to take advantage of the lower wages) or purchase the same inputs from specialised foreign suppliers (from here on, the suppliers).

On the demand side, each consumer maximizes a utility function of the form:

$$u = z^{1-\beta}\left[\int_0^n y(j)^\alpha \, dj\right]^{\frac{\beta}{\alpha}} \quad \text{with } \alpha, \beta \in (0,1) \tag{2.1}$$

subject to the following constraint:

$$I = p_z z + \int_0^n p(j)y(j) \, dj \tag{2.2}$$

with α representing the degree of product differentiation, whereas β is the share of spending that consumers optimally devote to the differentiated good. The world income I is fixed and derived from the total amount of labour L in each country, i.e. the analysis is a partial equilibrium one, and hence there are no income effects on demand.

I focus on the production and demand of good y, since it identifies the industry employing some intermediate inputs whose production generates the trade-off between FDI and international outsourcing. From the consumer's maximizing problem, I derive the demand for any differentiated products $y(i)$, given by:

$$y(i) = Ap(i)^{-\varepsilon} \tag{2.3}$$

where $\varepsilon = 1/(1-\alpha)$ represents the elasticity of demand. As it is well known, the CES utility function also implies

$$A = \frac{\beta I}{\int_0^n p(j)^{1-\varepsilon} dj} \tag{2.4}$$

where $I = wL_N + L_S$ is the aggregate level of income in the two countries, with wage w in the South equalised to one and $p(j)$ is the price of each variety j. Thus, consumers spend a constant fraction β of their income I on output from the industry; then, βI can be a proxy of the industry size, since it is the total expenditure devoted to the industry producing the differentiated good.

On the supply side the production of a unit of any variety of final goods requires one unit of specialised input. The homogeneous good z is used as an input for the production of the differentiated good, with one unit of input necessary for the production of one unit of output. However, given the differentiated nature of the final product, in order to be used as an input the intermediate good z has to undergo an investment in customization. The latter

changes according to the two possible ways in which the production of the intermediate good can be organised in South: outsourcing to local suppliers or foreign direct investment.

I shall now in turn analyze these two possible alternatives.

2.3 Outsourcing

If the final producer opts for the outsourcing relationship, in order to provide intermediate goods sufficiently close to the needs of the downstream firm the local supplier has to undertake an investment in customization $c(X)$, where c is any monotonous function and X a vector of firm-specific characteristics. The level of investment in customization concerns the first stage of the negotiation process, when the final producer and the potential supplier decide the extent of the supplier's investment in customization and the amount of compensation. Later, they negotiate the quantity of the input order. The first stage of the negotiation process is therefore characterised by an investment contract, whereas the second stage by an order contract. However, while the latter is complete, since quantities are verifiable, the investment contract is incomplete, as the supplier's investment and then the quality of the input are only partially verifiable by outside parties. We assume that an outside party, for instance a Court, can verify only a fraction $\gamma \in (0,1)$ of the total investment in customization undertaken by the intermediate supplier[6]. If γ approaches 1, a Court is able to verify almost the whole level of investment and hence the quality of the input. As a result, γ measures the degree to which it is possible to enforce a given contract, and hence

[6] Note that Grossman and Helpman (2003) assume $\gamma < \frac{1}{2}$, whereas, given our goal of studying the industry equilibrium with different degrees of contract incompleteness, in our model we consider $\gamma \in (0,1)$.

we can consider it to be a parameter reflecting the state of legal system in the host (Southern) country. Therefore, it is possible to study how the choice between FDI and outsourcing is affected by the degree of contract incompleteness in a host economy.

In particular, if $\gamma < 1$, the supplier's initial investment is likely to be suboptimal, due to a potential hold up problem: since the intermediate inputs are fully tailored to a particular variety i of the final product, the supplier may fear that, after having made the necessary investment to produce the inputs, the final producer denies the due payment, claiming that some contingencies, uncovered by the contract, have occurred. In order to prevent this situation, the producer provides to the supplier a payment P, in order to make sure that the latter carries out the necessary investment in customization $c(X)$[7]. The payment function P hence covers for the contingency of default of the counterparts, itself decreasing as the level of verifiability γ of the contract increases. As a result, the payment function can be considered as covering a variable share $(1-\gamma)g$ of the required investment in customization $c(X)$, where g is a scale parameter. It follows that, for a given choice of g, the payment function allows to reach a solution to the hold up problem, since it makes the local suppliers indifferent between undertaking all the investment in customization and deviating from the optimal level of investment[8]. In particular, assuming $c(X) = c$, the payment function P

[7] In Grossman and Helpman (2003) the payment P depends from the technological distance between the expertise of the supplier and the needs of the producer, with the latter homogeneously distributed along the unit circle. The assumption on the distribution of producers allows for a more precise matching technique, but it leads to an incomplete characterization over the degree of contract completeness γ, since in their framework one has to assume $\gamma < \frac{1}{2}$. Given our goal of studying the industry equilibrium with different degrees of contract incompleteness, i.e. $\gamma \in (0,1)$, we assume instead P to depend from the exogenous characteristics $c(x)$ of the local producers.

[8] In other words, if $\gamma \longrightarrow 1$, i.e. the contract is perfectly verifiable and hence enforceable, the payment function $P \longrightarrow 0$ and all the customization cost is born by the local suppliers. If $\gamma \longrightarrow 0$, then the payment function covers a share g of the investment in customization $c(X)$ agreed by the counterparts. Depending on the choice of g, one can always have that $P < \int_0^{(1-\gamma)g} c(X)dx$ is not incentive compatible (i.e. P is not

can be written as:

$$P = \int_0^{(1-\gamma)g} c(X)dx \qquad (5)$$
$$= \int_0^{(1-\gamma)g} c\,dc = \frac{1}{2}(1-\gamma)^2 g^2$$

As shown above, the payment function takes into account all the different degrees of contract completeness that the final producer might find, and it covers just the unverifiable part $(1-\gamma)g$ of the investment the intermediate producer should undertake. In this way, the intermediate producer has to bear the cost of investment that equals the verifiable part γg, not covered by P, and the final producer is sure that the whole investment of customization is undertaken in order to guarantee the quality of the intermediate goods.

Once specified the payment function, let S denote the total surplus arising from the sales of the final good when the two stages of the negotiation process are completed succesfully. The downstream firm produces the i^{th} variety of good y, and operates in a monopolistic competitive framework, while the production of the homogeneous good, which also serves as an input, is characterised by a perfect competitive market. The producers then have to choose the price p to maximize the profits on the sales of the differentiated good $y(i)$, minus the cost of the input z.

$$\max \pi = py(i) - p_z z \qquad (2.6)$$

In order to produce one unit of output, one unit of input is needed, and hence $y(i) = z$. Moreover, in case of outsourcing one unit of labor λ is required to manufacture one

high enough to solve the hold up problem), while $P > \int_0^{(1-\gamma)g} c(X)dx$ is not rational, since the payment P is then discounted by the total profits redistributed equally among the counterparts (no discount rate is considered in the model).

unit of intermediate good by the suppliers, i.e. $\lambda = 1$. Given the perfect competitive environment in which the input is produced, then its price is equal to its marginal cost, and hence $p_z = \lambda w = 1$ (the latter equality holds since the intermediate goods are produced employing labor in the South, whose wage I have normalised to 1). Then I can rewrite Eq. (2.6) as $\max \pi = py(i) - y(i)$. Substituting Eq. (2.3) and taking the derivative I obtain the following profit maximising price set by the final producer in case of outsourcing:

$$p_{out} = 1/\alpha \tag{2.7}$$

which, when substituted back into the profit equation, yields:

$$S = (1-\alpha)A(\frac{1}{\alpha})^{1-\epsilon} \tag{2.8}$$

where S is the total surplus to be shared by the contracting parties. The negotiation process is governed by Nash bargaining determining an equal share of the surplus for the two partners, since both the producer and the supplier have an outside option equal to 0[9]. Once the first stage of the negotiation ends up succesfully with the transfer of the payment P from the producer to the supplier, the partners can then write an order contract defining the quantity of intermediate inputs needed for manufacturing the final goods. Then, the total profits for the final producer in case of outsourcing are:

$$\pi_{out} = \frac{1}{2}S - \frac{1}{2}(1-\gamma)^2 g^2 \tag{2.9}$$

i.e. its share of total surplus as defined in (2.8) minus the payment P it has to guarantee to the local supplier for the enforcement of the contract

[9] Indeed, there is an exclusive dealing between supplier and producer: the former produces specialized inputs that are designed for a particular variety of final good on which the producer is a monopolist, and hence they have no value for other downstream firms. At the same time, if the negotiation with a potential supplier fails, the profit opportunity disappears due to entry by other downstream firms.

2.4 Foreign Direct Investment

If instead the producer chooses to vertically integrate its firm and produce the intermediate goods through a FDI, the total profits he or she makes are:

$$\pi_{fdi} = (w\lambda_i)^{1-\varepsilon} S - F \tag{2.10}$$

The producer in this case gets the entire surplus S but faces higher costs of production, with w being the wage rate in the country where production takes place and λ_i representing the units of labor required to assemby the intermediate input inside the i^{th} subsidiary. If the final good producers choose the FDI option, then $w = 1$ and hence one can think at λ_i as the marginal cost in case of vertical integration for the i^{th} producer.[10] and thus the optimal price set up by the firms deciding to internalize the whole production process is $p_{fdi} = \left(\frac{\lambda_i}{\alpha}\right)$. Note that , since $\varepsilon > 1$, the value $\lambda_i^{1-\varepsilon}$ measures the heterogeneous productivity level of the i^{th} subsidiary. In particular, following the results of a recent literature on firm heterogeneity (Helpman, Melitz and Yeaple, 2003), λ_i is drawn from a distribution $G(\lambda)$. Upon observing this draw, final producers assess their productivity level, calculate the value of π_{fdi} and decide whether to produce the intermediate inputs in-home or to outsource this stage of production[11].

Finally, I also consider that, once a firm decides to set up a subsidiary to produce the components, it incurs in a sunk cost F. Thus, if $\lambda_i < 1$, the foreign affiliates are more

[10] I recall that in case of outsourcing one unit of labor is required to manufacture one unit of intermediate good, i.e. the local suppliers have $\lambda = 1$.

[11] Note that if the trade off is between outsourcing and FDI the surplus is $S = \frac{(1-\alpha)\beta I}{n(\rho+(1-\rho)\lambda^{1-\varepsilon})}$. If I allow for $w > 1$, i.e. I allow the sourcing of intermediates to be undertaken in-house also in the Northern country, (thus considering the case of domestic vertical integration) the resulting surplus would be $S' = \frac{(1-\alpha)\beta I}{n[\rho+(1-\rho)(\lambda w)^{1-\varepsilon}]}$, and profits will be lower, since $(w\lambda_i)^{1-\varepsilon} < {\lambda_i}^{1-\varepsilon}$.

productive than the local firms, consistently with the findings of the empirical literature on FDI, but are subject to the sunk cost F. If instead $\lambda_i > 1$, in addition to the sunk cost F, the FDI option entails also some customization costs to tailor the (homogeneous) intermediate input z to the variety i of the final product. The range of the various exogenous parameters λ, F and γ will then determine the final producers' choice.

2.5 The trade-off between FDI and outsourcing

Before entering the market, a generic final producer has therefore to choose whether to outsource intermediates from a local supplier or to set up a foreign subsidiary for their internal production. Comparing the profits associated with these two options, and reported in (2.9) and (2.10), respectively, it is possible to calculate the probability ρ of doing outsourcing:

$$\begin{aligned} \rho &= prob(\pi_{fdi} \leq \pi_{out}) \\ &= prob(\lambda_i^{1-\varepsilon} S - F \leq \frac{1}{2}S - \frac{1}{2}(1-\gamma)^2 g^2) \\ &= prob(\lambda_i^{1-\varepsilon} \leq \frac{S - (1-\gamma)^2 g^2 + 2F}{2S}) \end{aligned} \tag{11}$$

where $\lambda_i^{1-\varepsilon}$ represents the productivity level (i.e. the cut-off condition) under which for the i^{th} final producer it is indifferent to choose either FDI or outsourcing. As it can be seen from Equation (2.11), the higher the productivity $\lambda_i^{1-\varepsilon}$ of the i^{th} subsidiary, the higher, *ceteris paribus*, the probability of opting for the FDI alternative, in line with the findings of Helpman, Melitz and Yeaple (2003). Outsourcing is instead more likely the greater the sunk cost F of setting up a foreign subsidiary and the greater the level of contract completeness γ in the Southern region.

The expected profits gained by the final producer once he chooses to enter the market are the following:

$$\pi_n = \rho\,\pi_{out} + (1-\rho)\,\pi_{fdi} = \rho[\frac{1}{2}S - \frac{1}{2}(1-\gamma)^2 g^2] + (1-\rho)[\lambda_i^{1-\varepsilon}S - F] \qquad (2.12)$$

On the other hand, the expected profit condition of the intermediate suppliers is completely driven by the existence of the contractual relationship with the final producers, which takes place with probability ρ, given that their outside option is equal to zero. In addition, the intermediate suppliers face the cost of customization $c(X)$, discounted by the payment function P they get. Since I have written the payment function as covering a share $(1-\gamma)g$ of the required investment in customization $c(X)$, the share γg is born by the suppliers. Hence, recalling the assumption $c(X) = c$, I can write their expected profit as:

$$\begin{aligned} \pi_m &= \rho(\frac{1}{2}S - \int_0^{\gamma g} c(X)\,dx) \qquad (13) \\ &= \rho(\frac{1}{2}S - \frac{1}{2}\gamma^2 g^2) \end{aligned}$$

I now turn to the determination of the industry equilibrium.

2.6 Solving for the industry equilibrium

My aim is to check how changes in the degree of contract completeness γ affects the industry equilibrium and hence the trade-off between FDI and outsourcing. In order to do this, I focus on how changes in γ affects the zero profit condition $\pi_n = 0$, from which I derive the endogenous number of final producers n[12].

