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**ESSAYS ON THE BOUNDARIES
OF THE MULTINATIONAL ENTERPRISE**

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*To my parents
and Matteo*

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INTRODUCTION

Recent years have witnessed very important changes both in the world economy and in the nature of the enterprise. A new feature of globalisation seems to be the dramatic increase in Foreign Direct Investment (FDI) and trade in intermediate goods which, in turn, reflects the new way firms organize their activities.

Multinational Enterprises (MNEs) have become key players in this scenario, raising a number of interesting issues about their determinants, boundaries and effects. They operate abroad mainly through Foreign Direct Investment, even though we adopt a broader definition here and call “multinational” a firm that is engaged in international operations of any kind; the label FDI is, instead, restricted to the case of wholly-owned subsidiaries (WOS)¹, among the wide array of feasible contracts in a foreign market.

As Abraham-Taylor (1996), Campa-Golberg (1997), Yeats (2001) have documented, firms in many countries are sub-contracting abroad an increasing range of activities – from product design and intermediate good production, to assembly, marketing and after sales services – meanwhile, the same and other firms have been engaging in FDI, so that already in the 1990s, more than 40 percent of US imports of goods took place within the boundaries of Multinational Enterprises (Zeile 1997), and roughly one third of world trade now occurs intra-firm (Antras 2003).

¹ According to the IMF/OECD definitions, FDI is in investment in a foreign company where the investor owns at least 10 percent of the ordinary shares, undertaken with the objective of establishing a lasting interest in the country, a long term relationship and significant influence on the management of the firm (IMF 1993; OECD 1996). The reason why we adopt a narrower definition here is that the ultimate goal of our research is to discuss the relative attractiveness of full versus shared ownership of a production affiliate abroad, as it is clarified below. Following the *Dissipation of Intangible Assets* literature, we thus restrict the term FDI to the case of full ownership, as opposed to joint-venture agreements.

One of the most important changes involves the increasing interconnection of production processes in a vertical trading chain that stretches across many countries, with each country specializing in a particular stage of production, rather than manufacturing final goods from start to finish.

“Outsourcing”, “slicing up the value chain”, “disintegration of production” are just a few labels for the same phenomenon of vertical specialisation that pushes modern corporations towards a global structure (Hummels et al. 2001; Feenstra 1998; Feenstra-Hanson 1996).

The enterprise itself has become the theatre of a massive reorganization, whose keywords sound like downsizing, decentralisation and empowerment of workers, resulting in flatter hierarchies and new balances inside the firm (Holmstrom-Kaplan 2001). While traditional conglomerates were shaped by ownership of physical assets, modern organisations increasingly recognize the importance of human capital and talent, as the new stakeholders of the firm (Rajan-Zingales 2000).

What accounts for these changes in the world economy, on the one hand, and in the nature of the enterprise, on the other?

In the last 20 years, the literature on Multinational Enterprises has basically developed around Dunning’s OLI framework, which groups the motives to undertake Foreign Direct Investment in three categories: *Ownership*, *Location* and *Internalisation* advantages (Dunning 1993).

If MNEs were exactly identical to domestic firms, they would not find it profitable to enter the domestic market, due to the high cost of doing business abroad; since FDIs indeed exist, it must be the case that multinational firms possess some inherent advantages easily exploitable through direct investment.

Ownership advantages correspond to some product, know-how, reputation or production process to which other firms do not have access. *Location advantages* arise when it is profitable to produce directly in the domestic market, rather than producing at home and exporting abroad. *Internalisation advantages* represent the most abstract concept within the OLI framework and generically refer to the boundaries of the firm.

The literature on MNEs has first combined Ownership and Location considerations (see, for instance Helpman 1984, 1985; Markusen 1984; Helpman-Krugman 1985; Horstmann-Markusen 1987a, 1992; Brainard 1993) while corporate governance concerns have received only a later explanation in the dissipation of intangible assets or monitoring costs (see, among others, Ethier-Markusen 1996; Markusen 2001; Fosfuri et al. 2001; Glass-Saggi 2002; Horstmann-Markusen 1987b; Fosfuri 2000; Horstmann-Markusen 1996).

This thesis is a collection of essays on the boundaries of the Multinational Enterprise; therefore our ultimate focus is the *Internalisation issue*, or *entry mode*.

Broadly speaking, we should recognize that international operations may be organized either “internally” – in wholly-owned subsidiaries – or “externally” – under arm’s length contracts with independent local producers: we call *FDI* or *Integration* the first case, while *relying on the market* or *Outsourcing* refer to the second one.

Firm’s make-or-buy decision is usually explained through a comparison between the costs and the benefits of using the market (Coase 1937; Williamson 1985). Integration typically brings direct cost penalties, in terms of knowledge, expertise and cost advantage; however, Outsourcing may be risky as well due to technology transfer (see, among others: Teece 1977, 1986, Rugman 1986), informational asymmetries (Ethier 1986), moral hazard (Rugman 1985, 1986, Horstmann-Markusen 1996), and reputation

concerns (Horstmann-Markusen 1987b). The trade-off between Integration and Outsourcing arises in the domestic, as well as in the foreign scenario, but it is likely that operating abroad exacerbates market failures.

The literature on the boundaries of the Multinational Enterprise has fruitfully developed around three strands, namely: a) *Dissipation of Intangible Assets*; b) *Agency Costs*; 3) *Theories of the Firm*.

Based on the first approach, the rationale for internalising production arises from the risk of *Dissipation of Intangible Assets* (DIA)², while contracting abroad. Intangible Assets (IAs) may consist either of a stock of goodwill – associated with the *reputation* for product quality – or of superior *knowledge* – related, for instance, to the production process or some managerial techniques.

Suppose that a Multinational Enterprise, renowned for its product quality, has to decide whether to operate abroad via FDI or relying on the market. In Horstmann-Markusen (1987), exporting, setting up a wholly owned-subsidiary and licensing are considered alternative entry modes. The key argument is that a local party may have too few incentives to maintain the MNE's *reputation* high, although benefiting from its strong brand image. This implies that any licensing agreement must provide the licensee with the adequate incentives to enhance the multinational's reputation. When providing incentives of this sort becomes too costly, the foreign firm decides to internalise production.

Knowledge is another key resource that a Multinational Enterprise may wish to preserve in its foreign activities (Ethier-Markusen 1996; Fosfuri 2000; Mattoo et al. 2001; Markusen 1998, 2001; Fosfuri et al. 2001; Saggi 1996, 1999; Glass-Saggi 2002a). This

² Charter 1 provides a more detailed survey of these contributions.

is quite a particular good: some types of knowledge are very difficult to transfer outside the firm in which they originate, while some others easily become available to third parties, once revealed. The first case refers to several forms of know-how that are, to some extent, embodied in the human capital of the employees, whereas the second case relates more specifically to technology, as an Intellectual Property.

Compared to physical capital, intangible resources are more likely to give rise to FDI because they can be easily transferred back and forth and they enjoy a “public good” nature, being available to additional facilities at relatively low costs (Markusen 1995). The same joint-ness feature that enables MNEs to cheaply move IAs exposes them to the risk of *dissipation* whenever production activities are outsourced. Notice that *dissipation*, in this framework, entails different meanings, depending on the asset under consideration: in the case of knowledge – human capital and technology – a spillover mechanism is likely to help the local counterpart in taking over production secrets, copy final goods and eventually start a rival firm on the basis of the “stolen” asset; in the case of reputation, dissipation occurs because the local counterpart benefits from the MNE’s brand image, but puts no effort in enhancing it. The risk of losing any of the firm’s key assets provides a motive for keeping production internal rather than outsourcing.

The second approach to the *Internalisation issue* focuses on a different set of costs – called *Agency Costs* - incurred by the multinational (the principal) in contracting with an independent local firm (the agent). They are associated with monitoring the employees and motivating the managers in a setting in which a standard principal-agent problem arises, since the agent’s actions are not perfectly observable, and the two parties’ interests may not be completely aligned. Although an independent local firm

may have superior information about the state of the market, it is not necessarily in her interest to reveal it to the MNE; the agent is likely to have different objectives and the imperfect observability of her actions leaves room for shirking. In Horstmann-Markusen (1996) sales are a function of the agent's effort plus a random component, known to the local firm, but not to the principal. Therefore the multinational cannot distinguish whether a low level of sales is related to low effort by the agent or to a bad state of the market. If designing an incentive scheme, to induce appropriate agent's effort, is too costly for the multinational firm, it may opt for an integrated solution.