[12] I recall that by assumption final producers delocalise the production of intermediate goods abroad. It

As a first step, in order to maintain the model tractable, I assume that both $G(\lambda)$, and hence $G(\lambda^{1-\varepsilon})$, are uniformly distributed, i.e. all productivity levels for the final producers are equally probable. This type of distribution allows to forego any assumption on which productivity level occurs with greater frequency once a firm puts in place the delocalisation of its production process. Hence, in the model I exploit this assumption for the determination of the industry equilibrium. In particular, if $G(\lambda^{1-\varepsilon})$ are uniformly distributed, Equation (2.11) becomes:

$$\rho = prob(\lambda_i^{1-\varepsilon} \leq \frac{S-(1-\gamma)^2 g^2 + 2F}{2S}) = \frac{S-(1-\gamma)^2 g^2 + 2F}{2S} \tag{2.14}$$

The latter expression can be rewritten as follows: considering Eq. (2.3) and employing the expressions for the prices p_{out} and p_{fdi} I find an expression for the parameter A in Eq. (2.4) in terms of n and ρ which I substitute into (2.8) to derive:

$$\rho = \frac{(1-\alpha)\beta I - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} + 2Fn\lambda^{1-\varepsilon}}{2(1-\alpha)\beta I + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}} \tag{2.15}$$

The number of final producers n is endogenously determined by the zero profit condition $\pi_n = 0$. To calculate this, I substitute in Eq. (2.12) the expression for the surplus S of Eq. (2.8) where again the expression for A in Eq. (2.4) has been considered in terms of n and ρ. Then, I get:

$$n = \frac{(1-\alpha)\beta I[(1-\rho)\lambda^{1-\varepsilon} + \frac{1}{2}\rho]}{\left[\rho + (1-\rho)\lambda^{1-\varepsilon}\right]\left[F(1-\rho) + \frac{1}{2}(1-\gamma)^2 g^2 \rho\right]} \tag{2.16}$$

Unfortunately, this is not a closed form solution, since in the latter expression n still depends on ρ. In turn, Eq. (2.15) shows that also ρ depends from n. In order to

means that n is the number of final (foreign) producers.

solve for the the industry equilibrium, the reciprocal effects of n and ρ have to move in opposite directions, such that $\rho = f(n)$ and $n = f(\rho)$ cross at least once. Moreover, if they are strictly monotonic functions, for a given level of contract completeness γ the industry equilibrium is unique. I am hence interested in exploring the conditions under which such a unique equilibrium exists; after that, I analyze the effects caused by changes in the parameter γ.

Proposition 1 *An internal industry equilibrium* (n, ρ) *always exists if* $P < F < 2P$ *or if* $\lambda^{1-\varepsilon} < \frac{F}{2P - 2F}$ *for* $F \leq P$.

Proposition 1 states that, if direct investments require higher sunk costs than outsourcing ($P < F < 2P$), the probability of doing outsourcing is $\rho \in (0, 1)$, i.e. it identifies mixed strategies of final goods producers[13]. If direct investments require lower sunk costs than outsourcing ($F \leq P$), there is still a positive probability of doing outsourcing if the productivity level of the foreign affiliates is not too-high (smaller than the cut-off value $\frac{F}{2P - 2F}$). For "extreme" values of F and P, instead, i.e.if $F > 2P$ or if $F < P$ such that $\frac{F}{2P - 2F} < \lambda^{1-\varepsilon}$, the probability of doing outsourcing ρ will be, respectively, 1 or 0, i.e. all final good producers will either outsource or undertake a FDI, independently from their productivity levels. These conditions are reported in Figure 1, which precisely characterizes the boundaries of the industry equilibria.

[13] Furthermore, if all the final producers were of the same type (i.e. with $F \leq P$ or $F \geq P$), then we could identify the proportion of them doing outsourcing, equal to $n\rho$.

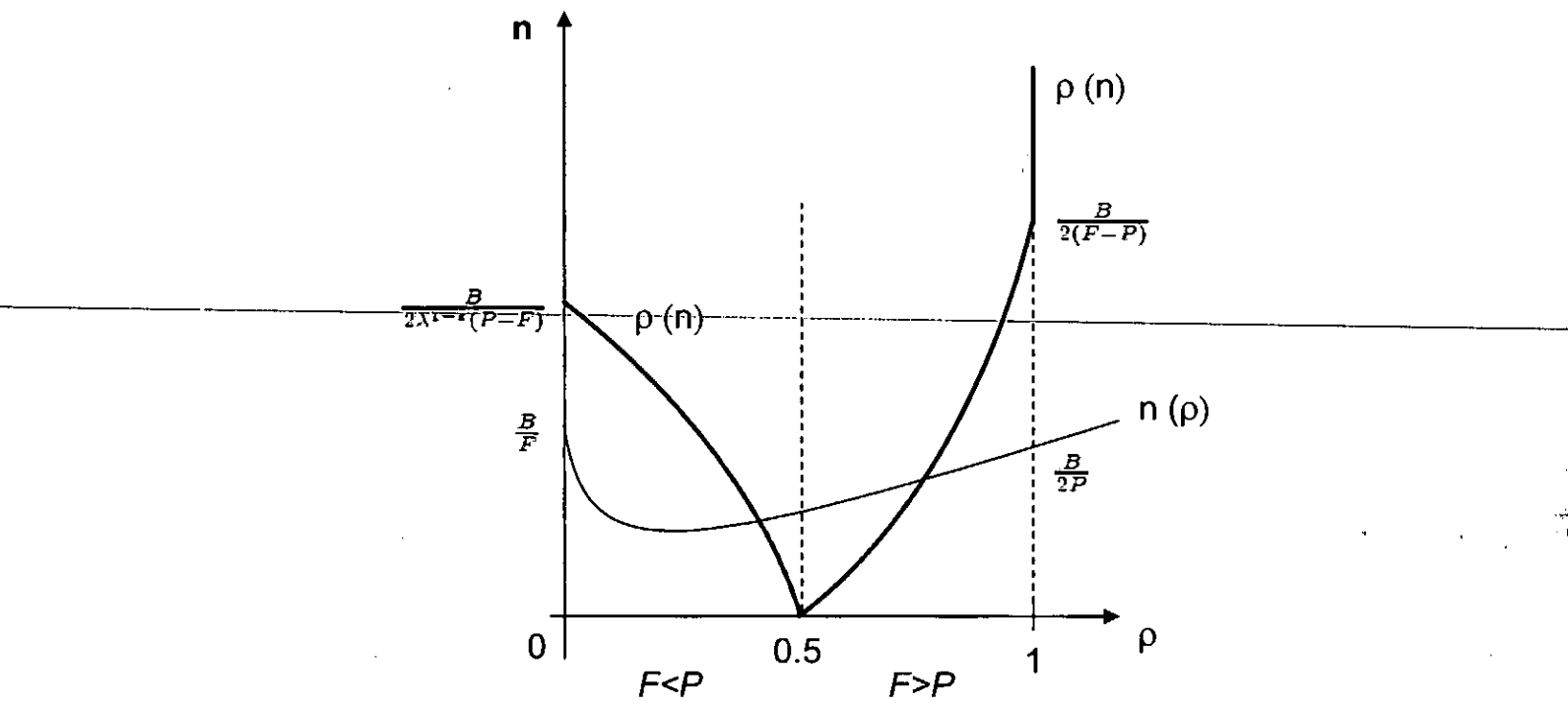

Figure 2.1. Range of industry equilibria

As it can be seen in Figure 1, the equilibrium number of final producers n ultimately depends not only from the parameters P and F, affecting the probability of outsourcing ρ, but also, as one could expect, from the market size of the Northern country, $B = (1-\alpha)\beta I$.

2.7 Industry equilibrium and contract incompleteness

Having shown that a unique industry equilibrium exists, we are now interested in assessing how the legal framework in the Southern region, as measured by the parameter γ, affects the industry equilibrium. At this purpose, recall that γ appears in both Eq. (2.15) and

(2.16), thus influencing both the parameters n and ρ. Hence, it is possible to prove the following Proposition 2 and Proposition 3.

Proposition 2 *The probability of outsourcing ρ always increases when the degree of contract completeness γ increases, i.e.* $\frac{\partial \rho}{\partial \gamma} > 0$.

Proof. See the Appendix. ■

Proposition 3 *As γ increases the equilibrium number of final entrants n raises, i.e.* $\frac{\partial n}{\partial \gamma} > 0$.

Proof. See the Appendix. ■

As I expect, an improvement in the level of contract completeness γ implies a lower value of the payment function P for producers, thus higher profits (see Eq. 2.12) leading to an increase in the number of entrants in equilibrium and hence an higher probability that the final producers choose to outsource the production of intermediates.

Revisiting Proposition 2 and 3 in light of Propositions 1, it can be thus shown that an improvement in contract verifiability γ causes a shift of both $n = f(\rho)$ and $\rho = f(n)$ such that a new equilibrium characterized by a higher number of final entrants is generated.

In order to have a better understanding of the way the model works, and its implications for the local economy, the following section investigates the interaction between foreign firms and local producers once the legal framework in the South, γ, improves.

2.8 The effects of suppliers' profits

I have seen that a change in the legal framework of the host economy affects the number of firms operating in the final sector, with an in increase in contract completeness γ leading in equilibrium to a higher number n^* of entrants. However, recalling Eq. (2.13), it is possible to show that the degree of contract completeness influences also the profits of the local suppliers. In particular, considering again Eq. (2.3) and employing the expressions for the prices p_{out} and p_{fdi} in Eq. (2.4) and then in Eq. (2.8), it is possible to rewrite Eq. (2.13) as follows:

$$\pi_m = \rho(\frac{1}{2}S - \frac{1}{2}\gamma^2 g^2) = \frac{1}{2}[\frac{(1-\alpha)\beta I\rho}{n[\rho + (1-\rho)\lambda^{1-\epsilon}]} - \gamma^2 g^2] \tag{2.17}$$

From Eq. (2.17), one can see that the degree of contract completeness γ, the probability of outsourcing ρ and the equilibrium number of downstream firms n all influence the suppliers' expected profits.

In order to derive a better understanding of these interactions, it is useful to prove the following propositions:

Proposition 4 *For any given n and γ, the profit condition for intermediate suppliers depends positively on the the probability of doing outsourcing, i.e.* $\left.\frac{\partial \pi_m}{\partial \rho}\right|_{n,\gamma} > 0$.

Proof. See the Appendix. ■

Proposition 5 *For any given ρ and γ, the profit condition for intermediate suppliers depends negatively on the equilibrium number of final entrants n, i.e.* $\left.\frac{\partial \pi_m}{\partial n}\right|_{\rho,\gamma} < 0$.

Proof. See the Appendix. ■

Proposition 6 *For any given n, it exists a value of contract completeness γ^* such that* $\left.\frac{\partial \pi_m}{\partial \gamma}\right|_{\gamma^*} = 0$.

Proof. See the Appendix. ■

Proposition 4 and 5 can be reconducted to some of the traditional effects identified by the literature on linkages[14]. In particular, Proposition 4 represents a (positive) *backward linkage* effect: the increase in the probability ρ of choosing the outsourcing option by the final producer induces a more intensive use of local intermediates and thus creates, *ceteris paribus*, higher profit opportunities for the suppliers. Proposition 5 identifies a (negative) *competition effect in the final goods sector*: an higher number of final producers leads to a reduction of the total surplus also available for the local suppliers, thus compressing their profits.

Proposition 6 states that for any given number of final producers, there exist an optimal value of contract completeness γ^* for which the suppliers'profits π_m possibly reach a maximum (I have not characterised in so far second order derivatives). In order to explore this result, and recalling Eq. (2.17), one has to consider that an increase in the degree of contract completeness γ affects the suppliers'profits π_m via three channels: a direct negative effect, through a reduction of the payment P the suppliers obtain from the producers; an indirect effect, through the change that γ induces in the probability of outsourcing ρ and the equilibrium number of downstream firms n, as shown in Proposition 2 and 3. Since all

[14] See Gorg and Greenaway (2002) for an updated survey.

the effects move in opposite directions, in order to keep the derivations tractable we have separated in Proposition 6 the competition effect from the other two[15].

I can then use a numerical calibration to explore whether π_m reaches a maximum given the (γ, n) space. In particular, given a set of exogenous parameters[16], I will generate an endogenous value of ρ via Eq. (2.15) for any combination of (γ, n) and then use Eq. (2.17) to explore the combined effects of (γ, n) and ρ on the suppliers'profits π_m.

Figure 2 below depicts the results of the numerical calibration. Reading it along the Y axis, the analysis reveals that profits tend to be higher the lower the competition effect, i.e. the lower the number of final producers n operating in the market, thus confirming our Proposition 5. Reading Figure 2 along the X axis, it is shown that for a given n the suppliers'profits reach their maximum for an intermediate level γ^* of contract completeness: the idea is that, once the legal framework in the country starts to improve, this generates an increase in the probability of outsourcing ρ (the result of Proposition 2), thus inducing a positive backward linkage on the suppliers' profits, as indicated by Proposition 4. However, for $\gamma > \gamma^*$ the loss induced on π_m by the cost of customization (the $\gamma^2 g^2$ term in Eq. 2.17) becomes stronger and leads to a decrease in total profits of local suppliers, thus confirming Proposition 6. Notice that this result is consistent with a simultaneous increase in the profits of final goods producers, as an improvement of contract enforceability reduces the level of the payment function that makes local suppliers indifferent between deviating

[15] Note that in this setup an increase in the degree of contract completeness γ leads to an increase in the total number of entrants n, which leads to a reduction in π_m; however, an increase in n leads also to an increase in the probability of outsourcing ρ, as shown in Proposition 1, and hence in a positive effect on π_m. Essentially, the latter is the traditional backward linkage identified by the literature (e.g. Markusen and Venables, 1999), with the entry of foreign firms in the market strenghtening local demand for intermediates.

[16] In the simulation we have considered $g = 2$, $F = 5$, $(1 - \alpha)\beta I = 500$ and $\lambda^{1-\varepsilon} = 0.8$.

or not from the optimal level of investment. This result is however partial, since it holds for a given number of final producers n, itself endogenous to γ, as indicated by Proposition 3.

To get a more general result one has therefore to look at the simultaneous impact of γ and n on π_m. At this purpose, Figure 2 shows that the effect of an increase in the number of final producers n has a non-monotonic effect on the profit of the local suppliers. As n increases, any value of $\gamma > \gamma*$ induces in fact a proportionally higher reduction in the suppliers' profit, and hence it is rational for the local suppliers to react to the entry of new final producers with a reduction in the degree of contract completeness of the host country.

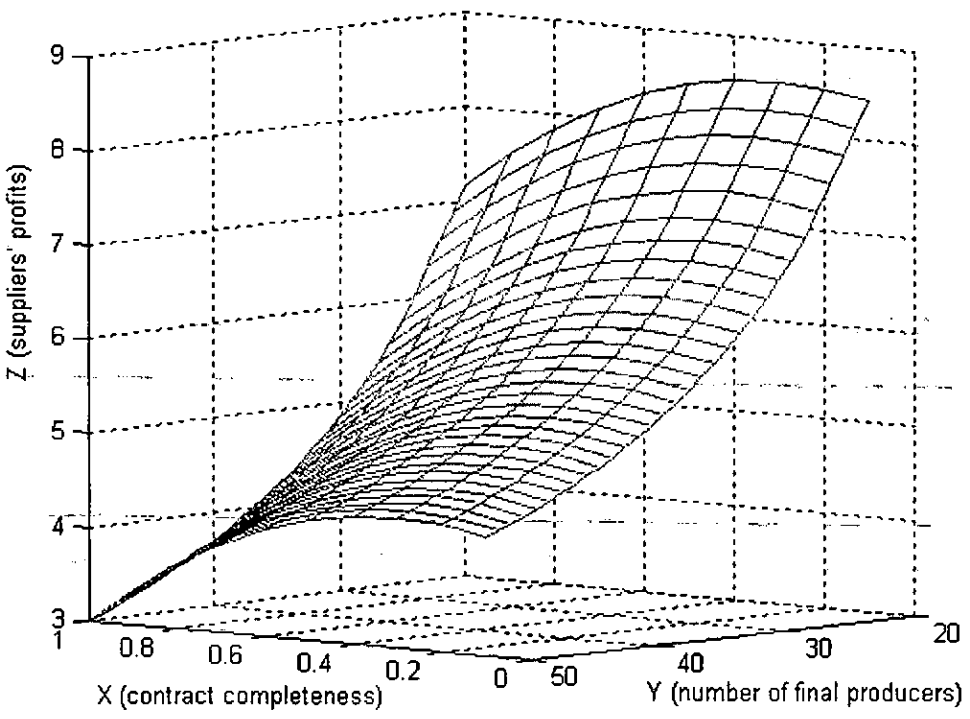

Figure 2.2 Local suppliers'profits

2.9 Policy implications and further developments

In this model I tried to characterize under a general set of conditions an industry equilibrium with a trade-off between outsourcing and FDI, where fixed sunk costs exist for the setting up of foreign subsidiaries and the latter are heterogeneous in productivity levels. I have then explored the relation existing between such an industry equilibrium and the degree of contract completeness prevailing in the host country, finding that a proper legal framework, not surprisingly, leads in equilibrium to a higher number of final producers with an higher probability of doing outsourcing.

The model allows also to characterize the relationship between this industry equilibrium and the profits available to the local suppliers, thus exploring the evolution of the linkages between the two classes of firms. Here, the results obtained are more controversial. On the one hand, the model replicates the traditional competition and backward linkage effects found by the literature on linkages and spillovers. On the other hand, however, a surprising result emerges when analyzing the effect of the contract completeness on the profits available to the local suppliers, relating this result to the number of final producers and their probability of doing outsourcing. I find in fact that an increase in competition level has a non-monotonic effect on the profit of the local suppliers, since as the number of entrants increases, the higher is the degree the contract completeness, the lower are the profits available for the local suppliers. As a result, it becomes rational for local suppliers to contrast the entry of new final producers with a reduction in the degree of contract completeness in the host country.

Although the latter result seems to be consistent with the empirical evidence of a non-increasing protection of property rights in most developing countries once they open up to international trade, it has however to be further explored by future lines of research.

First of all, the robustness of the result has to be checked against a different set of exogenous parameters, and in particular the level of sunk costs of setting up the FDI subsidiary. Secondly, the model should be characterized for a distribution of the heterogeneous productivity levels of final producers different from the uniform one. This would allow to generalize the results of the model, although preliminary experiments I have performed suggest that the qualitative conclusions that I reach should not change.

Finally, in order to overcome the limitations of the numerical calibration, the formal propositions should be tested with data. The main problem here relates to the availability of firm level data on the amount of outsourcing, for both the local suppliers and the final producers, but an effort to test some implications of the model has been made in the following chapter.

2.10 Comparative statics

The non monotonicity of the previous result can be assessed looking at some comparative statics obtained plotting π_m on the (γ,n) plane for different values of the parameters g, F and $\lambda^{1-\varepsilon}$.

Consistently with the previous findings, it is always true that the profits of suppliers are lower as the number final producers n increases (Proposition 5) and that the effects of contract completeness γ on the profits of local suppliers is non linear. Ceteris paribus, the

profits of suppliers are also lower as the fixed costs of doing FDI decrease (compare the two top graphs), or when customization costs increase (compare the two graphs on the left), since in both cases it is more convenient for the final goods producers to choose the FDI option.

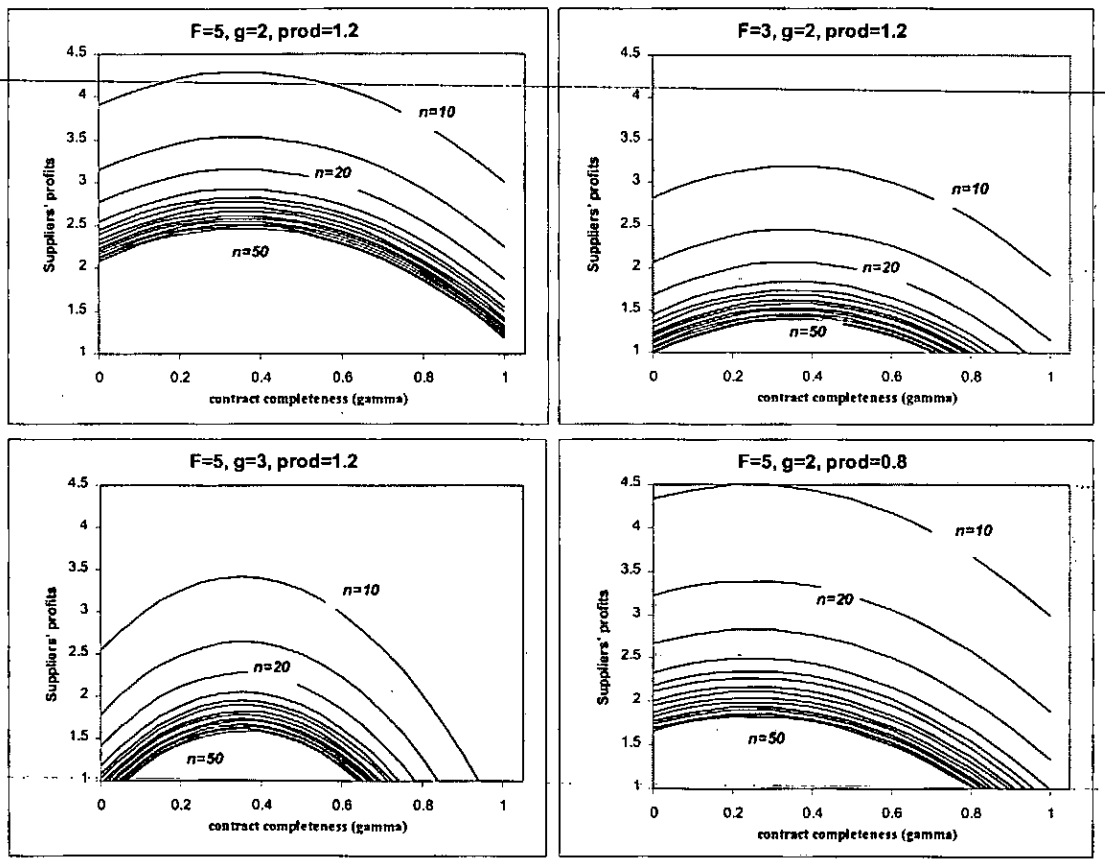

Figure 2.3. Comparative statics on local suppliers' profits

Finally, a lower productivity of the final good producers induces, as expected, higher profits for the local suppliers, since the FDI option becomes less profitable (compare the top left with the bottom right graph). However, the effect seems to be non linear in n, in that the higher the number of equilibrium firms operating in the market, the lower the

marginal effect on profits induced by a decrease in productivity. While I do not discuss the theoretical implications of this result, due to this reason I will however control for the productivity levels in the empirical test of the model described in the following sections.

2.A Mathematical Derivations

Proof of Proposition 1 Recalling (2.15)

$$\rho = \frac{B - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} + 2Fn\lambda^{1-\varepsilon}}{2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}}$$

where $B = (1-\alpha)\beta I > 0$, I compute the following derivative:

$$\frac{\partial \rho}{\partial n} = \frac{\left[-(1-\gamma)^2 g^2 \lambda^{1-\varepsilon} + 2F\lambda^{1-\varepsilon}\right]\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]}{\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]^2}$$

$$- \frac{\left[B - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} + 2Fn\lambda^{1-\varepsilon}\right]\left[(1-\gamma)^2 g^2 - (1-\gamma)^2 g^2 \lambda^{1-\varepsilon} - 2F + 2F\lambda^{1-\varepsilon}\right]}{\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]^2}$$

$$= \frac{-B(1-\gamma)^2 \lambda^{1-\varepsilon} + 2F\lambda^{1-\varepsilon} B - B(1-\gamma)^2 g^2 + 2FB}{\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]^2}$$

It results that, for $F < P$ (recalling that $P = \frac{1}{2}(1-\gamma)^2 g^2$) $\rho(n)$ is downward sloping, i.e. $\frac{\partial \rho}{\partial n} < 0$. In particular, the part of the curve we are interested in is for $\rho \leq \frac{1}{2}$ since $\rho(n=0) = \frac{1}{2}$ and $\rho = 0$ if $n = \frac{B}{\lambda^{1-\varepsilon}[(1-\gamma)^2 g^2 - 2F]}$. From the zero profit condition for the final producers, defined in (2.16) I also have that:

$$n = \frac{(1-\alpha)\beta I[(1-\rho)\lambda^{1-\varepsilon} + \frac{1}{2}\rho]}{\left[\rho + (1-\rho)\lambda^{1-\varepsilon}\right]\left[F(1-\rho) + \frac{1}{2}(1-\gamma)^2 g^2 \rho\right]}$$

Given the continuity of $n(\rho)$ on the entire support $\rho \in (0,1)$, an internal equilibrium would therefore exist if $n(\rho = \frac{1}{2}) > 0$ and $n(\rho = 0) < \frac{B}{\lambda^{1-\varepsilon}[(1-\gamma)^2 g^2 - 2F]}$. The former is always verified, whereas the latter holds for $\lambda^{1-\varepsilon} < \frac{F}{(1-\gamma)^2 g^2 - 2F}$.

In the case that $F > P$ it results that $\rho(n)$ is upward sloping, i.e. $\frac{\partial \rho}{\partial n} > 0$. Hence, the relevant part of the curve is comprised between $\frac{1}{2} \leq \rho \leq 1$, in correspondence of which $n = 0$ and $n = \frac{B}{2F - (1-\gamma)^2 g^2}$ respectively. Hence, an internal equilibrium exists if the zero profit condition satisfies $n(\rho = 1) < \frac{B}{[(1-\gamma)^2 g^2 - 2F]}$, given that $n(\rho = \frac{1}{2}) > 0$

holds. Hence, if the sunk costs of doing a FDI are higher than the payment function the equilibrium condition is met for $F < (1-\gamma)^2 g^2$.

Proof of Proposition 2 In order to simplify the derivation of this result, it is convenient to calculate the derivative with respect to $1-\gamma$, i.e. the degree of contract incompleteness rather than contract completeness. Proving that $\frac{\partial \rho}{\partial(1-\gamma)} < 0$ then implies that $\frac{\partial \rho}{\partial \gamma} > 0$. Starting from

$$\rho = \frac{(1-\alpha)\beta I - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} + 2Fn\lambda^{1-\varepsilon}}{2(1-\alpha)\beta I + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n \lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}}$$

Replacing $B = (1-\alpha)\beta I$, and calculating $\frac{\partial \rho}{\partial(1-\gamma)}$ I get:

$$\frac{\partial \rho}{\partial(1-\gamma)} = \frac{\left[-2(1-\gamma)g^2 n\lambda^{1-\varepsilon}\right]\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]}{\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]^2} -$$

$$- \frac{\left[B - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} + 2Fn\lambda^{1-\varepsilon}\right]\left[2n(1-\gamma)^2 g^2 - 2(1-\gamma)n\lambda^{1-\varepsilon}\right]}{\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]^2}$$

$$= \frac{-2(1-\gamma)g^2 n\lambda^{1-\varepsilon} B - 2(1-\gamma)g^2 nB}{\left[2B + (1-\gamma)^2 g^2 n - (1-\gamma)^2 g^2 n\lambda^{1-\varepsilon} - 2Fn + 2Fn\lambda^{1-\varepsilon}\right]^2} < 0$$

I need to discuss just the numerator, since the denominator is a quadratic expression. It is easy to see that both terms $2(1-\gamma)g^2 n\lambda^{1-\varepsilon} B$ and $2(1-\gamma)g^2 nB$ are positive, due to the fact that $B = (1-\alpha)\beta I$ is the total income devoted to consumption of the final goods, the term $(1-\gamma)$ is positive, and the parameters n and $\lambda^{1-\varepsilon}$ are greater than zero. Hence the numerator is negative, and thus $\frac{\partial \rho}{\partial(1-\gamma)} < 0$.

Proof of Proposition 3 Recalling

$$n = \frac{(1-\alpha)\beta I[(1-\rho)\lambda^{1-\varepsilon} + \frac{1}{2}\rho]}{\left[\rho + (1-\rho)\lambda^{1-\varepsilon}\right]\left[F(1-\rho) + \frac{1}{2}(1-\gamma)^2 g^2 \rho\right]}$$

Then,

$$\frac{\partial n}{\partial \gamma} = \frac{(1-\alpha)\beta I g^2 \rho \left[(1-\rho)\lambda^{1-\varepsilon} + \frac{1}{2}\rho\right] \left[\rho + (1-\rho)\lambda^{1-\varepsilon}\right](1-\gamma)}{\left\{\left[\rho + (1-\rho)\lambda^{1-\varepsilon}\right]\left[F(1-\rho) + \frac{1}{2}(1-\gamma)^2 g^2 \rho\right]\right\}^2} > 0$$

The derivative is always positive for γ and ρ different from zero (otherwise it could be that $\frac{\partial n}{\partial \gamma} = 0$): indeed $(1-\alpha)\beta I > 0$, given that it represents the total income devoted to the industry producing the differentiated good, ρ is the probability of doing outsourcing and then $1-\rho$ is positive.