The third approach – called *Theories of the Firm*³ – embraces recent contributions in which the firm's make-or-buy decision, at an international level, is assessed through the opening up of the “black box” – traditionally explored by the theorists of the firm – and the simultaneous endogenization of the market environment – as in the International Economics tradition. In particular, three paradigms – the Grossman-Hart-Moore (G-H-M) treatment of hold-up and contractual incompleteness (Grossman-Hart 1986; Hart-Moore 1990), the Holmstrom-Milgrom (H-M) view of the firm as an incentive system (Holmstrom-Milgrom 1994) and the Aghion-Tirole (A-T) conceptualisation of formal and real authority in organisations (Aghion-Tirole 1997) – have been embedded in industry and general equilibrium models, offering a complete characterisation of the interactions between ownership and location, although confined to a limited menu of contractual arrangements. The boundaries of the Multinational Enterprise are shaped by a comparison between governance and transaction costs in the G-H-M framework (see, among others: Grossman-Helpman 2002, 2003; Antras-Helpman 2004; Antras 2003; Feenstra-Hanson 2003, 2004; Ottaviano-Turrini 2003), by a trade off between control

³ Charter 3 provides a detailed survey of this literature, as an attempt at organizing the recent contributions across already established theories of the firm.

and initiative in the A-T formalisation (Marin-Verdier 2002, 2003), while in Holmstrom-Milgrom-based contributions Outsourcing tends to be characterized by high powered incentives whereas Integration emerges when workers earn a fixed wage and use firms' tools (Grossman-Helpman 2004; Feenstra-Hanson 2003, 2004).

This thesis makes a few attempts at contributing to the existing literature on the boundaries of the Multinational Enterprise, both at an empirical and a theoretical level.

First of all notice that the papers reviewed above basically provide theoretical formalisations of the entry mode decision, almost ignoring its empirical dimension; this limitation is probably due to the lack of firm-level data that poses serious constraints to econometric tests.

To overcome this problem, at the basis of our contribution, there is a strong effort in data collecting. For the purpose of chapter 1, a new firm-level dataset has been constructed, covering the whole population of Japanese multinationals, with manufacturing activities in Europe. In particular, two sources have been merged, after a careful translation process: the Toyo Keizai Inc. (2004a), which provides a comprehensive periodical census of Japanese companies engaged in international business all over the world; and the Toyo Keizai Inc. (2004b), which contains firm-level information on all the Japanese corporations listed on the First Section of Tokyo, Osaka, and Nagoya stock exchanges. So, we ended up with a quite extensive database, which offers full coverage in terms of parent companies and host countries in Europe up to 2004, accounting for more than 600 observations, overall.

A similar exercise is provided in chapter 2, where we employ an entirely new firm-level dataset, on the whole population of Italian firms with manufacturing activities in Asia. Data come from an extensive survey, personally conducted between 2001 and 2005, on

the basis of a multiple choice questionnaire, to derive a detailed profile of the MNEs and investigate the major challenges faced abroad, for more than 40 questions and 300 observations, overall.

The selection of the home and host countries for the empirical analysis grounds on recent stylised facts, as well as the author's personal interest on Asia.

Although Foreign Direct Investment in 2005 grew for the second consecutive year as a worldwide phenomenon, South, East and South-East Asia proved to be the main magnet for inflows into developing countries (UNCTAD 2006). At the same time, new global and regional players are emerging from the same region making Asia a number-one-target both as a source and a destination market. This is the reason why chapter 1 deals with the experience of Japanese firms in Europe, while chapter 2 takes an opposite perspective and analyses Italian operations in China, India and South-East Asia, providing a sort of double-sided interaction between Eastern and Western economies, developed and developing countries.

Data collection served the purpose of deriving firm-level information and set econometric tests on the boundaries of the MNE, to complement the existing theoretical literature. Based on the three strands reviewed above, it is clear that the *Dissipation of Intangible Asset* provides the most direct channel to the empirical analysis, being relatively easy to measure the extent of knowledge and reputation⁴, compared to monitoring costs, agents' effort or contractual incompleteness.

However, collecting the data, we realized that the menu of contractual arrangements available for multinational corporations is wider than the standard FDI/licensing trade off, formalised in DIA papers.

⁴ Measures of *knowledge* usually include R&D expenditures and patent, as a proxy for technology, employees skills, as a proxy for human capital; *reputation* can be approximated by advertising expenditure. See chapter 1 and 2 for a discussion about these empirical issues.

In particular, the main issue for Italian and Japanese firms seemed to be the comparison between full and shared ownership of the production affiliate, which we call FDI and joint-venture (JV). It is worth mentioning that, in our terminology, the FDI/JV decision does not necessarily coincide with the Greenfield/Acquisition one. In particular joint-ventures differ from Acquisitions because the local firm is not “bought” by the MNE, and the two enterprises do not disappear and “merge” into a new economic entity: they simply make a temporary cooperation agreement in order to produce final goods together. At the same time, joint-ventures differ from licensing contracts in that the multinational and the local firm cooperate to produce final goods, and share revenues and costs, instead of having a licensee retaining the whole profit and bearing the entire cost, and a licensor receiving a constant fee.

It is widely known that international JVs offer the possibility to make profitable use of the local partner capabilities; they may facilitate cooperation with foreign governments, and generate valuable knowledge (Desai et al. 2002). Nonetheless, these advantages are often offset by the implicit costs of split ownership: access to Intangible Assets may enable the local company to expropriate the MNE’s key resource and start a rival firm. On the contrary, Foreign Direct Investment secures knowledge within the boundaries of a wholly-owned subsidiary (WOS), but typically brings higher costs, because an integrated firm is less efficient than a pair of specialized producers, and lacks expertise and familiarity with the local market.

Joint-ventures are sometimes mentioned in DIA papers (see, for instance: Teece 1977, Mansfield et al. 1979; Rugman 1985, 1986; Saggi 2000; Ramachandran 1993; Glass-Saggi 1999, 2002a) but, to the best of our knowledge, no theoretical formalisation has

been offered yet, in assessing the boundaries of the Multinational Enterprise, where the debate is entirely dominated by licensing agreements.

At the same time, there exists an empirical literature on the impact of IAs on the choice of full versus shared ownership (see, for instance: Andersen-Gatignon 1986, Gomes Casseres 1989, Hennart 1991, Agarwal-Ramaswami 1992, Erramilli 1996, Buckley-Casson 1996, Smarzynska 2000, Desai et al. 2002, Pan 2002, Chen-Hu 2002, Herrmann-Datta 2002, Brouthers 2002, Guillen 2003), but these contributions qualitatively extend some DIA arguments to the case of joint-venture, without any formalising effort.

Chapter 1 and 2 are intended to fill the gap between the theory and the data, and possibly reconcile the theoretical and empirical strands mentioned above. According to our data, the main rationale for operating in a WOS is the wish to preserve knowledge, while joint-venture establishments ground on the attempt at finding a complementary partner, well acquainted with the local market and efficient in input supply. Therefore, an extension of the DIA argument to the case of shared ownership seems more than reasonable.

Chapter 1 and 2 provide a simple theoretical formalisation of the JV option, as a contract based on the partners' complementary skills: in a two-period, two-country setting, we show that Foreign Direct Investment is more likely to emerge the higher the threat of Intangible Assets dissipation, resembling the main findings on the FDI/licensing trade off. Probit estimates, from our datasets, suggest that the experience of Japanese corporations in Europe, and Italian firms in Asia, is in line with these predictions: firms endowed with better technology and human capital or belonging to high tech sectors are more prone to operate abroad through FDI. An important element

of novelty, here, is the possibility to include measures of human capital in the econometric regressions, adding to the broadly employed technological aspects; while employees skills have been rarely considered in previous studies, due to the lack of firm-level information, the personal design of the survey enabled us to further investigate those issue.

Although grounded on a common motivation, chapter 1 and 2 differ in many regards. As far as the theoretic modelling is concerned, chapter 1 offers a more general treatment of the FDI/JV trade off, working with implicit functions and letting the multinational and the foreign firm have a different discount factor. Since the model is inspired by Japanese operations in Europe, a double-sided spillover mechanism is introduced: when a joint-venture agreement is signed, the two parties operate very close to each other, which allows for a knowledge dissipation that operates both sides, with the MNE and the local firm learning from each other. This depends on the fact that we consider a sort of North-North economic relation, in which the home and the host countries are all developed⁵.

Chapter 2 model works with explicit functions and solves the market game in case of FDI and joint-venture. The possibility of a double-sided spillover is considered only in the Appendix as a pure theoretic exercise, since the experience of Italian firms in Asia suggests that the MNE bears the risk of dissipation more than the local enterprise, which is good at input providing, but has no clue in managerial techniques. Given the enormous differences among the Asian economies included in the sample – from huge countries like China and India to tiny ones as Singapore, from extremely advanced economies like the Japanese to labour-intensive ones like the Vietnamese – we also

⁵ See charter 1 for more information about the European countries included in the dataset. Even if some of them can be classified as transition economies, the largest part of Japanese affiliates is located in UK, Germany, France and other advanced countries.

include a measure of market size in the equations and derive testable predictions on its impact, adding to the role of IAs, in shaping the FDI/JV choice.

Noticeable differences also denote the two datasets. Although they are both firm-level, the Japanese sample accounts for a larger number of observations (around 600) but it is less detailed. For instance, human capital aspects are ignored, since they were absent in the original data sources provided by the Toyo Keizai Inc (2004a, b). The Italian sample is smaller (around 300 observations) but more detailed: since data have been collected on a personal basis, we have been careful in including lots of alternative measures of knowledge, to capture different technological and human capital aspects.

Results on the impact of DIA, on the relative attractiveness of full versus shared ownership, are robust to the different theoretical and empirical specifications provided in chapter 1 and 2, and they perfectly match with the respondents' answers, giving strong support to our analysis.

At this stage, it is worth mentioning that data collection served another important goal, adding to providing a base for econometric tests: it helped us understand that real world negotiation is far more deep and complex than the stylised contracts designed by economic theorists. Our modelling of the joint-venture option was already an attempt at moving the debate on the boundaries of the MNE to a more concrete level, in which modern corporations decide over practical issues such as the property of the local affiliate. However, this attempt was just a first step, because real world joint-ventures are characterized by a number of details, beyond the common label, that would be extremely interesting to investigate.

What is a contract? Where can we settle the boundary line among FDI, licensing, joint-venture?

It is clear that all these arrangements locate along a continuum of entry modes that would be incredibly challenging to discover and analyse; but taking this road requires a serious commitment to look inside the firm, allow for contractual incompleteness and study workers' incentives. Put another way, traditional approaches, such as the *Dissipation of Intangible Assets* and the *Agency Costs* need to be somehow overcome, to open the "black box".

Chapter 3 moves along this direction and provides a unitary framework to organize very recent contributions on the boundaries of Multinational Enterprises, based on tools from the Theory of the Firm. The papers reviewed share a common feature in bridging ideas, originally developed in Microeconomics, with the international setting of trade and FDI. In our view, this represents an interesting and innovative perspective, in that the firm – originally taken as given – becomes the centre of the analysis, and its internal hierarchy is carefully explored, and related to the market dynamics.

While our key, in reading this burgeoning literature, moves around the already mentioned paradigms - Grossman-Hart-Moore, Holmstrom-Milgrom, Aghion-Tirole - in presenting the papers we do not necessarily follow a chronological order, rather we consider each contribution as a further step towards a comprehensive characterisation of firms' organisational solutions, starting from the simple domestic ownership decision and ending with richer formalisations of location and ownership concerns in a unitary framework.

Despite many important achievements reached by this literature, our survey exercise sheds light on a few tesserae that are still missing, to draw the complete picture.

In empirical terms, the main challenge regards the measurement of key variables such as contractual incompleteness and workers' incentives, in order to test the theoretical

propositions. This requires, for sure, firm-level data, but there is no general consensus on the best proxies and econometric methods.

In theoretical terms, we believe that a future agenda should include the combination of the three paradigms in a unitary framework to see how hold up concerns may eventually interact with incentive problems, and how this richer apparatus can be settled in equilibrium models; the possibility to consider a richer menu of contractual arrangements - including export, Integration and various forms of Outsourcing – needs further investigation as well.

In our view, these are the main challenges on the *Internalisation issue*...probably too ambitious for a PhD thesis, not for future research. Building on chapter 3, for the theoretical setting, and chapter 1 and 2 for the empirical samples, our goal for the next few years is precisely to go deeper into the boundaries of the Multinational Enterprise.

CHAPTER 1: DISSIPATION OF KNOWLEDGE AND THE BOUNDARIES OF THE MULTINATIONAL ENTERPRISE⁶

Abstract

This paper provides a theoretical formalisation of the joint-venture contract, as an alternative to Foreign Direct Investment (FDI), within a *Dissipation of Intangible Assets* framework. In a two-period model, we discuss how the threat of knowledge spillover shapes the boundaries of a Multinational Enterprise. Similarly to the theoretical findings on the FDI-licensing trade off, we show that the integrated solution is more likely to emerge when know-how easily spills over – i.e. when firms are endowed with more Intangible Assets or they belong to high tech industries. Probit estimates, from a new firm-level dataset, show that Japanese manufacturing operations in Europe are in line with these predictions.

JEL: F23, C25, O5

Keywords: Dissipation, Intangible Assets, FDI, joint-venture, Internalisation, Japan

⁶ This paper, joint with C. Molteni, is forthcoming on *Review of World Economics / Weltwirtschaftliches Archiv*. We have benefited from comments from Matteo Carminati, Jenny Corbett, Paolo Epifani, Hiromasa Kubo, Kyoji Fukao, Nicolas Maystre, Gianmarco Ottaviano, Dennis Tachiki, and participants in seminars at Bocconi University (Milan), Vienna University (Vienna), Hitotsubashi University (Tokyo), Geneva University (Geneva). We are also grateful to Kentaro Ide of Jetro (Milan) for having provided the data on Japanese Foreign Direct Investment projects in Europe, Miyako Hakuta for precious help in translation. The usual disclaimer applies.

1. Introduction

Multinational Enterprises (MNEs) have become key players in globalised modern economies, raising a vivid debate, among policy makers and academics, about their determinants and effects.

MNEs mainly operate abroad through Foreign Direct Investment (FDI), even though we adopt a broader definition here and call “multinational” a firm that is servicing a foreign market in general; the label FDI is instead restricted to the case of wholly-owned subsidiaries (WOS), as opposed to partial ownership typical of joint-ventures (JV).

Recent years have witnessed a dramatic increase in Foreign Direct Investment and trade in intermediate goods so that, already in the 1990s, more than 40 percent of US imports took place within the boundaries of multinational firms (Zeile 1997), and roughly one third of world trade now occurs intra-firm (Antras 2003).

The terms of “outsourcing”, “slicing up the value chain”, “disintegration of production” have been coined to label the increasing interconnection of production processes in a vertical trading chain that touches many countries, with each country specializing in a particular stage of production (Hummels et al. 2001; Feenstra 1998; Feenstra and Hanson 1996).

Vertical specialisation takes two primary forms since international operations may be organized either “internally” – in wholly-owned subsidiaries – or “externally” – under arm’s length contracts with independent local producers: we call *FDI* or *integration* the first case, while *relying on the market* or *outsourcing* refer to the second one. The decision over the boundaries of the firm – also known as *Internalisation issue* or *entry mode* - concerns the choice between keeping production internal and relying on the market.

What accounts for a Multinational Enterprise's choice of integration versus outsourcing?

Firms' make-or-buy decision is usually explained in terms of costs and benefits of using the market (Coase 1937; Williamson 1985). Internalising typically brings direct cost penalties, in terms of knowledge, expertise and cost advantage; however, relying on the market may be highly risky due to a number of obstacles such as technology transfer (see, among others: Teece 1977, 1986, Rugman 1986), informational asymmetries (Ethier 1986), moral hazard (Rugman 1985, 1986, Horstmann and Markusen 1996), and reputation concerns (Horstmann and Markusen 1987). This trade off arises in the domestic, as well as in the foreign scenario, but it is likely that operating abroad exacerbates the costs of outsourcing.

Broadly speaking, we should recognize that there exist different ways of servicing a foreign market – from export to FDI, from joint-venture (JV) to licensing – each of them involving a different degree of knowledge transfer from the parent to the local firms.