Proof of Proposition 4 Given the profit function for the intermediate suppliers:

$$\pi_m = \frac{1}{2}\left[\frac{(1-\alpha)\beta I \rho}{n[\rho + (1-\rho)\lambda^{1-\varepsilon}]} - \gamma^2 g^2\right]$$

denoting $B = (1-\alpha)\beta I$, $c = \lambda^{1-\varepsilon}$,

$$\left.\frac{\partial \pi_m}{\partial \rho}\right|_{n,\gamma} = \frac{\left[B - \gamma^2 g^2 n\left(2\rho + c - 2\rho c\right)\right]\left[2n\left(\rho + c - c\rho\right)\right] - \left[B\rho - \gamma^2 g^2 n\left(\rho^2 + c\rho - \rho^2 c\right)\right]\left[2n\left(1-c\right)\right]}{\left[2n\left(\rho + c - c\rho\right)\right]^2}$$

$$= \frac{2nB\left(\rho + c - c\rho\right) - 2n\gamma^2 g^2 n\left(2\rho + c - 2\rho c\right)\left(\rho + c - c\rho\right)}{\left[2n\left(\rho + c - c\rho\right)\right]^2} -$$

$$- \frac{2nB\rho\left(1-c\right) - 2n\gamma^2 g^2 n\left(\rho^2 + c\rho - \rho^2 c\right)\left(1-c\right)}{\left[2n\left(\rho + c - c\rho\right)\right]^2}$$

$$= \frac{2nBc - 2n^2 g^2 \gamma^2 \left(\rho + c - \rho c\right)^2}{\left[2n\left(\rho + c - c\rho\right)\right]^2}$$

Note that the denominator is always positive; also the numerator is positive, under the plausible assumption that $B > \frac{\gamma^2 g^2 n}{c}$, i.e. $(1-\alpha)\beta I > \frac{\gamma^2 g^2 n}{\lambda^{1-\varepsilon}}$, since the left hand side can be considered a proxy of the total demand faced by final good producers.

Proof of Proposition 5 Rearranging Eq. (2.17) I get:

$$\pi_m = \left[\frac{(1-\alpha)\beta I \rho - \gamma^2 g^2 n \rho\left(\rho - \rho\lambda^{1-\varepsilon} + \lambda^{1-\varepsilon}\right)}{2n[\rho + (1-\rho)\lambda^{1-\varepsilon}]}\right]$$

Again, I impose $B = (1-\alpha)\beta I$, $c = \lambda^{1-\varepsilon}$. Calculating $\frac{\partial \pi_m}{\partial n}$ I get:

$$\left.\frac{\partial \pi_m}{\partial n}\right|_{\rho,\gamma} = \frac{2n[-\gamma^2 g^2 \rho(\rho + c - c\rho)][\rho + (1-\rho)c]}{2n[\rho + (1-\rho)c]^2} -$$

$$\frac{[B\rho - \gamma^2 g^2 n\rho\,(\rho - \rho c + c)][2\,(\rho - \rho c + c)}{2n[\rho + (1-\rho)c]^2}$$

$$= \frac{-2n\gamma^2 g^2 \rho[\rho + c - \rho c]^2 - 2B\rho[\rho + c - \rho c] + 2\gamma^2 g^2 n\rho[\rho + c - \rho c]^2}{2n[\rho + (1-\rho)c]^2} < 0$$

I find that both for $c < 1$, i.e local suppliers are more efficient than foreign affiliates, and $c >$ 1,i.e. doing FDI is more efficient than local firms, $\left.\frac{\partial \pi_m}{\partial n}\right|_{\rho,\gamma} < 0$ is always negative,since the numerator is always negative.

Proof of Proposition 6 Recalling the profit condition for the local suppliers, i.e.

$$\pi_m = \rho(\frac{1}{2}S - \frac{1}{2}\gamma^2 g^2) = \frac{1}{2}[\frac{(1-\alpha)\beta I \rho}{n[\rho + (1-\rho)\lambda^{1-\varepsilon}]} - \gamma^2 g^2]$$

denoting $B = (1-\alpha)\beta I$, $c = a^{1-\varepsilon}$, and computing its derivative with respect to γ, it results:

$$\frac{\partial \pi_m}{\partial \gamma} = \frac{2n\left[B\frac{\partial \rho}{\partial \gamma} - 2\gamma g^2 n(\rho^2 + c\rho - c\rho^2) - \gamma^2 g^2 n(2\rho\frac{\partial \rho}{\partial \gamma} + c\frac{\partial \rho}{\partial \gamma} - 2\rho c\frac{\partial \rho}{\partial \gamma})\right][\rho + (1-\rho)c] -}{4n^2[\rho + c(1-\rho)]^2}$$

$$\frac{2n\,[B\rho - \gamma^2 g^2 n(\rho^2 + c\rho - \rho^2 c)]\left[\frac{\partial \rho}{\partial \gamma} - \frac{\partial \rho}{\partial \gamma}c\right]}{4n^2[\rho + c(1-\rho)]^2}$$

$$= \frac{B\frac{\partial \rho}{\partial \gamma}c - (\rho - \rho c + c)^2(\gamma^2 g^2 n\frac{\partial \rho}{\partial \gamma} + 2\gamma g^2 n\rho)}{4n^2[\rho + c(1-\rho)]^2}$$

To verify whether the derivative is positive we focus on the numerator, that is positive if $\gamma_1 < \gamma < \gamma_2$, where

$$\gamma_{1,2} = \frac{-g^2 n\rho(\rho - c\rho + c)^2 \mp \sqrt{g^4 n^2 \rho^2(\rho - \rho c + c)^4 + B(\frac{\partial \rho}{\partial \gamma})^2 c g^2 n(\rho - c\rho + c)^2}}{g^2 n\frac{\partial \rho}{\partial \gamma}(\rho - \rho c + c)^2}$$

Proposition 3 proves that $\frac{\partial \rho}{\partial \gamma} > 0$, and we employ this results to verify that $\gamma_1 < 0$, whereas $0 < \gamma_2 < 1$. It means that there exists a range of values of γ, that is $\gamma < \gamma_2$, for which $\left.\frac{\partial \pi_m}{\partial \gamma}\right|_n > 0$, whereas for $\gamma > \gamma_2$ it results that $\left.\frac{\partial \pi_m}{\partial \gamma}\right|_n < 0$.

Chapter 3
An empirical investigation on the Central and Eastern European Countries

3.1 Introduction

This chapter provides an empirical counterpart for the model discussed so far. I have analysed the international fragmentation of production occurring in Central and Eastern European Countries (CEECs) for various reasons.

First of all, because these countries have been characterized by a very fast process of economic integration with the European Union (EU) via both FDI and trade flows. This fact is particularly relevant if we consider that fragmentation of production is often accompanied by the parallel evolution of trade and FDI flows taking place once tariff barriers have been reduced (Altomonte, 2003). Indeed, both trade and FDI flows increased by a factor of 10 in the last decade, with trade in intermediates playing a significant role in the process, although with some differences across sectors (Baldone et al., 2001). This huge increase of trade flows in intermediate goods between the CEECs and the EU is largely due to the process whereby previously integrated productive activities start being segmented and spread over multiple production sites located in the CEECs.

Second, these countries have satisfied the conditions for fragmentation of production. As a consequence of increasing competition, especially from low wage producers, EU firms pursued strategies aiming at the reduction of their production costs. This required

a number of organizational changes for the European firms, and resulted in the shift of the labour-intensive production phases toward countries characterized by relatively low labour costs, like the CEECs. Evidence on this phenomenon can be found in the data on trade in intermediate goods between Western and Central-Eastern Europe, as reported by Kamisnski (2001). In his work he highlights that CEECs have experienced a faster growth of trade in parts and components than in trade of manufactures: during the 90s, between 1993 and 1998 the total value of exports of parts and components from CEECs to the EU grew 4.8 times , while that of final goods 2.8 times. In line with this trend over the same period imports of parts and components increased four times, whereas those of manufactures excluding chemicals grew less than three times.

Third, the transition process experienced by CEECs has determined a sort of "institutional upgrading" that led to the economic integration with the EU and allowed some countries to gain access in 2004. The case of those economies in Central and Eastern Europe offers an example of the impact of external anchors on domestic reforms, namely the prospect of EU accession and the internationalization spurred by the signature of international treaties. By reducing the risk that foreign investors face and improving a country's business climate, the structural and institutional reform process played the same role of the contract completeness in the model discussed in the previous chapter. Then, the upsurge of economic activities outsourced in CEECs is associated with a parallel evolution of their institutional and regulatory framework. However, the latter implies some measurement problems related to the fact that many institutional dimensions are involved, due to the contemporaneous impact of the natural transition process from central planned to market

oriented economies and external factors that boosted domestic reforms. Hence, paragraph 3.2.1 concerns with this issue, whereas paragraph 3.2.2 copes with problems related to the measurement of outosurcing through a review of some previous empirical studies. So far the existing empirical works dealing with fragmentation of production have tried to find some proxies for measuring outsourcing, since the latter should require data at firm level that are still missing. This is one of the reasons for which many of these empirical studies differ greatly from the purposes of my research.

It depends from the fact that there is still a wide gap between the empirical and the theoretical approach used to deal with the phenomenon of outsourcing. Indeed, theorical models of contract incompleteness employed to explain different modes of production chosen by the firms have not been tested empirically yet, due to the lack of micro data, while the existing empirical work has been so far almost entirely based on a strict statistical analysis of trade flows focusing on macro evidence of the issue. This part of research tries to reconcile these two approaches but with some difficulties due to the availability of the data. Following other empirical studies, I tried to overcome the problem of how measuring outsourcing taking into account the evidence of increasing trade flows in intermediate goods, that are at least partly due to the rising of outsourcing in the CEECs. Eurostat, the Statistical Office of the European Commission, provides detailed data on trade flows, identifying within trade in intermediate products a particular regime, the so-called Outward Processing Trade (OPT), that is trade flows registered as "trade for reasons of processing" i.e. goods temporarily exported from the EU to be processed abroad and eventually re-imported into the EU. As a result, since OPT implies by definition a subcontracting arrangement with the

purpose of processing an intermediate good, it is a very good proxy for my purposes[17] as it will be further discussed in the chapter. Indeed, Paragraph 3.3 covers a detailed description of the datasets and the variables used to carry out the econometric investigation, whereas paragraph 3.4 reports econometric estimates and comments of the results.

3.2 Some measurement issues

3.2.1 Legal enforcement

The measurement of the various characteristics of the institutional upgrading the CEECs experienced in the last decade is no easy matter. Their reform process has been multi-dimensional and hence its assessment implies the need of different indicators measuring the institutional conditions. The underlying concept is that a market economy can only operate if there are certain rules of the game, and in particular that property and contract rights have to be defined and there have to be mechanisms that will credibly enforce them. A well working of the institutional framework prevents the occurrence of violations of these rights, such as corruption, unreliable judiciaries, unpredictable changes in rules and policies. In the case of the economies in Central and Eastern Europe, the institutional enhancement has been promoted by their transition from central planned to market -oriented economies,

[17] As pointed out by several authors (e.g. Baldone et al., 2001) OPT data is a conservative and not exhaustive measure of the phenomenon of vertical specialisation, as not all trade in intermediate and unfinished goods to be processed abroad is recorded as OPT according to the Eurostat definition. However, some characteristics of this variable make it a convenient proxy: OPT data come in complete time series and tend to be strictly correlated with trade in intermediate products; in addition, lacking a precise definition of "intermediates to be processed abroad", OPT data are in principle unbiased, being defined according to an exogenous and observable characteristic (the choice of the custom regime).

associated with the prospect of EU accession and the internationalization pledged by the signature of international treaties. In particular, these two events can be considered as external anchors that have influenced the transition strategies of these countries. Evaluating the way in which policy measures have been implemented, they undertook the so called Big Bang strategy[18], characterized by the implementation of the greatest number of policies as fast as possible.

The comparison between different transition strategies is the result of a greater attention that in recent years has been paid to new global standards of governance. This is due to the fact that citizens of developing countries are demanding better performance on the part of their governments. Furthermore, international actors are paying much more attention on the institutional quality performed by a country. On the one hand, at the World Bank and other international agencies, scarce resources must be allocated to governments that will use them most effectively. On the other, institutional variables are important factors that determine countries'attractiveness for foreign investors: indeed they are associated with better economic performance, since they affect positively investment and growth[19]. These developments have led to new interest in measuring the performance of governments, using indicators of governance and institutional quality.

The World Bank provides six aggregate indicators covering 180 countries for the years 1996, 1998,2000 and 2002. Each indicator is based on aggregating information from

[18] See Roland, G., p.78. In contrast with this strategy, other transition countries like the Asian economies adopted a gradual approach.

[19] Mauro (1995), Knack and Keefer (1995), Brunetti, Kisunko and Weder (1998) study large samples of countries and find that institutional performance impacts on investment and growth. Brunetti, Kisunko and Weder (1997) and Havrylyshyn and van Rooden (2000) investigate transition countries and find a positive relatiosnhip between institutions on FDI and growth (respectively).

a large number of underlying component indicators. For instance, the aggregate indicator "Rule of Law" is based on 28 components which are drawn from nine different sources. The advantage of this aggregation is that it creates a comprehensive cross section; the main disadvantage is that these indexes are not computed for a continuous time series. Furthermore, even though their approach presupposes that all component indicators used to calculate the aggregate index are measures of the same underlying basic concept, combining information from such a large variety of sources can undermine this assumption. Nevertheless, the World Bank provides very comprehensive governance indicators, as well as the European Bank of Research and Development (EBRD). The EBRD is "specialised" in producing transition indicators that lie at the core of the Bank's assessment of progress in transition. These have been published since 1994, tracking reform developments in all 27 countries of the region. Progress is measured against the standards of industrialised economies, focusing on nine areas which, when combined, cover the four main elements of a market economy: market and trade, enterprises, infrastructure and financial institutions. In 2003 the EBRD launched a New Legal Indicator Survey, which introduces a new way of measuring legal progress in the transition countries. Its assessments measure "laws in transition", that is to what extent legal rules comply with international standards, and "laws in action" that aims at evaluating legal effectiveness through countries' case studies. In the following table there are summarized the main characteristics of some databases that provide indexes measuring different aspects of institutional quality:

Sources	Some Aspects of Governance considered	Method of Data Collection	Coverage across countries	Coverage over time
BERI	Bureaucratic Delays;Contract Enforceability; Nationalization Risk	Experts	53	Since1980
Heritage Foundation	Trade policy, Fiscal burden of government, monetary policy; foreign investments, banking and finance, Property rights, regulation, black market	Experts	161	Since1995
ICRG	Investment Profile; Bureaucracy Quality; Corruption; Law and Order	Experts	140	Since 1984
Transparency International	Corruption Perception Index	Aggregation	145	Since 1995
World Bank	Rule of law; Voice and Accountability; Graft; Government effectiveness; Regulatory burden; Political stability	Aggregation	180	1996-1998-2000-2002
EBRD	Privatisation; Governance and Enterprise restructuring; Price liberalisation; Trade and Foreign Exchange system; Competition policy; Banking reform; securities markets; New Legal Indicator Survey (NLS)	Experts	27	Since 1994; NLS since 2003
The Doing Business Database (World Bank)	Enforcing contracts; Protecting investors; Starting a Business	Research of laws, with verification from more than 3,000 local government officials and experts.	145	Since 2004
BEEPS (WB and EBRD)	Business Climate; Corruption; Functionning of Judiciary;	Business survey	26	1999-2000