While many authors mention the JV across the wide array of feasible contracts in a foreign country (see, for instance: Teece 1977, Mansfield et al. 1979; Rugman 1985, 1986; Saggi 2000; Ramachandran 1993; Glass and Saggi 1999, 2002a), to the best of our knowledge, no theoretical formalisation has been offered yet, in assessing the *Internalisation issue*.

This paper provides a first attempt at modelling joint-ventures, as an alternative to Foreign Direct Investment, within the *Dissipation of Intangible Assets* (DIA, see Section 2) framework.

In a two-period model, we discuss how the threat of knowledge spillover shapes the boundaries of the Multinational Enterprise.

Similarly to the findings on the FDI-licensing trade-off (see, among others: Ethier and Markusen 1996; Fosfuri 2000; Mattoo et al. 2001; Markusen 1998, 2001; Fosfuri et al. 2001; Saggi 1996, 1999; Glass and Saggi 2002a), we show that integration is more likely to emerge when know-how easily spills over – i.e. when firms are endowed with more Intangible Assets (IAs) or they belong to high tech industries.

Notice that the DIA approach mainly accounts for theoretical contributions, due to the lack of firm-level data, which makes it hard to test the relevance of IAs on firm's entry mode decision.

For the purpose of the present work, we have constructed a new firm-level dataset on Japanese manufacturing activities in Europe, covering more than 600 observations of joint-venture and Foreign Direct Investment establishments. Basing on these data, Probit estimates match with our model predictions.

The paper is organized as follows: in Section 2, we provide a literature review on the *Internalisation issue*, with a particular focus on knowledge dissipation; Section 3 presents the theoretical model, while Section 4 is entirely devoted to the empirical analysis – data description, methodology and Probit estimates; Section 5 concludes and sets the future agenda.

2. Literature review

Theories on the boundaries of the Multinational Enterprise can be grouped according to three strands⁷, which we call: *Theories of the Firm* (Grossman and Helpman 2002,

⁷ For extensive surveys, see Markusen (1995), Saggi (2000), Barba Navaretti and Venables (2004). Chapter 3 provides a detailed review of the *Theories of Firm* approach.

2003; Antras and Helpman 2004; Antras 2003; Feenstra and Hanson 2003, 2004; Ottaviano and Turrini 2003; Marin and Verdier 2002, 2003; Grossman and Helpman 2004; Feenstra and Hanson 2003, 2004); *Agency Costs* (Horstmann and Markusen 1996); *Dissipation of Intangible Assets* (Horstmann and Markusen 1987b; Ethier and Markusen 1996; Fosfuri 2000; Mattoo et al. 2001; Markusen 1998, 2001; Saggi 1996, 1999; Glass and Saggi 2002a; Fosfuri et al. 2001).

For the purpose of the present work, we move within the DIA framework and, while abstracting from any *reputation* consideration (as in Horstmann and Markusen 1987), we focus only on *knowledge*, as an asset that is likely to be dissipated, through spillover, during foreign operations.

Knowledge is quite a particular good: some types are very difficult to transfer outside the boundaries of the firm in which they originate, while some others easily become available to third parties, once revealed. The first case refers to several forms of know-how that are, to some extent, embodied in the human capital of the employees. Due to its tacit component, it can be difficult to transfer knowledge⁸ without direct personal contacts between the contracting parties, lengthy demonstrations and constant involvement. The second case relates more specifically to technology, as an Intellectual Property, i.e. an asset covered by Intellectual Property Rights (IPRs) that define the extent to which their owners may exclude others from activities that infringe or damage the property; the need for IPRs arises from the fact that a piece of potentially valuable

⁸ The intrinsic costs of knowledge transfer by MNEs have been empirically investigated in Caves (1974), Teece (1977), and further discussed and documented in Teece (1986), Davidson and Mc Fetridge (1984), Ramachandran (1993), Glass and Saggi (1999).

information would otherwise suffer from overuse - since access to it is free – therefore limiting the incentives to innovate⁹.

Within the DIA framework, Ethier and Markusen (1996) develop a two-period model in which a firm decides whether to internalise production in a foreign country or to operate through arm's length agreements. Working within firm's boundaries, in a wholly-owned subsidiary, involves a fixed cost of doing business in an unknown market, but guarantees lower manufacturing costs; export entails no fixed cost, but higher manufacturing costs; under a licensing contract, production takes place in the host market but outside the firm's boundaries, posing the threat of knowledge dissipation to a licensee that might be capable of producing alone in the second period, through the technology learnt in the first one. As a result, MNEs are more likely to emerge, the more important the Intangible Assets, the lower the discount factor between the first and the second period, the larger the wage gap between the source and the host country and the more concentrated the recipient market.

In Fosfuri (2000), a firm endowed with a new technology has to choose an entry mode among export, licensing and direct investment in order to serve a foreign market. The vintage of the transferred technology is endogenized and the model allows for imitation by the licensee, while subsidiary production and exports are assumed to avoid imitation but entail higher costs for the innovating firm. Notice that the MNE can strategically use the vintage of its technology in order to deter imitation by the local firm; as a result, transfers to affiliates might be of later vintage relative to technologies sold to independent local firms.

⁹ Under the classical intellectual-property doctrine, we distinguish between two forms of property: industrial property and artistic & literary properties; assets of the first type are usually protected through patents, trademarks, breeder's rights and trade secrets, while artistic & literary properties can be covered by copyrights. For an extensive review of these practices, see Maskus (1998).

Mattoo et al. (2001) develop a model of FDI in which a foreign enterprise can choose between direct entry – what we call Integration – and the acquisition of an existing domestic firm. The Internalisation decision has a direct impact on the local market degree of competition: if we assume that there exists only one domestic firm, setting up a wholly-owned subsidiary results in a Cournot duopoly, while partnering with a local enterprise corresponds to a monopoly¹⁰. Production costs are the same for the foreign and the local firm and technology transfer is assumed to be cost reducing. Prohibitively high or particularly low technology transfer costs generate a divergence between the MNE and the local government most preferred mode of entry, while for intermediate levels, the preferences are aligned and there is no need for policy intervention.

The debate on the effects of Foreign Direct Investments on the host country is at the core of Markusen (1998, 2001)'s two-period model, where contract enforcement – in the form of IPR protection – is shown to influence FDI inflow to developing countries and host countries welfare¹¹. While stronger IPR protection leaves the multinational better off, the host country effects are more ambiguous, depending on whether local production would occur even without contract enforcement or not. Differently from the other models in which keeping production within firm's boundaries provides a solution against asset dissipation, here the multinational may find it optimal to export, instead of

¹⁰ In the paper, they also make a more general case in which the local market is populated by n firms. Under this assumption, the choice of FDI results in a $n+1$ firms Cournot game, while operating with a domestic firm collapses in a n firms Cournot market structure.

¹¹ Transferring technology in the absence of patent protection poses notable risks to an innovating firm in also in Vishwasrao (1994). As an assumption of the model, production of final goods can take place only in two countries of the world, denoted by North and South; a Northern firm has invented and patented a new good, which it wants to introduce to the Southern market, via licensing, export or FDI; IPRs are protected in the North, but not in the South; technology transfer may occur, under a licensing agreement, through imitation. Basing on a different set of theoretical tools, Vishwasrao (1994) incorporates this asymmetric information in a screening game where the Northern enterprise attempts to find a contract that provides information about the local firm's ability to imitate. In choosing between licensing and Foreign Direct Investment, foreign firms trade off the benefit of lower costs with the risk of dissipating knowledge through technology transfer.

investing, in order to protect its technology. This result comes from the specific modelling of the FDI case, very close to the licensing contract designed elsewhere.

A similar view is taken in Fosfuri et al. (2001) in analysing the spillover effects of FDI on the whole population of local firms¹² and their interactions with the entry mode decision of a Multinational Enterprise, endowed with a superior technology. In this model, export comes without any knowledge dissipation, while FDI involves technology transfer – as in Markusen (1998, 2001) - through the training of a local worker.¹³ According to this framework, the MNE and the local firm do not interact by means of a partnership agreement, but in the run for the trained worker. In solving the model, the authors show that technological spillovers do not occur if the joint profit of the MNE plus the local firm is highest when the multinational can use the technology as a monopolist; moreover, they find that a low level of absorptive capability by the local firm reduces the potential for FDI generating spillover¹⁴.

In Saggi (1996), the choice of integration, relative to licensing, is motivated by the wish to protect the MNE's key resources not only in the domestic market, but in all the markets in which it potentially competes with a local firm, adding an element of novelty to the existing literature. As a result, FDI becomes a more preferable option if competition from a licensee in one market erodes the licensor's profit in other markets, whereas licensing is chosen if competition can be prevented.

¹² This is a notable difference, with the respect to the literature reviewed in this section, in that it deals with spillover effects to the whole population of domestic firms, rather than on the single firm engaged in the licensing agreement together with the multinational.

¹³ Here they are interested in a particular kind of spillover, based on workers mobility. Other sources of spillover are backward and forward linkages (Lall 1980, Rodriguez-Clare 1996), and demonstration effects from foreign affiliates to local firms (Mansfield and Romeo 1980, Blomstrom 1986).

¹⁴ Technology transfer arising from labour movements is also at the core of Glass and Saggi (1999)' duopoly model. By assumption, all the workers employed by a Multinational Enterprise acquire knowledge of its superior technology; being hired by a local firm, those workers partially dissipate the MNEs intangible assets. In order to prevent workers from leaving the company, the Multinational Enterprise pays a wage premium if local firms are sufficiently disadvantaged and/or there are sufficiently many local firms.

This analysis is extended in Saggi (1999)'s two-period duopoly model, in order to study the impact of the entry mode choice on the incentives for innovation. Relative to licensing, Foreign Direct Investment limits technology spillovers, but dissipates more rents. As a result, the domestic firm's technological development receives the strongest boost if the foreign firm were to follow initial licensing and FDI; however, since the foreign firm's profits under FDI vary inversely with the quality of the domestic firm's technology, it does not choose the selected combination of entry modes, leaving room for policy intervention.

A similar point is made in Glass and Saggi (2002a) where the *Internalisation issue* – FDI versus licensing – is shown to play a role in determining the rate and magnitude of innovation. This paper entails an interesting difference, with respect to the related literature, since the licensing contract is characterized by profit sharing between the foreign and the local firm, rather than having the licensee paying a fee to the licensor and retaining total revenues. In taking the Internalisation decision, MNEs thus trade off the cost disadvantage of operating alone, with the profit retention by the local firm. When the mode choice is fixed, a subsidy to multinational production - by reducing the cost disadvantage of producing abroad - increases the rate, but decreases the size of innovation; when the mode can switch, the rate and level of innovation both increase, provided that the subsidy is not too large¹⁵.

To the best of our knowledge, studies on the boundaries of the Multinational Enterprise, inspired by the *Dissipation of Intangible Assets*, basically cover theoretical contributions. The reason for that is perhaps the difficulty in finding firm-level datasets in order to test the theoretical priors.

¹⁵ A different result is obtained in Glass and Saggi (2002b)' product cycle model, stronger IPR protection – through the imitation disincentive and resource wasting effects – decreases both innovation and FDI, because multinational firms feel more secure from imitation.

A few exceptions are given by Mansfield et al. (1979), Mansfield and Romeo (1980) and Smith (2001), where entry mode and technology transfer decisions by US multinationals are analysed.

Mansfield et al. (1979), Mansfield and Romeo (1980) find that knowledge is more likely to be transferred internally when it is relatively deep and new, since losses from spillover are potentially higher.

In Smith (2001)'s gravity model, the impact of IPR protection is shown to play a role in shaping the servicing choice of US multinationals, within an OLI framework which allows for simultaneity of export, FDI and licensing decisions. As long as IPR protection becomes stronger, by increasing the ownership advantage, it prompts a rise in bilateral exchanges of any kind; moreover, by conferring location advantages, it increases FDI and licensing relative to export, and by strengthening internalisation advantages, it pushes towards licensing.

From the papers reviewed above, it should stand clear that the literature on the *Internalisation issue*, based on the DIA approach, has focused solely on licensing and export, as an alternative to Foreign Direct Investment.

Nonetheless, we should recognize that there exist various ways of servicing a foreign market – export, FDI, joint-venture and licensing – which can be classified according to their knowledge transfer, from the safest arrangement of export, that secures knowledge inside the firm and the country where it originates, to the most risky case of licensing, through which knowledge is transferred both outside the source firm and the source country. Foreign Direct Investment and joint-venture represent two intermediate steps in this continuum, the former having knowledge inside the source firm but transferred outside the source country, the latter being very close to the licensing case, except for

the fact that the multinational participates in final good production together with the local partner.

While many authors mention the JV across the wide array of feasible contracts in a foreign country (see, for instance: Teece 1977, Mansfield et al. 1979; Rugman 1985, 1986; Saggi 2000; Ramachandran 1993; Glass and Saggi 1999, 2002a), to the best of our knowledge no theoretical formalisation has been offered yet, in a DIA framework.

In our view, this lack represents one of the main shortcomings of the related literature, given the significant and broadly documented empirical relevance of joint-ventures (see, among others: Andersen and Gatignon 1986; Gomes Casseres 1989; Hennart 1991; Agarwal and Ramaswami 1992; Erramilli 1996; Buckley and Casson 1996; Smarzynska 2000; Desai et al. 2002).

The model presented in Section 3 is an attempt at filling this gap, considering a foreign firm's decision of FDI versus JV, grounded on the risk of dissipating knowledge.

3. The model

3.1 Basic version

In a setting similar to Barba Navaretti and Venables (2004), consider a simple economy in which a multinational firm is willing to produce a final good abroad; the MNE has to decide whether to serve the foreign market via FDI or in joint-venture with a local firm¹⁶.

Final good production requires two activities, x and y , which we call *input manufacturing* and *processing* for expositional convenience; technology is linear, i.e.

¹⁶ In order to keep the formalisation as simple as possible, we do not include set up costs in the foreign market, and we abstract from any matching consideration between the MNE and the local company, taken as given the pair of partners.

firms employ 1 unit of input to obtain 1 unit of output; x and y are normalized to 1 for simplicity, making sales revenues R constant.

Notice that these activities can be performed either by the multinational (through its subsidiary) or by the local enterprise, but the two firms are not equally efficient, since the MNE has an advantage in processing final goods, while the other party does better in input manufacturing¹⁷.

To capture this idea, without loss of generality, we assume that the per unit cost of each activity is a ($a > 0$) if this is performed by the company that has a relative advantage in it, whereas the cost equals αa ($\alpha \geq 1$) if the same activity is due to the other firm.

As in (Ethier and Markusen 1996; Saggi 1999; Fosfuri 2000; Markusen 2001), the time horizon covers two periods, which we denote by subscripts 1 and 2; *MNE* and *local* stand for the multinational and the local firm respectively; in principle, we allow for different discount factors for the foreign ($\delta \geq 0$) and the domestic ($\tilde{\delta} \geq 0$) firm.

Operating through Foreign Direct Investment implies that the multinational enterprise keeps production within its boundaries, by means of a local subsidiary; in this case it is the same firm that performs both input manufacturing and assembly.

The very essence of a joint-venture agreement lays, instead, in the partners' complementary skills: in this case, each party performs only the activity in which it has a relative advantage, and sales revenues are shared with weights θ ($0 < \theta < 1$) for the MNE and $(1 - \theta)$ for the local firm, in the first period and $\bar{\theta}$ ($0 < \bar{\theta} < 1$), $(1 - \bar{\theta})$ in the second period¹⁸.

¹⁷ This assumption is broadly consistent with the Japanese experience in Europe, presented in Section 4. Empirical evidence shows that Japanese multinationals tend to contribute know-how and technology while relying on their local partner for input supply (Jetro 2004a).

¹⁸ Our modelling of the joint-venture contract is quite close to Ramachandran (1993), Mattoo et al. (2001), Glass and Saggi (2002a). Notice that the FDI/joint-venture decision does not necessarily coincide with the Greenfield/Acquisition one. In particular joint-ventures differ from Acquisitions because the

Consider, first, the FDI case.

Equation (1) gives the present value of the MNE profit when final good production is internalised.

$$\Pi_{MNE}^{FDI} = R_1 - a\alpha - a + \frac{R_2 - a\alpha - a}{1 + \delta} \quad (1)$$

By operating alone, the Multinational Enterprise benefits from keeping entire revenues R_1 and R_2 in both periods, but it entails higher costs in input manufacturing, with respect to the local firm.