Table 3.1 Selected Institutional Indicators

The case of Central and Eastern European Countries suggests that external political anchors can greatly assist institution building and implementing governance indicators. They began their structural reform process earlier, pursued it more vigorously, and are currently far more advanced than other transition economies. According to the EBRD tran-

sition indicators, they show much faster structural reforms than other transition countries. This argument holds not only for the CEECs that have already gained the EU membership in 2004, but also for the other countries that will join the European Union. There are several reasons for their accelerated transition process. A key factor was that the EU accession was seen as delivering concrete benefits to the accession countries. Strong support for institutional reforms reflected the belief that, as these countries anchored their institutional structures to the European Union, they would be viewed as more secure places for investing and doing business. EU accession proved an especially powerful anchor because it forced concrete discussions of specific wide ranging laws, including the entire acquis communautaire. For instance, accession candidates had to deal with detailed obligations related to common external tariff and associated requirements for the customs union and full opening of the capital account. In addition, the accession process placed a strong emphasis on increasing competition that helped reduce rent-seeking opportunities, lowering the benefits to vested interests from the staus quo. But the European Union is not the only external anchor. International treaties help promote openess and may also act to encourage institutional reform by increasing the potential payoff to improvements in transparency. For instance, membership in the WTO should lead to reduce incentives for corruption "by providing countries with what are perhaps the most powerful institutional checks and balances in the international economic sphere" (Bacchetta and Drabek, 2004). Indeed, the adherence to internationally acceptable rules for international trade and FDI imposes strict disciplines on governments. An assessment of the impact of WTO membership and other international treaties on institutional quality is difficult to evaluate since many other factors

can affect the quality of governance. Moreover, the causality may go in both directions; a high level of institutional quality will facilitate the accession while the accession promotes good institutional quality. Furthermore, it is not possible to trace the precise time pattern of the effect of these external anchors and hence it is plausibly difficult to disentangle the effects produced by a "natural" process of transition on the one hand and the role played by external anchors on the other hand.

Bearing these limitations in mind, it may be interesting to analyze the time series of an index that can proxy the quality of institutional framework, developed by the International Country Risk Guide. It is a composite indicator that takes into account more than one aspect of the economic and business structure (see the Appendix). in order to verify whether its trend has been affected by the signature of some relevant international treaties during the period considered. I employ this indicator since it is available for all the countries and over the time span I am interested in. Also, it can be considered a good proxy of the institutional quality for those aspects related to the investment climate since it is correlated at 63% level with an indicator of legal framework[20].

The international treaties I take into account are those cited by the World Investment Directory (2003) prepared by the United Nations Conference for Trade and Development (UNCTAD). These multilateral and regional instruments are those that plausibly involve some institutional aspects that affect the countries'business climate. They are summarized

[20] This indicator is a subindex of the so- called R-factor, developed by the Business Envirnment Risk Intelligence (BERI S.A), measuring aspects like profits repatriation and contract viability. This elements are also included in the ICRG indicator, but the latter is a wider index that comprises other political and economic evaluations. Hence, the found correlation confirms the opportunity to use the ICRG indicator as a proxy of the legal framework.

in the following table that provides also the date of signature made by the CEECs (Czech Republic, Hungary, Poland and Romania) on which the empirical analysis is conducted:

International Treaties and Regional Agreements	Countries	Date of Ratification	Entry into force
Paris Convention of Industrial Property	Czech Republic		1993
	Hungary		1970
	Poland		1975
	Romania		1970
New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards	Czech Republic		1993
	Hungary		1962
	Poland		1961
	Romania		1961
Convention on the Settlement of Investment Disputes between States and Nationals of Other States	Czech Republic	1993	
	Hungary	1987	
	Poland		
	Romania	1975	
Convention establishing the MIGA	Czech Republic	1993	
	Hungary	1988	
	Poland	1990	
	Romania	1992	
Declaration on International Investment and Multinational Enterprises	Czech Republic	1995	
	Hungary	1996	
	Poland	1996	
	Romania		
WTO membership	Czech Republic	1995	
	Hungary	1995	
	Poland	1995	
	Romania	1995	
OECD Convention on Combating Bribery	Czech Republic	2000	2000
	Hungary	1998	1999
	Poland	2000	2000
	Romania		
Europe Agreements	Czech Republic	1993	
	Hungary	1991	
	Poland	1991	
	Romania	1993	

Table 3.2 Main multilateral and Regional Instruments (*elaborated* from WID 2003, Unctad)

In the light of the previous table regarding the main multilateral and regional instruments signed by the countries of the sample, I try to verify whether the latter have had any

kind of impact on the evolution of the index of legal framework employed in the econometric analysis over the period between 1990 and 2001:

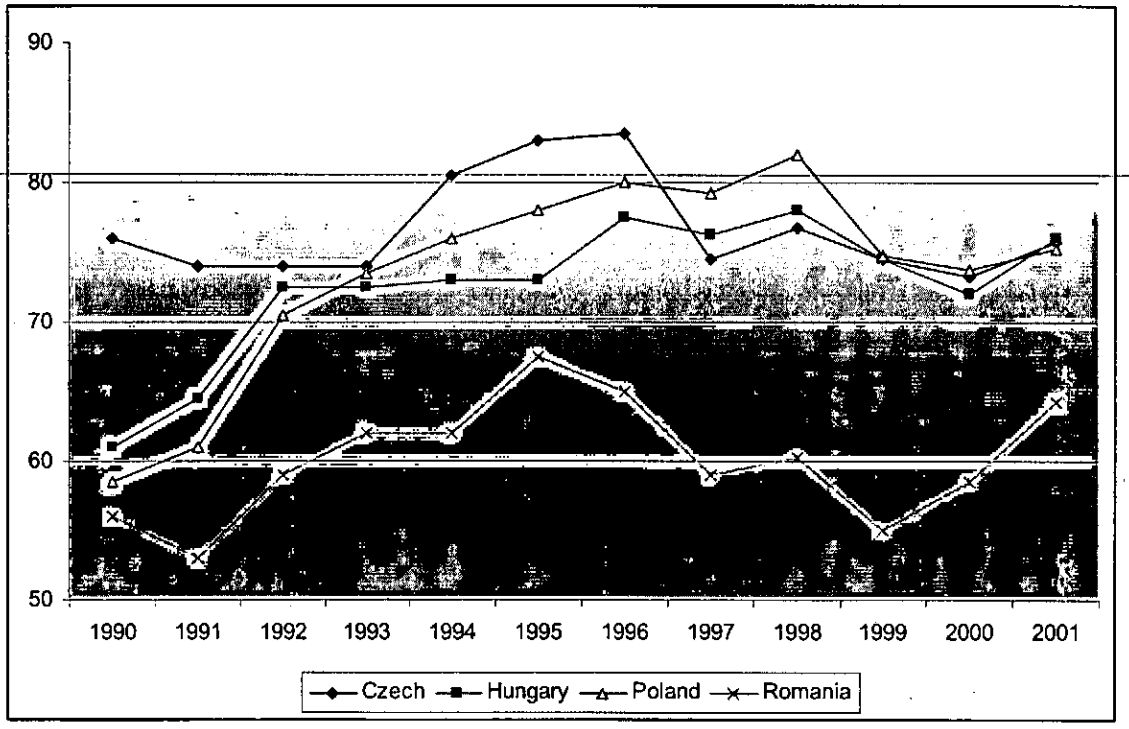

Figure 3.1 Trends of the legal framework index

According to Figure 3.1, international agreements didn't affect the trend of the index of legal framework but for the case of Czech Republic. For this country it seems that institutional upgrading started in 1993, during which Czech Republic adopted the main multilateral instruments and signed the European Agreement. Instead, the other CEECs have already entered many international treaties before the beginning of their transition process; this time mistmatching did not allow these countries to benefit completely from the presence of external anchors. This fact highlights that is implementation, and not a formal

signature, to spur institutional enhancement: it is plausible assuming that Czech Republic not only adopted but also widely implemented the content of international instruments ratified during its "natural" transition process, in contrast with the other CEECs. Furthermore, whereas Poland experienced an initial improvement of its institutional framework, probably due to an internal reform process, with a peak reached in 1998, Romania lagged behind and Hungary displayed a trend that seems not to be influenced by its accession to international treaties that in fact were mostly signed before 1990.

The unique exceptions seem be represented by the signature of the Europe Agreements and the WTO membership. Analysing the last fact, even though these countries have already signed the GATT Agreement, the foundation of an international organization dealing with rules of trade between nations could have induced the CEECs to improve their legal framework. Indeed, WTO accession can spur the reform process of transition countries. Based on the idea that trade agreements can play the role of external anchors and thereby facilitate trade policy reforms, it may seem that WTO accession has played different roles in different countries. For example, in transition countries that were already WTO Members before the start of their transition, regional integration obviously played the leading role in facilitating the reform process. In other transition countries, WTO accession and regional integration both played a role while in a third group of countries, WTO accession most likely played the most important role. Nevertheless, the WTO disciplines are critical even for countries which may be more reliant on regional agreements since these must typically be WTO consistent.

In the four Central European countries - all four GATT Contracting Parties - trade policy reform measures were taken largely autonomously in the first half of the 1990's, that is prior to the conclusion of the Uruguay Round Agreements. Following the collapse of central planning, the countries eliminated foreign trade monopolies and introduced competition into virtually all foreign trade activities. Licencing requirements have only been retained for few foreign trade transactions such as trade in arms, drugs, goods of historical or artistic value and other transactions normally permitted in international practices. Price controls have been eliminated on all but a few non-tradeables, export and other trade-related subsidies have been abolished. Eliminated were also all quotas, the pillar of trade policy under central planning.

Thus, the countries were left with tariffs as the only instrument to control the flow of imports. The tariff schedules were all inherited from the previous trade policy regime with a fairly low tariff incidence. For example, the former Czechoslovakia inherited a tariff schedule with about 5 per cent average tariff incidence, one of the lowest in the world, whereas other two countries, like Hungary and Poland had a tariff incidence somewhat higher but even these two countries demonstrated a fairly open foreign trade regime as most of their tariffs were bound.

The trend towards trade liberalization was boosted by Regional Trade Agreements (RTAs) negotiations with the European Union. In the early 1990's the countries began their negotiations of the Association Agreements, later relabelled as the Europe Agreements. These were extremely important steps and they affected the course of trade policy in each of these countries. The agreements provided for the establishment of a free-trade

area between the EU and each of these four countries but the agreement extends far beyond a simple free trade arrangement. The agreements led to a radical opening of markets for foreign investment – direct and portfolio – and they covered various other activities such as economic cooperation, customs administration, labour issues, etc. They include provisions covering not only manufactures but also agriculture and services. In addition to the Europe Agreements, these countries have also signed other preferential trade agreements. For example, over the period considered in the empirical analysis, the Czech Republic entered a customs union with Slovakia; it signed the Central European Free Trade Agreement (CEFTA) with Hungary, Poland, Slovakia, and later with Romania, Slovenia and Bulgaria; it concluded an agreement with EFTA countries; and it built up its own generalized system of preferences. The Czech government also signed dozens of bilateral agreements on investment protection.

While the speed of liberalization provided under the umbrella of the Europe Agreements was quite impressive, and so was their scope, the agreements have not gone as far the Uruguay Round Agreements in several areas. For example, in services the Europe Agreements only provided a reference to the ongoing Uruguay Round Agreements binding both the EU and the countries concerned to incorporate into the Europe Agreements the commitments of both parties made in the Uruguay Round. Similarly, the Uruguay Round has gone further than the Europe Agreements in specifying in detail the technical standards as well as sanitary and phytosanitary standards. Excluded were also provisions concerning protection of intellectual property as well as trade-related investment measures such as those covered under Trade Related Aspects of Intellectual Property Rights (TRIPs) and Trade Related

Aspects of Investment measures (TRIMs) respectively in the Uruguay Round. Safeguards and anti-dumping measures were also refered to the WTO standards. Hence, the Europe Agreements did not cover everything, several topics were negotiated under the umbrella of the Uruguay Round.

Ultimately, the actual Uruguay Round negotiations have brought relatively little in terms of further market opening and trade liberalization in these transition countries. Most of the liberalization measures have been taken autonomously and/or as part of various RTAs. As a feature of trade policy-making, the experience of transition countries is not unique; it is a part of a general trend towards "new liberalism" of the 1980s and 1990s. The Uruguay Round Agreements have supplemented the existing reforms in some areas – especially in services, TRIMS, TRIPS as noted, and they have brought disciplines into these countries' trade regimes by adopting multilateral rules on safeguard, anti-dumping and others.

In the econometric analysis presented in paragraph 3.3, the eventual different impact of external anchors on the insitutional upgrading of the CEECs (for instance, as discussed earlier, the case of Czech Republic seems to differ with respect to the other countries taken into account in the empirical analysis) can be caught by country dummies (or country fixed effects in the case of implementation of the panel structure), whereas their insitutional upgrading, mostly due to their transition process but probably also spurred by WTO membership and by the preparation for accession into the EU, is grasped by the index of legal framework.

3.2.2 Outsourcing

The existing empirical works dealing with fragmentation of production are mainly focused on two aspects, one methodological and the other related to the explanation of the phenomenon. The former is mainly a measurement problem that is coped with in order to clearly identify the phenomenon, while the latter tries to explore its determinants.

As in this empirical investigation, the first issue rises because the lack of the data at firm level requires to find an indirect measure of the fragmentation of production, through the analysis of trade flows of intermediate goods. The early empirical literature that investigates the impact of outsourcing (e.g. Feenstra and Hanson, 1996, 1999;Yeats, 2001) generally defines international outsourcing as "imported intermediate inputs", and derives various industry measures of the degree of fragmentation of production using trade data. Yeats (2001) argues that global production sharing involves more than $800 billion in manufactures trade annually, or at least 30 percent of the total world trade in these products. Another important finding is that trade in components and parts has been growing at a considerably faster pace than that for final products, "a point that clearly documents the growing interdependence of countries in international trade and production operations".An interesting and widely used measure has been developed by Hummels el at. (2001). Their index allows to capture the amount of vertical specialization[21] for a country that uses imported inputs to produce exported goods. Vertical specialization and fragmentation of production are sometimes interchangeable to describe the same phenomenon since outsourcing

[21] According to their definition, vertical specialization occurs when 1) a good is produced in two or more stages; 2) the production process involves two or more countries; 3) at least one country must use imported inputs in its stage of the production process, and some of the resulting output must be exported.

implies the division of production chain into more specialised phases. Indeed, the main aim of fragmentation is to take advantage of specialization in components or phases of the value chain as well as to gain more profits from a cheaper final product due to scale economies in the production of these components. The vertical specialisation index for a country k in the sector (good) i is defined as the share of imported input content of exports:

$$VS = (\frac{\text{imported intermediates}_{ki}}{\text{gross output}_{ki}})\text{exports}_{ki} \tag{3.18}$$

Hummels et al. outline some advantages in employing this index. First of all, they note that the VS index better captures the sequential vertical trading chain stretching across many countries than the simple analysis of trade flows in intermediates. Moreover, they point out that any classification of goods by product codes or description into "intermediate" and "final" categories is arbitrary, and hence it is not straightforward to identify trade flows in intermediate goods.