Consider now the present value of the two firms' profits under the JV agreement - namely Π_{MNE}^{JV} for the MNE and Π_{local}^{JV} for the local firm:

$$\Pi_{MNE}^{JV} = \theta R_1 - a + \frac{\bar{\theta} R_2 - a}{1 + \delta} \quad (2)$$

$$\Pi_{local}^{JV} = (1 - \theta) R_1 - a + \frac{(1 - \bar{\theta}) R_2 - a}{1 + \tilde{\delta}} \quad (3)$$

Here both firms retain just a fraction of total revenues in periods 1 and 2, but production costs are lower compared to the FDI case.

Notice that, in a joint-venture, the two parties operate very close to each other, which allows for a knowledge spillover from the MNE to the local firm during the first period: having access¹⁹ to the multinational intangible assets, the partner learns about the processing procedure so that her cost disadvantage α drops from a prohibitively high value in the first period to a level $\tilde{\alpha}$ in the second one, with $\alpha > \tilde{\alpha} \geq l$.

local firm is not “bought” by the MNE, and the two enterprises do not “merge” into a new economic entity: they simply make a temporary cooperation agreement in order to produce final goods together. This is the reason why the local partner may deviate in the second period and eventually start a rival firm, as it is explained below, in Section 3.

¹⁹ Although licensing provides a more direct channel for technology transfer - because the licensor has to provide the licensee with the whole set of production tools – working side by side in a joint-venture similarly allows the local firm to learn from the MNE.

It follows that the local firm has the option of breaking up the JV contract at the beginning of the second period, and start a rival firm, with the “stolen” know-how; such an option does not exist for the Multinational Enterprise, this asymmetry depending on the fact the it has just a poor knowledge of the local market, with respect to the partner²⁰.

In case of defection – denoted by superscript d - the local firm makes profit:

$$\Pi_{local}^d = (1 - \theta)R_1 - a + \frac{R_2 - a - \tilde{\alpha}a}{1 + \tilde{\delta}} \quad (4)$$

while the multinational, having no other option, earns zero.

It is clear that the MNE can prevent this defection by setting $\bar{\theta}$ such that the local firm second period profit, under a JV agreement, is not lower that its profit in starting a rival firm, i.e.:

$$(1 - \bar{\theta})R_2 - a \geq R_2 - a - \tilde{\alpha}a \quad (5)$$

This is the Incentive Compatibility Constraint, which yields the following condition:

$$\bar{\theta} \leq \frac{\tilde{\alpha}a}{R_2} \quad (6)$$

The multinational firm chooses to integrate, rather than partnering, if its profits

Π_{MNE}^{FDI} from (1) are greater that Π_{MNE}^{JV} from (2), evaluated at the incentive compatible

value of the second period share $\bar{\theta} = \frac{\tilde{\alpha}a}{R_2}$:

$$\theta R_1 - a + \frac{\bar{\theta}R_2 - a}{1 + \delta} \leq R_1 - a\alpha - a + \frac{R_2 - a\alpha - a}{1 + \delta} \quad (7)$$

After some re-arranging, equation (7) gives the following condition:

²⁰ In other DIA papers, this asymmetry is captured by a fixed cost of operating abroad (see, for instance: Ethier and Markusen 1996; Saggi 1996; Fosfuri 2000; Fosfuri et al. 2001). In Section 3.2 an extension of the model is provided by removing this assumption.

$$R_1(1-\theta) - \alpha a + \frac{R_2 - \alpha a - \tilde{\alpha}a}{1+\delta} \geq 0 \quad (8)$$

where θ is an endogenous variable yet to be determined. Suppose that the multinational invites local firms to bid for the first period share: under this assumption θ results from the Participation Constraint, $\Pi_{local}^{JV} = 0$:

$$(1-\theta)R_1 - a + \frac{\left(1 - \frac{\tilde{\alpha}a}{R_2}\right)R_2 - a}{1+\tilde{\delta}} = 0 \quad (9)$$

Solving (9) for $(1-\theta)$, we obtain:

$$(1-\theta) = \frac{a}{R_1} - \frac{R_2 - \tilde{\alpha}a - a}{(1+\tilde{\delta})R_1} \quad (10)$$

By substituting (10) in (8), after some re-arranging, equation (11) gives the condition for the multinational to internalise:

$$(\tilde{\delta} - \delta)(R_2 - \tilde{\alpha}a) \geq a[\alpha(1+\tilde{\delta})(2+\delta) - (1+\delta)(2+\tilde{\delta})] \quad (11)$$

In choosing between FDI and JV, the multinational trades off the benefits of protecting its Intangible Assets against the threat of dissipation, with the efficiency loss in terms of input manufacturing.

From (11) we see that, if $\delta = \tilde{\delta}$, the MNE always chooses joint-venture rather than FDI. Indeed, it is ready to retain a low share $\bar{\theta}$ of sales revenues in the second period - satisfying the Incentive Compatibility Constraint - because this can be fully recouped by setting a high share θ in the first one - according to the Participation Constraint. Since the multinational is able to extract all surplus from the partner, it chooses to operate in joint-venture, to keep production efficiency high.

There are however circumstances in which the MNE is not able to extract the full surplus. This happens, for instance, when the two firms have different discount factors:

if $\delta < \tilde{\delta}$, the multinational puts more weight on the future than the local partner, and FDI may occur. Since the local firm discounts the second period profit more heavily, it is ready to accept a JV contract only if its first period share θ is sufficiently high, which implies a loss for the MNE. Therefore, integration is more likely the larger the difference in discount factors between the actors²¹.

From equation (11), it is crucial to see that the smaller $\tilde{\alpha}$, meaning a higher degree of knowledge spillover from the foreign to the local firm, the more appealing the FDI solution, confirming the empirical evidence of Mansfield et al. (1979), Mansfield and Romeo (1980).

3.2 Extension

In the present Section we extend the previous framework by removing the strong assumption of asymmetric opportunities for the foreign and the local firm in case of defection, thus allowing for a double-sided spillover mechanism between the partners.

The aim of this exercise is to discuss whether the possibility for the MNE to learn about input manufacturing eventually affects its choice of FDI versus joint-venture.

The model is solved as before. Equations (1), (2) and (3) are simply recouped from our previous formalisation, and express respectively the MNE profit in case of FDI and joint-venture, and the local firm profit under JV.

Equation (4), instead, needs to be restated as:

²¹ If $\delta > \tilde{\delta}$, a joint-venture contract is chosen when $\alpha > \frac{(1+\delta)(2+\tilde{\delta})}{(1+\tilde{\delta})(2+\delta)}$, while for $1 < \alpha <$

$\frac{(1+\delta)(2+\tilde{\delta})}{(1+\tilde{\delta})(2+\delta)}$ there is room for Foreign Direct Investment.

$$\Pi_{local}^d = (1 - \theta)R_1 - a + \frac{\frac{1}{2}R_2 - a - \tilde{\alpha}a}{1 + \tilde{\delta}} \quad (4a')$$

$$\Pi_{MNE}^d = \theta R_1 - a + \frac{\frac{1}{2}R_2 - a - \tilde{\alpha}a}{1 + \delta} \quad (4b')$$

The main difference compared to Section 3.1 is that, in case of defection, the MNE is able to start a new firm as well as the local enterprise, so they compete in quantities and, being symmetric in terms of costs, they earn the same revenues in period 2.

Having removed the asymmetric assumption, it is interesting to compare the three alternatives – FDI, joint-venture and defection²² - from the point of view of the foreign company.

FDI is still appealing since it guarantees all revenues and preserve from knowledge dissipation, but this is the situation that entails the largest production cost; under a joint-venture contract production efficiency is achieved and costs are comprised to their minimum, while revenues are shared; the defection case locates somewhere between the two extremes, presenting intermediate costs and equal revenues for the two enterprises. Therefore it is clear that the relative preference for JV or defection crucially hinges on the extent of the spillover $\tilde{\alpha}$ and the share of the revenues θ and $\bar{\theta}$ accruing to the multinational.

While in Section 3.1 the MNE was always interested in preventing defection, here it does so only if $\Pi_{MNE}^{JV} \geq \Pi_{MNE}^d$, namely if:

²² Notice that the defection case looks like the evolution from a former joint-venture to a Foreign Direct Investment.

$$\bar{\theta} \geq \frac{1}{2} - \frac{\tilde{\alpha}a}{R_2} \quad (12)$$

Suppose that condition (12) holds. In order to prevent defection, the MNE sets $\bar{\theta}$ according to the Incentive Compatibility Constraint of the local firm, which yields:

$$\bar{\theta} \leq \frac{1}{2} + \frac{\tilde{\alpha}a}{R_2} \quad (6')$$

Similarly to Section 3.1, θ is chosen according to the Participation Constraint of the local firm, so:

$$(1-\theta) = \frac{a}{R_1} - \frac{\frac{1}{2}R_2 - \tilde{\alpha}a - a}{(1+\tilde{\delta})R_1} \quad (10')$$

In the end, the multinational prefers to integrate, rather than partnering if its profits Π_{MNE}^{FDI} from (1) are greater than Π_{MNE}^{JV} from (2), evaluated at (6') and (10'); this gives condition (11'):

$$(\tilde{\delta} - \delta)\left(\frac{1}{2}R_2 - \tilde{\alpha}a\right) \geq a\left[\alpha(1+\tilde{\delta})(2+\delta) - (1+\delta)(2+\tilde{\delta})\right] \quad (11')$$

It is easy to compare (11) and (11'): the right hand side of the two expressions is the same, while the left one is smaller in the extended version of the model. This means that, *ceteris paribus*, FDI looks less appealing than JV when the multinational has the possibility to learn from the local partner, while joint-venture contracts become more attractive than before due to the higher second period share $\bar{\theta}$ for the MNE. Notice, however, that dissipation of knowledge plays exactly the same role as before, since it enters (11) and (11') in the same way.

Now suppose that (12) does not hold, which means that defection is preferable than JV for the foreign enterprise. In order to induce defection, the MNE should set $\bar{\theta}$ such that

$\Pi_{local}^{JV} < \Pi_{local}^d$, namely $\bar{\theta} > \frac{1}{2} + \frac{\tilde{\alpha}a}{R_2}$ from (6'); therefore it would set $\bar{\theta} \rightarrow 1$, which is not compatible with (12) non holding. So defection never takes place, as in the basic version of the model²³.

In the end, we can conclude that multinational firms decide whether to integrate or to engage in a partnership based on a trade off: with the FDI option, they are able to protect their Intangible Assets against the threat of dissipation; with the JV option, they entail lower production costs and achieve more efficiency.

The relative attractiveness of those options is crucially related to the extent of the spillover mechanism involved by the partnership: irrespective of the fact that only one or both firms are able to learn from the other party, a strong message comes out from our model, namely the higher the threat of IA dissipation, the more appealing the FDI solution.

At a broader level, we can conclude that Foreign Direct Investment, induced by the threat of DIA, is more likely to emerge when know-how easily spills over – namely in high tech industries – when MNEs are able to borrow on capital markets at a lower cost – i.e. a higher discount factor – and when host countries governments do not provide strong IPR protection or the local counterpart is capable of fast learning.

Notice that these priors are broadly consistent with those derived for licensing (see Section 2) and they match with the empirical evidence on the choice between joint-venture and FDI (see, among others: Andersen and Gatignon 1986; Gomes Casseres 1989; Hennart 1991; Agarwal and Ramaswami 1992; Erramilli 1996; Buckley and Casson 1996; Smarzynska 2000; Desai et al. 2002).

²³ This evidence is in line with the experience of Japanese MNEs in Europe, as documented in our dataset (see Section 4).

4. Empirical Analysis

In this Section, we empirically assess the choice of FDI versus joint-venture of Japanese multinational companies in Europe, by means of a new firm-level dataset, constructed by the authors. The discussion is organized in three steps: first we present the data (4.1) and the methodology (4.2), and then we comment on the empirical findings (4.3) and their matching with the theoretical predictions, derived in Section 3.

4.1 Data

Since the 1970s, Japanese Foreign Direct Investment has shown a steady trend upwards, driven by limited domestic opportunities and the need to seize openings abroad. The great boost came during the post Plaza agreement bubble period: with the JPY appreciating 46 per cent between 1985 and 1987, FDI almost tripled (Blair and Freeman 2004). Yet, this trend continued even in the 1990s, notwithstanding the collapse of the bubble and the domestic stagnation.

As far as Japanese direct investment to EU15 is concerned, the fiscal year 2003 (April-March) has registered a clear fall in value terms, edging down 20 per cent to 12,034 USD, however the number of manufacturing affiliates in the European region²⁴ is still growing (Jetro 2004b).

For the purpose of the present work, we have built a new firm-level dataset, covering the whole population of Japanese Multinational Enterprises, with manufacturing activities in Europe in 2004.

²⁴ By Europe, we mean the countries of interest for our study, namely Czech Republic, Hungary, Turkey, Norway, UK, Netherlands, Belgium, France, Germany, Denmark, Ireland, Luxembourg, Switzerland, Finland, Russia, Austria, Serbia & Montenegro, Greece, Romania, Slovakia, Portugal, Spain, Italy and Poland.

This cross-section sample, accounting for more than 600 observations, captures all Japanese investors either operating alone (FDI) or in joint-venture with a European partner.

In order to construct such a dataset, two sources have been employed and merged: the Toyo Keizai Inc. (2004a), which provides a comprehensive periodical census of Japanese companies engaged in international business of any kind – from export to FDI, from joint-venture to licensing - all over the world, up to the year examined; and the Toyo Keizai Inc. (2004b), which contains firm-level information on all the Japanese corporations listed on the First Section of Tokyo, Osaka, and Nagoya stock exchanges. So, we proceeded as follows. First, we derived the complete list of Japanese manufacturing firms that were operating in Europe under FDI or joint-venture agreements in 2004²⁵, according to the Toyo Keizai Inc. (2004a). For all investors it was possible to see the host country and the year of establishment of the local subsidiary. Unfortunately no mention was made at the original agreement signed, meaning that we could not follow their past dynamics and see whether they switched from previous contracts to the present one, but we are simply aware of when they started their actual business agreement in the form of joint-venture or FDI, as in the model described in Section 3. Second, we matched the list of parent companies with information regarding their sales, R&D expenditure, industry, region of origin etc., from the Toyo Keizai Inc. (2004b). So, we ended up with a quite extensive database, which offers full coverage in terms of number of Japanese parent firms and host country in Europe up to 2004. Given that both data sources are in Japanese - which made the translation process extremely hard and long - we could not add the time dimension and

²⁵ We chose 2004, since it was the most recent year for which the Toyo Keizai book was available, thus offering the broadest and most comprehensive census of the Japanese presence abroad.

remained with a cross-section perspective. Indeed, we believe that the present exercise makes a valuable – although preliminary – attempt at explaining the Japanese Internalisation strategies on the basis of the *Dissipation of Intangible Assets*. Being it possible to look at previous versions of the Toyo Keizai books, it would be interesting to explore also investors dynamics over time.

4.2 Methodology

Based on the data described above, we regress the Internalisation decision – FDI versus joint-venture – of Japanese multinationals in Europe, within the DIA framework sketched in Section 3.

The empirical specification is as follows:

$$FDI = F \alpha + C \sigma + \varepsilon \quad (13)$$

FDI is the $(n \times 1)$ dependent variable vector, whose elements take the value of 1 in case of wholly-owned subsidiary, 0 in case of joint-venture.

Explanatory variables are of two types: F is a $(n \times m)$ matrix of Firm-level regressors; C is a $(n \times k)$ matrix containing host Country characteristics; α and σ are the vectors of parameters associated to firm and country variables respectively, and ε denotes the error term.

Our empirical specification is richer than the theoretical one, in order to offer a more realistic picture of the real world. The model designed in Section 3 was kept as simple as possible to derive testable predictions on how the DIA mechanism eventually shapes the choice between FDI and joint-venture. Nevertheless, when we deal with real world data, we cannot ignore real world complexity and multifaceted nature. This is the reason why FDI is regressed on a number of firm and country variables, adding to Intangible Assets.

In particular, within the F matrix, we distinguish between *core* and *control* regressors: core regressors are those measuring Japanese firms' Intangible Assets²⁶, over which priors have already been derived; control regressors denote other firm-level characteristics that may play a role in shaping the Internalisation decision, but over which we do not have any specific expectation.

Before turning to the estimates, we think it is worth spending a few words on the variables description.