Using input-output tables, their evidence indicates that, as of 1990, vertical specialization, measured by (3.18), accounts for 20 percent of merchandise exports among the OECD countries, whereas for four countries outside the OECD (Mexico, Taiwan, Korea, Ireland) vertical specialisation accounts for 40 percent of exports. Moreover, in the last twenty five years world VS share has increased by 40 percent and through a decomposition of export flows Hummels et al. find that vertical specialisation is particularly relevant for those sectors that have experienced most export growth.

An alternative measure employed to identify international fragmentation of production is the so called Outward Processing Trade (OPT)[22], that can be considered a subcontracting arrangement. It makes possible to export goods temporarily for processing and to import the compensating products with a full or partial exemption from duties and levies. Then, OPT concerns with goods whose production process is split up into different phases that can be performed in different locations, but it represent a subset of vertical specialisation defined according to Hummels et al. since it implies at least a double crossing of international border. The aspect that characterizes OPT is the formal status granted to it within the EU trade legislation. Fabbris and Malanchini (2000) widely discuss the OPT regime, analysing European activities in OPT with the rest of the world, with a particular focus on the neighbouring countries involved in the integration process within the EU (before their accession in 2004), notably the CEECs, and the Mediterranean countries, that participate in looser agreements. Their study considers the period of 1988-1998 and it is motivated by a parallel analysis of the economic performance of the CEECs and the Mediterranean region. According to their work, OPT statistics reveal that the degree of trade competition between these two geographical areas is not reduced, notwithstanding their different factor endowments and different European markets of destination. Indeed, the decision to delocalise some stages of production activities in these two regions comes from the opportunity to exploit low labor costs. Hence European firms deverticalise mainly labor intensive phases production, i.e. traditional textile and clothing industry, footwear, mechanical and electromechanical sectors. However, if spatial dimension of competition is considered, they find

[22] Further details on this trade regime granted by EU legislation are provided in the Appendix of this chapter.

that the two regions do not appear as direct competitors because of the different destination of their products in the European markets. Finally, in terms of trade volumes generated, Fabbris and Malanchini point out that the perfomance of the CEECs is more satisfying than that of the Mediterranean region during the entire period considered, especially from 1994. This trend is also characterized by higher degree of homogeneity as a group for the CEECs with respect to the Mediterranean countries, probably due to a different political climate and level of integration strategy with Europe conducted by the two areas.

The definition of the phenomenon to analyse and the choice of the data and the index to use are necessary steps for investigating the reasons underlining the international fragmentation of production. Some empirical works try to explore this issue departing from a strict statistical analysis but employing alternatively the index developed by Hummels et al. and OPT data.

Among the others, particularly interesting seems to be the contribution of Baldone et al. (2001) that tries to understand determinants at the basis of the choice to delocalise production toward the CEECs. In particular, this work focuses on a specific and relevant case, that is the pattern of production and trade in the textile and apparel industry in Europe. Over the period 1989-1996 they consider four CEECs (Hungary, Poland, Bulgaria and Romania) in order to verify to what extent the decision by EU apparel producers to delocalise phases of production is driven by labor cost saving granted in these countries. They find out that labor costs are certainly important in determining this choice but it appears that it is not enough to explain international trade flows when segmentation of production occurs. Instead, there is robust evidence that EU firms do not always look for the lowest labor

cost country as the preferred partner. It occurs for the case of Germany, the most important originator of OPT: in this case also geographic and cultural proximity are reasons for the original choice of a given country as a processing partner. Furthermore, they argue that, once the process has been activated, EU firms tend to stay with the selected country even though lower labour cost countries open themselves up to the practice. However, these considerations do not hold for the case of Italy, as Italian firms tend to delocalise selecting the lowest labor cost partners.

Swenson (2003) provides an empirical work that examines the pricing of outsourcing imports brought to the U.S. through the 9802 Overseas Assembly Program (OAP). She starts from a Bertrand model in order to explore the nature of competition between alternative country sources. Then, the econometric exercise tries to test the implications of the cost structure and tariff treatment of producers who utilized the 9802 program between 1991 and 2000. Like the OPT statistics, also this kind of data used by Swenson identify a particular trade regime provided by the United States. The 9802 regulations are provided to assist firms that use parts originated from the U.S., as once they ship final products to the U.S. they do not pay tariffs on the portion of product value that originates in the United States. Most of these activities involves assembly activity conducted in developing countries and the sectors that are mostly involved are electrical machinery, transportation equipment, apparel and clothing.

Analysing the pricing of goods re-imported to the U.S after that their production was partly delocalised abroad, it emerges a high level of competition among countries that benefit from OAP. Prices of outsourcing imports reflect just a little portion of the changes of

assembly cost, and import prices are also determined by the prices chosen by other countries. Furthermore, Swenson finds that the degree of cost pass through rises for countries that are more highly educated and price competition is particularly clear- cut in capital intense industries.

Feenstra and Hanson (1996) use trade flows in intermediates to examine the reduction in the relative employment and wages of unskilled workers in the U.S. during the 1980's. They find that a contributing factor to this decline was rising imports reflecting the outsourcing of production activities.

Despite the previous contributions, De Simone (2003) explores the effects of international fragmentation of production on the export performances of different countries. In particular, this empirical work tries to capture differences in French and Japanese exports in manufactured goods compared with the United States toward other OECD countries over the period 1980-1994. In order to capture the phenomenon of delocalisation of production De Simone exploits the VS index elaborated by Hummels et al. and he finds out that fragmentation affects differently the export perfomance of these countries, depending on factors like different economic structures, factor endowments and productivity. For instance, over the period considered delocalisation of production allowed France to cover the gap in terms of productivity and innovation suffered with respect to the United States, whereas for Japan fragmentation had a negative impact in those sectors previously featured by a better export performance. The main result is that the impact of delocalisation on trade patterns is ambiguous and depends on the structural characteristics of the participants in the formation of international value chains.

Another interest work provided by Girma and Gorg (2002) uses establishment level data for UK manufacturing industries to analyse either the determinants of outsourcing and its effect on productivity of the establishments. Among the potential determinants of outsourcing they consider three main factors that may affect firms' decision to externalise some production stages, namely, wage costs savings, output cyclicality and economies of scale. Their empirical results suggest that high wages are positively related to outsourcing, highlighting that the cost saving motive is important for firms' decision in this regard. In the productvity analysis the main finding is that positive and significant effects on productivity are sector- specific, since establishments' outsourcing intensity is positively related to labour productivity in the chemical and engineering industries. Finally, they investigate whether there are differences in the determinants and effects of outsourcing between domestic and foreign-owned establishments. Girma and Gorg find that foreign-owned firms have higher levels of outsourcing than domestic establishments. Since the former are by definition part of a multinational company, they can be expected to use higher levels of technology than purely domestic firms, due to their access to firm specific assets. Furthermore, foreign establishments tend to contract out low-tech intensive activities. Nationality of ownership of a firm matters also when productivity effects are investigated: indeed, it seems that the positive relationship between outsourcing and plants' productivity is particularly pronounced in foreign-owned establishments.

So far I have briefly illustrated some recent empirical works concerning with delocalisation of production. The econometric exercise taken here departs from them in order to test some implications of the model discussed in the previous chapter. As long as I know,

there is only another work of Feenstra and Hanson (2003) that, after building a model of international outsourcing under incomplete contracts, applies empirically the model to the case of China. It departs from my study because the theoretical framework originates from the Grossman-Hart-Moore property rights (PR) approach. In this set up, they consider a multinational firms that sends intermediate inputs to a processing factory, which converts the inputs into finished goods and then exports the final output. In this context the decisions facing the multinational are focused on who should own the processing factory and who should control input-purchase decisions the factory makes. In order to develop the empirical test Feenstra and Hanson employ trade data that fall into two regulatory regimes for export processing, which imply very different responsibilities played by the factory manager in China and hence are useful to disentangle the ownership/control instruments between the parties. Their main empirical finding is that the sharing of ownership between foreign and local parties holds when value-added produced by the factory is high or human capital specificity is low.

Before explaining the methodology used it is noteworthy devoting the following paragraph to the explanation of the datasets and the variables used to run the econometric estimation.

3.3 The econometric implementation of the model

The analysis is carried out through two stages that identify the twofold aim of the model. First, recalling Proposition 1 and 2, I try to characterize the industry equilibrium relying on a relationship between the number of final goods producers n and the probability of doing

outsourcing ρ. I also focus on the role of the legal framework in shaping this equilibrium. This stage of the analysis is run at sectoral level on four CEECs (Poland, Romania, Hungary and Czech Republic) for which series are complete over the time span comprised from 1990 to 1999.

The second step of this econometric exercise is carried out using data at firm level in order to test empirically the impact of some variables on the profits of local firms. In particular, I explore among the others the role played by the presence of foreign final goods producers, the legal framework represented in the model by the parameter γ, as well as the impact of outsourcing over the period 1995-2001.

3.3.1 Description of the datasets and variables

The variables used are drawn from different sources.

Dependent variables that characterise the industry equilibrium according to Proposition 1 and 2 are the following:

- The presence of foreign firms proxied through the (log) number of foreign direct investments in absolute value ($nsect$) for fourteeen manufacturing industries[23]. In order to measure the presence of foreign firms, I exploit the EURECO database, developed within the Research Network on "The impact of European Integration and Enlargement on Regional Structural Change and Cohesion" financed by the EC fifth Research Framework Programme. In turn, it combines two datasets: the PECODB database, a unique firm specific collection of more than 5000 FDI operations in the

[23] See the Appendix of this chapter for details.

CEECs in the period 1990-2001 and the AMADEUS dataset provided by the Bureau Van Dijck, a consulting firm operating in Brussels, containing balance sheet data in time series of a sample of roughly 5000000 companies operating in both Western and Eastern Europe.

- The amount (in log) of outsourcing (*louts*) registered in each of the 14 sectors identified according to the NACE classification. In order to find a proxy for this variable I exploit trade data from Eurostat, Comext CD-Rom, Intra and Extra-EU trade, classified according to the Combined Nomenclature. In particular, I considered bilateral data of imports from each of the CEECs toward the European Union registered as "trade for reasons of processing", i.e. goods temporarily exported from the EU to be processed abroad and eventually re imported into the EU.

Control variables employed in this first stage of the econometric model are the following:

- Sectoral productivity (*lsectprod*) expressed in logarithm and one- year lagged to control for potential endogeneity. The industry equilibrium is explored at sectoral level and it justifies a control for differences in productivity among industries determined by, as Proposition 1 and 2 outline, productivity levels performed by local suppliers and subsidiaries controlled by foreign final goods producers. This variable, provided for each year over the time span considered, is constructed as the ratio between industrial production (drawn from WIIW Database of Eastern European Countries) and the number of hours worked by sector (data that are

sourced by Laborstat ILO Database). Sectoral productivity should capture the effects of efficiency-seeking investments and it is expected that both FDI and outsourcing react positively to this variable. However, *a priori* it is not possible to say whether productivity matters more for a direct investment rather than for outsourcing.

- Relative wages (*relwages*), i.e. the ratio between gross monthly wages of each country and the average of the countries considered for each sector (sourced by Laborstat ILO Database, they are classified according to the ISIC Rev.2 and 3 nomenclature and hence converted into the NACE classification). This type of covariate is widely used in order to highlight comparative advantages in terms of labor costs endowed by the CEECs. In both cases, the expected sign should be negative as the higher the cost of production the lower the level of outsourcing and the number of FDI, as it reduces the relative comparative advantage of a given country with respect to the average of the CEECs in terms of manfacturing costs. However, as in the case of sectoral productivity, we cannot say whether this variable reduces more the number of FDI rather than the amount of outsourcing, given that the two choices are alternative.

- Log of minimum efficient scale of domestic firms in each industry (*lmes*).This variable is the median domestic firms'employment of each industry calculated on the set of considered countries. This variable is elaborated from data on employment provided by the EURECO database. It contributes to control for a non uniform distribution of investments observed in different sectors. Consistently with the

general findings of the literature and the effects of fixed costs postulated in the theoretical model, the minimum efficient scale (MES) should affect positively the absolute amount of outsourcing registered for each sector, since a higher MES tends to be associated with higher- labour intensive industries. As in Geroski (1991) I use median employment at the firm level to calculate minimum efficient scale. It uses domestic and not employment of foreign firms to avoid introducing endogeneity in the estimates when the dependent variable is FDI, although the two measures turned out to be highly correlated.

- An index of legal framework ($gamma$), expressed in terms of log values, provided for every country and every year. It can be considered as a proxy of the degree of contract enforceability presented in the model of the previous chapter. This indicator is drawn from the International Country Risk Guide, that produces ratings for 140 countries concerning their whole quality of institutional pattern comprising political, economic and financial assessments[24]. According to the theoretical model, the expected sign should be positive.

- Interactions between high/medium or low tech sectors[25] with the index of legal framework. This comes from the fact that in reality improvement in contract enforceability matters mainly for those sectors in which knowledge assets are particularly relevant. Indeed, foreign firms can fear that local producers may steal ideas and technologies due to the fact that property rights over intangible assets are

[24] See the appendix for deatils regarding the construction of this index.

[25] See the Appendix 3.2 to see how sectors have been classified according to their level of technology.

hard to define and to enforce. For this reason, I include in the econometric exercise these interactions (since the chosen benchmark group is the interaction between low-tech sectors and *gamma*, I enter just the interactions between medium-tech sectors and *gamma* , and high-tech sectors and *gamma*). In this way it is possible to disentangle different effects that institutional upgrading should produce according to the industries involved.

- Transport costs expressed in logarithm (*ltransportcost*) in order to control for additional costs deriving from the shipment of intermediates toward the countries in which are temporarily exported for processing. They are calculated as 1992 freight costs for every industry (Bernard, Jensen and Schott, 2003). What I expect is a negative relationship with the level of outsourcing since the higher the cost of shipment the lower the amount of production activities delocalised abroad since a comparative advantage in terms of labour costs can vanish for too high levels of transport costs.

- $L\sec tgdp$, i.e. sectoral gdp (in log) since, according to the model, it enters both in the expression for n and ρ, contributing to describe the industry equilibrium. This covariate is a proxy of the market size served by the final good producers. As Resmini (2000) points out, many empirical investigations of FDI in Central and Eastern Europe suggest that most firms have invested in the CEECs not only to exploit labour costs saving but also to find new market. For this reason, I include this variable as covariate. The expected sign is positive since, consistently with the

model and figure 2.1, the larger the market size the larger the presence of foreign firms and the amount of outsourcing. These data are drawn from the WIIW Database for Eastern Europe and represent the GDP at market prices allocated across the manufacturing structure of the countries taken into account.

- Annual dummies ($years$) set in order to control for the transition process experienced from these countries.

The second step of the econometric model is aimed at exploring the impact of some relevant covariates on the profits of local firms located in the four CEECs taken into account. The EURECO database provides data on the performance of domestic firms in the considered country/industry pairs from 1995 to 2001. In particular, profits are proxied through the return on total assets (ROA) perfomed, whereas the control variables are:

- The number of foreign direct investments for each sector in logarithm ($nsect$).
- The log of the amount of outsourcing registered through OPT data ($louts$) for each industry.
- The interaction between $louts$ and $nsect$, called $inter$. The rationale of this covariate derives from the need to adjust for the particular data used to "quantify" the amount of outsourcing undertaken in each sector for a given country by foreign firms. Indeed, OPT incorporates all the outsourcing activity that has taken place without distinguishing between the trade in intermediates generated by the local producers

and the trade generated by the foreign affiliates of parent companies. Hence, *inter* should capture the activity of outsourcing generated by foreign subsidiaries.

- Firm productivity expressed in logarithm and one period lagged ($lfirmprod$). This covariate allows us to preserve an analysis at firm level, the most appropriate given the implications of the model I try to test. It is calculated as the value of annual sales over the number of employees for each firm of our sample. In order to take into account the fact that profits and firm productivity could be simultaneously determined, I consider the latter in terms of one period lag.

- The index of legal framework ($gamma$).

- The square of the index of legal framework ($gamma2$). This covariate is introduced in order to account for the particular non-monotonic effect on the profits of local suppliers predicted by the model. Indeed, Proposition 7 and the numerical calibration highlight the existence of a value $\gamma*$ for which profits reach their maximum and then any value $\gamma > \gamma*$ induces a proportionally higher reduction in the suppliers' profit. Hence, $gamma2$ controls for this concave relationship between γ and π_m.

- The log of relative wages ($lrelwages$) still expressed at sectoral level. This kind of data are not provided firm specific by the EURECO dataset; however they can be proxied by the average gross monthly wages per sector in which domestic firms operate in a given country with respect to the average of the CEECs in the sample.

- Country dummies (*countries*) in order to highlight differences among the CEECs during their transition process.
- Annual dummies (*year*) in order to take into account the transition path of these countries.

3.3.2 Methodological issues

Notwithstanding the richness of these datasets, some problems are still present. If we consider the first step of the econometric implementation of the model, i.e. the characterization of the industry equilibrium, some problems of mispecification can arise and hence are to be clarified. In particular, recalling Proposition 1, the industry equilibrium relies on a relationship between the number of final good producers and the probability of doing outsourcing expressed by the following system of simultaneous equations:

$$\begin{cases} \gamma_{11}\rho + \gamma_{21}n + \beta_{11}x_1 + ... + \beta_{K1}x_K = \varepsilon_1 \\ \gamma_{12}\rho + \gamma_{22}n + \beta_{12}x_1 + ... + \beta_{K2}x_K = \varepsilon_2 \end{cases} \tag{3.19}$$

where $x_1, ..., x_K$ are covariates such as the industry dimension, the degree of contract completeness, wages and productivity, whereas ε_1 and ε_2 are the error terms.

In these relationships, n encompasses both the firms that undertake a FDI to get their inputs, which can be denoted as $\hat{n}_{FDI}$, and those deciding to purchase the same inputs from the local suppliers, denoted n_{out} and not retrievable from our data. As a result $n = \hat{n}_{FDI} + n_{out}$ or, *mutatis mutandis*, the observed variable $\hat{n}_{FDI} = n - n_{out}$ is subject to a measurement error n_{out} with respect to the variable of interest (n). Along the same lines,

the observed measure of outsourcing activity (OPT) which I denote as $\hat{\rho}$, incorporates all the outsourcing activity that has taken place between the considered countries, without distinguishing between the trade in intermediates generated by the local producers, the ρ of the theoretical model, and the trade in intermediates generated by the foreign affiliates of parent companies, denoted as ρ_{FDI}. Hence, also the observed variable $\hat{\rho} = \rho + \rho_{FDI}$ is subject to the measurement error ρ_{FDI} with respect to the variable of interest (ρ).

In general measurement errors on the dependent variable, if normally distributed, are not of a particular concern, since the measurement error can be absorbed in the disturbance of the regression and thus ignored (Greene, 2003, p. 84). If in addition measurement errors have a systematic component (say, industry and country-specific, as it is likely to be the case in our sample), the use of fixed-effects panel data techniques is normally a proper way of dealing with the problem. All the previous reasoning is however valid for single-equation models, but it remains to be seen whether I can encompass a measurement error in the disturbance term in a system of two equations when both dependent variables are subject to it, imposing in addition a panel structure to the data in order to take into account its systematic component. Baltagi (1981) has developed a methodology for calculating simultaneous equation models with an error component using an instrumental variable approach based on 2SLS estimates, which corrects for the correlation existing between the endogenous regressors and the disturbance term. Since a measurement error on the same endogenous regressors just adds to the latter correlation, it is possible to treat it with the same set of instruments, and thus proceed with our estimates of Eq. (3.19).

Furthermore, in order to verify the validity of instrumental variables, I run the Sargan Test, that is a test of the overidentifying restrictions. The hypothesis being tested with the Sargan test is that the instrumental variables are uncorrelated to some set of residuals, and therefore they are acceptable, healthy, instruments. If the null hypothesis is confirmed statistically (that is, not rejected), the instruments pass the test; they are valid by this criterion.

The second step of the model has brought few difficulties in terms of the econometric technique employed but the large amount of observations has determined the need to evaluate and eventually rule out some outliers from the dataset. A simple panel data analysis has been carried out with sectoral fixed effects, allowed to be correlated with the vector of time, country and in some cases industry varying explanatory variables.

The econometric equation estimated is the following:

$$ROA_{it} = \alpha_{it} + \beta_1 n\sec t_{skt} + \beta_2 louts_{skt} + \beta_3 inter_{skt} + \beta_4 lfirmprod_{it-1} + \beta_5 gamma_{kt} + \beta_6 gamma2_{kt} + \beta_7 lrelwages_{skt} + \beta_8 countries + \beta_9 year + c_k \quad (20)$$

where the subscript i identifies each firm of the sample, s represents the sectors in which the firms operate for a given year t and c_k captures sectoral fixed effects. The fixed effects treat the constant as a fixed, unknown parameter and in effect the panel data model model with fixed effects entails it specifying a different intercept for each industry in the data sample. In this way it seemed redundant introducing other sectoral variables like

sectoral gdp and productivity, as well as the minimum efficient scale, that are originally taken into account in the profit equation of the theoretical model.

3.4 Empirical results

This paragraph presents the estimation results of the system of equation testing the industry equilibrium and the profits of domestic firms represented by Eq.(3.20).

Table 3.1 and 3.2 display results for the simultaneous equations, treated econometrically through the two stage least squares with instrumental variables to which it has been imposed a panel data structure. Table 3.3 and 3.4 consider the same simultaneous equations but with a pooled regression model with instrumental variables.

Regarding the first econometric model, Table 3.1 reports findings for the equation whose dependent variable is the amount of outsourcing. According to Proposition 1 of the model, what we expect is a positive impact of the number of foreign goods producers. This outcome is confirmed through the econometric exercise taken here with a significance at 1 per cent level, notwithstanding the presence of foreign firms is subject through a "partial" measurement, that is the number of foreign firms that undertake a FDI (not including those that contract out some stages of the production process to local producers). Due to the measurement error in the data, the channel through which the positive relationship between the presence of foreign firms and the amount of outsourcing is verified is more complex than the one we have modelled. In fact, our variable measures the number of foreign firms that undertake a FDI, not including those that contract out some stages of the production process to local producers. Along the same lines, our outsourcing measure, OPT, includes

also trade flows of components and intermediate inputs between foreign firms and their affiliates located in these countries. The estimates thus might be capturing these flows between parent and affiliate MNEs rather than between final producers and subcontractors.

Sectoral productivity positively affects the absolute amount of outsourcing registered for each sector, meaning that OPT trade flows involve mainly those sectors featured by higher productivity levels. It is expressed in terms of one period lag as there is not an immediate adjustment on the level of outsourcing registered for each industry in a given country. Another significant control variable is transport costs that, as we could expect, impact negatively on the dependent variable: the higher the costs deriving from the shipment of intemediates between the country pairs, the lower the amount of production activities delocalised abroad. Looking at the impact of the legal framework, as we could expect, its impact is greater and significant for OPT trade flows in high and medium tech sectors than in low tech industries. Indeed, in the former dissipation of intangible assets is more critical rather than in sectors where specific know-how or innovative technologies are not employed.

Dep. Var: louts	Coefficient	Std Err.	t	P>|t|
nsect	0.449	0.104	4.31	0.000***
lsectprod_{t-1}	1.252	0.119	10.50	0.000***
lmes	0.049	0.105	0.47	0.637
ltransportcost	-2.502	0.256	-9.77	0.000***
gamma	-2.961	2.873	-1.03	0.303
gamma * mediumtech	0.392	0.064	6.07	0.000***
gamma * hightech	0.226	0.067	3.35	0.001***
lsectgdp	-0.007	0.099	-0.07	0.941
years	yes			*not significant*
_cons	22.988	11.500	2.00	0.046***
$Fixed\ effects: \mathbf{F-test}$	8.30			0.000***
$Obs. = 430$	$t = 1990 - 1999$			

***Significant at the 1 per cent level

** Significant at the 5 per cent level

Table 3.1. Estimation results. Dependent variable, outsourcing

(First stage within regression with country fixed effects)

In table 3.2 the instrumented values of outsourcing are used together with other covariates to explain the presence of foreign firms (FDI), according to Proposition 2. It is found that FDI are positively and significantly influenced by the presence of outsourcing. This is consistent with the previous finding, and not in contrast with our characterization of the industry equilibrium (see Figure 2.1). Again, any generalization has to take into account the nature of our measured variables. Controlling for the (lagged) productivity level and the sunk costs (proxied by the MES), I find that both of them are consistently signed and significant. Sectoral productivity affects negatively the number of FDI since, other things being equal, the same covariate induces greater OPT trade flows rather than spurring

the presence of foriegn subsidiaries, and the latter also depends negatively on the minimum efficiency scale, given that they proxy the sunk costs of installing a plant abroad.

As we could expect, the index of legal framework has the appropriate sign: the presence of multinationals depends also on the sectors in which production takes place abroad. The level of legal quality interacted with medium and high-tech sectors displays a negative and significant sign since institutional upgrading matters mostly in those sectors in case of outsourcing rather than in case of in-home production.

Dep. Var: nsect	**Coefficient**	**Std Err.**	**t**	**P>|t|**
louts	1.911	0.427	4.47	0.000***
lsectprod$_{t-1}$	-2.803	0.674	-4.16	0.000***
ltransportcost	5.611	1.245	4.51	0.000***
gamma	0.190	0.185	1.03	0.305
gamma * mediumtech	-0.879	0.206	-4.27	0.000***
gamma * hightech	-0.508	0.169	-3.00	0.003***
lmes	-0.11	0.233	-0.47	0.636
years	yes			*not significant*
_cons	-51.976	29.858	-1.74	0.082*
$Fixed\ effects: F-test$	7.54			0.005***
$Sargan\ test$	0.006			0.939
$Obs. = 417$	$t = 1990 - 1999$			

***Significant at the 1 per cent level

** Significant at the 5 per cent level

* Significant at the 10 per cent level

Table 3.2 Estimation results with dependent variable, presence of foreign firms (*Panel instrumental variables regression with country fixed effects*)

In the following tables I have employed relative wages instead of productivity to control for comparative advantage in terms of costs saving embedded by the host country.

Since in this case a panel structure with fixed effects on countries is rejected, I run a pooled two stage least squares with instrumental variables. Table 3.2 reports results regarding the instrumented equation, whose dependent variable is the amount of outsourcing. Outcomes of the previous econometric model are mostly confirmed, highlighting their robustness, especially for what concerns with the significant impact of the number of MNEs, and the role played by other covariates, like transport costs and the interactions between the index of legal framework and high and medium tech sectors. Instead, even though sectoral wages expressed relative to the average of the four CEECs has a positive sign, it is not significant, pointing out the countries are chosen because of their higher productivity rather than their lower relative wages.

Table 3.4 displays findings regarding the equation that describes the relationship between the presence of foreign firms and some covariates. Still, OPT trade flows impacts positively on the number of FDI whereas all other explanatory variables have an opposite signs with respect to the instumented regression.

Dep. Var: louts	Coefficient	Std Err.	t	P>|t|
nsect	0.465	0.098	4.74	0.000***
relwages	0.423	0.561	0.75	0.452
lmes	0.147	0.107	1.37	0.170
ltransportcost	-3.004	0.274	-10.96	0.000***
gamma	-1.007	2.005	-0.50	0.616
gamma * mediumtech	0.466	0.070	6.65	0.000***
gamma * hightech	0.234	0.075	3.12	0.002***
lsectgdp	0.115	0.104	1.11	0.269
years	yes			*not significant*
_cons	32.592	8.551	3.81	0.000***
$Obs. = 418$	$t = 1990 - 1999$			

***Significant at the 1 per cent level

** Significant at the 5 per cent level

Table 3.3. Estimation results. Dependent variable, outsourcing (*Pooled two stage least squares*)

Dep. Var: nsect	Coefficient	Std Err.	t	P>|t|
louts	1.961	0.379	5.17	0.000***
relwages	-0.836	1.157	4.98	0.000**
gamma	1.573	3.914	0.40	0.688
lmes	-0.268	0.215	-1.25	0.213
gamma * mediumtech	-0.891	0.192	-4.63	0.000***
gamma * hightech	-0.442	0.158	-2.79	0.005***
ltransport cos t	5.828	1.17	4.98	0.000***
years	yeas			significant
_cons	-66.232	20.422	-3.24	0.001***
Sargan test	1.338			0.2473
$Obs. = 418$	$t = 1990 - 1999$			

***Significant at the 1 per cent level

** Significant at the 5 per cent level

Table 3.4. Estimation results. Dependent variable, presence of foreign firms (*Pooled two stage least squares*)

The system of simultaneous equation is performed through the usage of instrumental variables in order to explain one of the two endogenous variables ($louts$[26]). In both cases the Sargan test tells us that the instruments used are valid since I do not reject the null under which instruments are not correlated with the error term.

Finally, I test the theorical implications on the profits of local firms installed in the CEECs of our sample. From Table 3.5 it emerges that the number of FDI affects negatively and in a significant manner the profits of domestic producers. This result is not in contrast with Proposition 6 that in fact identifies a (negative) *competition effect* in the downstream sector that also affects the upstream industry. Indeed, according to the model a higher number of final producers in equilibrium leads to a reduction of the total surplus available for the local suppliers.

The positive impact of outsourcing on the profits of local firms is in line with Proposition 5 of the model. However, outsourcing, as it is measured in this empirical test does not exclude trade flows between multinationals and their subsidiaries. As a consequence, I introduced an interaction variable ($inter$) between outsourcing and the presence of foreign investors through FDI, in order to disentangle the impact of outsourcing activites carried out by foreign firms towards their parent affiliates on the profits of local suppliers. Indeed, this variable displays a negative sign since it identifies multinationals that trade intermediate inputs with their subsidiaries under OPT regime.

As we could expect, firm productivity (expressed in terms of one period lag in order to avoid problems of endogeneity with the dependent variable) has a positive and significant

[26] In this case the endogenous variable that was instrumented is outsourcing. However, the covariates entering the two equations are the same but sectoral gdp that is used to overidentify the system.

sign, as well as relative wages show up the right negative and significant impact on the profits.

Another very interesting result is represented by the role played by the index of legal framework. Both *gamma* and *gamma2* are significant and taken together describe the concave relationship existing between the profits and the contract incompleteness[27], like in Figure 2.2. As further discussed, this outcome can be ascribed to the fact that higher contract enforcement increases outsourcing activities but at a lower rate, as higher investment costs arising from an improvement in contract enforceability are shifted to the local producers. Furthermore, too much contract completeness generates too much entry and hence a suboptimal level of local profits. As a result, countries which open up to international investment (higher n) have lower incentives to put in place a "complete" regulatory framework γ (e.g. IPRs) due to the negative effects this has on the profits of the local firms π_m.

[27] In this context, I have performed other specifications of the econometric test, taking into account the fact that there could be other functional forms shaping the relationship between profits and the parameter of legal framework. However, terms with higher powers are not significant, confirming the robustness of the concave relationship between γ and the profits of local suppliers.

Dep. Var:ROA	Coefficient	Std Err.	t	P>|t|
nsect	-1.803	0.399	-4.52	0.000***
louts	0.135	0.206	0.66	0.512
inter	-1.555	1.568	-0.99	0.321
lfirmprod_{t-1}	0.463	0.140	3.31	0.001***
lrelwages	-5.332	2.027	-2.63	0.009***
gamma	2.207	0.567	3.89	0.000***
gamma2	-0.013	0.004	-3.20	0.001***
countries	yes			*significant*
years	yes			*significant*
_cons	-87.29	23.11	-3.78	0.000***
$Fixed\ effects: F-test$	14.88			0.000***
$R-squared$	$within = 0.16$			
$Obs. = 20856$	$t = 1995-2001$			

***Significant at the 1 per cent level

** Significant at the 5 per cent level

Table 3.5. Estimation results. Dependent variable, profits of local firms

(Panel regression with industry fixed effects)

The simple empirical evidence provided here is mostly consisent with the theoretical predictions of the model. The first step of the econometric estimation highlights a positive impact of the presence of foreign firms on outsourcing, in line with Proposition 1. The negative partial derivative between ρ and n suggested by Proposition 2 is instead not confirmed by the econometric estimation, even though this is probably due to the fact that the proxy of outsourcing does not exclude outsourcing from MNEs'affiliates. In the second part of the empirical test Proposition 5 and 6 hold, i.e. outsourcing affects positively the profits of local producers whereas the number of foreign investors has a negative impact. But the most striking result is the relatiosnhip found between the index of legal framework and the profits of local suppliers: the econometric estimation fits the concave relationship

between the two variables and confirms the existence of a value of *gamma* that maximises the profits. This should explain why in reality we observe that countries which open up to international investment have lower incentives to put in place a "complete" regulatory framework (e.g. IPRs) due to the negative effects this has on the profits of the local firms. Too much contract enforceability and institutions quality can generate too much entry of foreign investors in the host countries, and hence higher competition in the downstream industry is also reflected into the upstream sectors in which local firms operate.

3.A Outward Processing Trade

Outward Processing Trade, as defined in EC law in Article 145(1) of the Council Regulation (EC) 2913/92, is the system whereby Community goods may be temporarily exported from the customs territory of the European Union in order to undergo processing operations and the compensating products resulting from those operations be released for free circulation with total or partial relief from import duties and non/tar

iff common commercial policy measures.

Being based on a system of licences granted by EU Member states, OPT imposes administrative and economic constraints both on firms and on national authorities. The administrative burdens impose licences, border controls, recognition of the merchandise and recording the temporary nature of the transaction. Until 1994, the authorisation fixed the maximum quantities of goods to be admitted to OPT on the basis of the assigned national quotas. After then, regulation 3036/94 implemented more restrictive rules; in particular, quotas started to be fixed at the Community level, and attributed according to the principle "first come, first served" imposing that firms entering OPT need to produce at least 50% of their production in the EU, whereas previous legislation did not impose any limits. Furthermore, firms requiring the application of OPT regime has to operate in the EU for at least three years. As a result, this rule favours the firms already operating in the market and discourages new firms from entering OPT regime.

Regulation 3036/94 also provides specific conditions for the application of economic outward processing arrangements to textile and clothing listed in Chapters 50 to 63 of the Combined Nomenclature and resulting from outward processing operations. Indeed, the

Community legislation differentiates fiscal OPT from Economic OPT, the former being regulated by the Custom Code and referring to all kind of commodities, the latter by the Council Regulation 2473/86 which concerns only textile and clothing.

The purpose of this mechanism is to avoid the levying of customs duty on goods exported from the Community for reasons of processing, where allowed processing operations are:

- the working of goods, including erecting or assembling them or fitting them to other goods;
- the processing of goods;
- the repair of goods, including restoring them and putting them in order.

OPT regime may apply to all Community goods other than those whose export gives rise to repayment or remission of import duties, or which prior to export were released for free circulation with total relief from import duties by virtue of end use, for as long as the conditions from granting such relief continue to apply, or whose export gives rise to to the granting of export refunds or in respect of which a financial advantage other than such refunds is granted under the common agricultural policy, according to Article 146 of Council Regulation 2913/92.

The total or partial relief from import duties guaranteed under the OPT regime comes from the fact that tariff is applied only on the value added generated by delocalisation process and not on the gross value. The tax effect, which is a kind of "liquidity premium " implied by the payment of TVA (tax on value added), adds an additional benefit to OPT

with respect of normal trade. Indeed, as in the case of import duties, the TVA on temporary export has to be paid on the value added originated in the double transaction, whereas in the case of normal trade it has to be paid on the total value of imports. Then, OPT allows for a temporary liquidity advantage as the payment is delayed over time with respect to normal trade.

3.B Classification of Manufacturing Sectors

In the econometric exercise presented here sectors are classified according to the NACE nomenclature (classification of economic Activities in the European Community).

Class. Code	Explanation
DA	Food products, beverages and tobacco
DB	Textiles and textile products
DC	Leather and leather products
DD	Wood and wood products
DE	Pulp, paper and paper products; publishing and printing
DF	Coke, refined petroleum products and nuclear fuel
DG	Chemicals, chemical products and man-made fibres
DH	Rubber and plastic products
DI	Other non-metallic mineral products
DJ	Basic metals and fabricated metal products
DK	Machinery and equipment n.e.c.
DL	Electrical and optical equipment
DM	Transport equipment
DN	Manufacturing n.e.c.

Accoding to the OECD classification (based on ISIC Rev 3 and converted into Nace Rev.1 nomenclature), I have split up the manufacturing sectors into three main categories, namely high, medium and low tech industries. Instead, in the original OECD classification the disaggregation is greater since industries are divided into high, medium-high, low and medium-low tech sectors:

Low tech industries: DA, DB, DC, DD, DE, DN;

Medium tech industries: DF, DH, DI, DJ, DM;

High tech industries: DG, DK, DL.

3.C International Country Risk Guide Index (ICRG)

The objective of ICRG is to gauge the operations climate for foreign businesses. There are two variables being measured:

- the degree to which nationals are given preferential treatment
- the general quality of the business climate, including bureaucratic and policy continuity.

Definition of the Index

There are 22 criteria in three subcategories: political, financial and economic assessments. These sub-indexes have a different score: the political one is based on 100 points, while the financial and the economic ones are based on 50 points respectively. The total points from the three indices are divided by two to produce the wights for inclusion in the composite country score. The composite scores, ranging from 0 to 100, are then broken into categories ranging from Very Low Risk (80 to 100 points) to Very High Risk (from 0 to 49.5 points).

Into the political index there is the aspects I am interested in, i.e. the Investment Profile.

This is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial components. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.

These subcomponents are:

- Contract Viability and Expropriation;
- Profits Repatriation;
- Payments Delays.

Conclusions

This work tries to contribute to the recent research on patterns and determinants of international fragmentation of production. Although in reality this phenomenon can occur according to different internationalization strategies, the main trade off can be referred to the so called "make or buy decision", i.e. whether firms should own the plants producing intermediate inputs or not.

Following recent international trade models that employ elements of contract theory to characterize industry equilibria, the model presented in chapter 2 adds some refinements that formalize the trade off between outsourcing and FDI.

Firstly, fixed sunk costs for the setting up of foreign subsidiaries have been introduced. Secondly, foreign affiliates, whose parent firms are placed in a industrialized country, have been allowed to be either more efficient or less efficient than local suppliers, located in a low wage country. In other worlds, heterogeneity in productivity levels has been inserted for foreign firms.

Then, it has been explored the relation existing between the industry equilibrium in the downstream sector, where foreign firms operate, and the degree of contract completeness prevailing in the host country. A finding is that a proper legal framework, not surprisingly, leads in equilibrium to a higher number of final producers with an higher probability of doing outsourcing.

Hence, the analysis of firms' decisions is mainly based on the comparison of profits that can be gained according to producing inputs in home or outside the ownership control.

But the model tries to go beyond the characterization of the industry equilibrium. Given the importance of legal improvements in the choice of foreign firms not only where but also how to invest, it has been detected the relationship between this industry equilibrium and the profits available to the local suppliers.

The results obtained are quite controversial.

The increase in the number of foreign firms reduces profits not only among them but also among the local suppliers.

On the other hand, however, a surprising result emerges when analyzing the effect of the contract completeness on the profits available to the local firms, relating this result to the number of final producers and their probability of doing outsourcing. In fact, an increase in competition levels has a non-monotonic effect on the profit of the local suppliers, since as the number of entrants increases, the higher is the degree the contract completeness, the lower are the profits available for the local suppliers. As a result, it becomes rational for the local suppliers to contrast the entry of new final producers with a reduction in the degree of contract completeness of the host country.

Although the latter result seems to be consistent with the empirical evidence of a non-increasing protection of property rights in most developing countries once they open up to international trade, it has however to be further explored by future lines of research.

In order to overcome the limitations of the numerical calibration used to verify some predictions of the model, the formal propositions have also been tested with data.

According to the main empirical studies that have explored so far delocalization of production in the Central and Eastern Europe, they have been employed processing trade

data that register flows of intermediates temporarily exported to be processed abroad. The main problem here relates to the availability of firm level data on the amount of outsourcing, for both the local suppliers and the final producers, since indirect measures of outsourcing elsewhere employed in the literature (e.g. Hummels et al., 2001) are not able to grasp all the interactions among the different parameters that the model is able to measure.

Bearing these limitations in mind and maintaining caution in economic interpretation of the results, the empirical test performed in Chapter 3 confirms the main predictions of the theoretical model presented in Chapter 2.

The role of legal enforcement is particularly important. As we could expect, it affects not only the industry equilibrium, and hence the presence of foreign firms, but also the the amount of outsourcing. In particular, it emerges that contract enforcement enhances mostly high and medium tech sectors rather than low tech industries. This is due to the fact that dissipation of intangible assets is more critical in sectors that require specific know how and innovative technologies.

Furthermore, as the model predicts, legal enforcement affects profits of local suppliers in a way that there is an optimum level of contract enforcement that maximizes the profits.

In this context it seems relevant to wonder what is in reality this parameter of legal enforcement displayed in the theoretical model. In economic theories this can represent a wide variety of variables, like the quality of institutions and regulatory framework, as well as the degree of contract enforceability. Multinational enterprises get into contact with host country institutions as soon as they start activities in a foreign economy, and institutions

certainly have a large effect on the continuous operations of the MNEs. In the peculiar case of the CEECs we can wonder what is the relationship between their institutional upgrading with some external anchors, like the Europe Agreements, the membership of WTO and the signature of international treaties. First of all, it is not possible to establish an unambiguous causal relationship between them. Secondly, in their specific case it is hard to distinguish natural components of the transition process they experienced during the nineties with the effective role that external anchors played in their institutional improvements. This is also witnessed by the fact that some of these countries have already been signatories of international agreements, like the General Agreement on Tariffs and Trade (GATT). Probably, the most relevant impact of external anchors among this group of countries has been registered for the case of Czech Republic, where multilateral and regional instruments have been introduced after the beginning of their transition process. This can be explained by the fact that implementation, and not just a formal signature matters in spurring institutional changes.

Furthermore, other regularities shown in the model have been confirmed in the econometric analysis. For instance, the competition effect in the downstream sector where foreign firms operate has a negative impact also on the profits of local suppliers in the upstream sectors, whereas wages and firm productivity have a negative and a positive influence respectively on the profits.

In light of the current debate regarding not only material but also services outsourcing, a further development of this work could be a rethinking of the model in the case of services. This should be considered in addition with other technicalities regarding the

model, like the introduction of different matching between final producers and local suppliers and among the latter, employing different distributions for modelling heterogeneous productivity levels. Furthermore, for what concerns with the empirical investigation, the main purpose is to overcome some measurement problems of variables through the use of firm level data.

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