As a proxy for technology, alternative indicators are employed: $R\&D$ refer to the firm's expenses in Research & Development; $R\&D/sales$ gives R&D expenditure as a fraction of the firm's sales; $R\&D_average$ is the average value of R&D expenditure in the industry; $R\&D_relative$ measures firm's R&D expenditure relative to the industry mean, to capture technological leadership (as in Smarzynska 2000, 2002; Desai et al. 2002, to mention just a few).

All these variables refer to the consistency of the parent company's Intangible Assets, so we expect a positive sign, basing on the model described before: Internalisation, induced by the threat of knowledge dissipation, is more likely to emerge when know-how easily spills over – i.e. when firms are endowed with more technology or they belong to high tech industries.

Control variables include sales ($SALES$, as in Blomstrom and Zejan 1991; Meyer 1998; Smarzynska 2000, 2002); the average age of the employees in the parent company (AGE); the year of the establishment in Europe ($YEAR_EU$), the industry – $TRANSPORT$, $OTHER$, $WHOLESALE$, $NON\ FERROUS$, $GLASS$ and $INSTRUMENTS$ are dummy variables taking the value of 1 if the Japanese company belongs to

²⁶ Intangible Asset, here, means *knowledge*, as in the model described in Section 3.

Transport Equipment, Other Products, Wholesale, Non Ferrous Metals, Glass & Ceramics and Precision Instruments, respectively; to account for possible influence by the Prefecture of origin, *KANAGAWA* is a dummy equal to 1 if the parent firm is located in Kanagawa Prefecture, 0 elsewhere.

As far as country variables are concerned, we include *TRADE*, as a measure of the host market degree of openness²⁷ (as in Smith 2001; Smarzynska 2002), *POP*, describing the host country population (as in Smarzynska 2002, Smith 2001); a corruption index *CORRUPT* and a variant of the economic freedom index *B&F* (as in Smarzynska 2002); two dummy variables are also constructed to indicate whether or not the destination country belongs to the EU15 (*EU15*), and whether or not the destination country has Euro as its national currency (*EURO*); *R&D/GDP* expresses R&D as a percentage of the GDP in the host economy.

In the Appendix, Table A1 provides a summary description of the variables included in Equation (13), while Table A2 displays the correlation matrix of the core variables.

Given the binary nature of the dependent variable *FDI*, regressions are carried out within a probit framework.

4.3 Results

Probit estimates are shown in Table 1.

²⁷ Although we were interested in distinguishing between tariff and non-tariff barriers, no such index performed well in our regressions because of lack of cross-country variation (remember that all host markets are located in Europe, mainly within the EU area, so these indexes took exactly the same value in almost all the cases, due to common rules or economic similarities). This is the reason why we employed *TRADE* as a measure of trade policy, also recommended by Dollar and Kraay (2004) as opposed to average tariff rates or non-tariff barrier coverage ratios.

Table1: Probit estimates²⁸

	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>
<i>R&D</i>	0.060 (0.010)**	0.07 (0.01)**	0.07 (0.014)**	0.06 (0.014)**	0.162 (0.002)***
<i>R&D/SALES</i>	0.379 (0.000)***	0.267 (0.002)***	0.252 (0.004)***	0.204 (0.017)**	
<i>R&D_average</i>					0.093 (0.07)**
<i>R&D_relative</i>	0.095 (0.000)***	0.094 (0.001)***	0.094 (0.001)***	0.074 (0.001)***	0.048 (0.02)**
<i>SALES</i>					-0.066 (0.005)***
<i>AGE</i>		-0.023 (0.022)**	-0.022 (0.027)**	-0.022 (0.026)**	
<i>EU15</i>			0.221 (0.005)***		0.191 (0.013)**
<i>EURO</i>			-0.144 (0.014)**		
<i>YEAR_EU</i>		-0.005 (0.072)*	-0.005 (0.074)*		
<i>KANAGAWA</i>			-0.469 (0.099)*		-0.477 (0.071)*
<i>TRANSPORT</i>				-0.133 (0.034)**	
<i>OTHER</i>					0.277 (0.023)**
<i>WHOLESALE</i>		-0.573 (0.001)***	-0.573 (0.001)***	-0.602 (0.000)***	
<i>NON FERROUS</i>				-0.242 (0.050)***	
<i>GLASS</i>			-0.315 (0.056)*	-0.293 (0.081)*	
<i>INSTRUMENTS</i>					0.277 (0.023)**
<i>R&D/GDP</i>					0.084 (0.087)*
<i>POP</i>					-0.328 (0.002)***
<i>CORRUPT</i>		0.120 (0.003)***		0.127 (0.001)***	
<i>B&F</i>		-0.06 (0.029)**		-0.071 (0.009)***	
<i>TRADE</i>			0.268 (0.014)**		
Observations	519	495	495	514	517
P-value [^]	0.000***	0.000***	0.000***	0.000***	0.000***
Pseudo R ²	0.0546	0.1376	0.1395	0.1408	0.0856

Reminding our theoretical priors, it is worth noticing that all the core variables are significant with the expected sign in every specification; this provides quite a good matching between the theory and the data.

²⁸ Marginal effects and P-value in round brackets. * significant at 10 per cent, ** significant at 5 per cent, *** significant at 1 per cent.

Pseudo R² is a typical measure for goodness of fit in discrete-dependent-variable models. The expression for Pseudo R² is $1 - 1/[1 + 2(\log L_1 - \log L_0)/N]$, where N is the total number of observations, L₁ is the maximum loglikelihood value of the model of interest, and L₀ the maximum value of the loglikelihood function when all the parameters, except the intercept, are set to 0. P-value[^] denotes the P-value of the joint null-hypothesis.

In particular, moving from the simplest specifications on the left – where *FDI* is regressed only on core-type variables – to the richer specifications on the right – where control variables are also included - we see that as long as the Japanese firms' Intangible Assets increase, the probability of internalising production, rather than operating in joint-venture, increases as well. *R&D*, *R&D/SALES*, *R&D_average*, *R&D_relative* all display the positive expected sign, meaning that wholly-owned subsidiaries are more likely to be settled by Japanese companies operating in high tech sectors, investing a lot in Research & Development, and being technological leaders in their respective sectors, as in Smarzynska (2000).

As in (Blomstrom and Zejan 1991; Meyer 1998), *SALES* turn out to be significant, with a negative sign, meaning that larger enterprises tend to share ownership with a European partner, rather than operating alone. Furthermore, we find that investing within the EU15 encourages FDI, while investing in Euro countries pushes towards joint-ventures; more recent establishments are associated with a stronger preference for JV. Among our dummy control variables, *KANAGAWA*, *TRANSPORT*, *WHOLESALE*, *GLASS* and *NON FERROUS* are significant and negative, while *INSTRUMENT* and *OTHER* display a positive sign, providing empirical evidence on the sectors in which FDI are more likely to emerge.

As far as country variables are concerned, Table 1 shows that the larger the *R&D/GDP* ratio, the higher the degree of openness and transparency of the bank and finance sector, and the more corrupted and less populated the host country, the higher the preference for FDI confirming that partners are more useful in countries with less friendly investment climate, in lines with previous studies²⁹.

²⁹ A measure of IPR protection was also included, but it did not turn significant in any specification.

5. Conclusion

This paper addresses multinationals' choice of joint-ventures versus FDI in a *Dissipation of Intangible Asset* framework. We construct a two-period model and show that Foreign Direct Investment is more likely to emerge when know-how easily spills over – i.e. when firms are endowed with more Intangible Assets or they belong to high tech industries. Probit estimates, based on a new firm-level dataset of Japanese production activities in Europe, are in line with these priors.

Given these promising results, we believe that it is worth carrying out further research within the DIA field: in theoretical terms, future steps should include the creation of an industry equilibrium model on the FDI-JV trade off, and the treatment of the whole array of feasible contractual arrangements - namely joint-venture, licensing, export and FDI – in a single model; in empirical terms, further evidence is also needed to add the time dimension and eventually observe Japanese investors' dynamics over time; we also believe that a multiple-home multiple-host perspective would also help to control for possible selection bias³⁰.

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³⁰ This issue is discussed more extensively in charter 2.

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Appendix

Table A1: Variables description

<i>Variable</i>	<i>Description</i>
<i>FDI</i>	Dummy variable, 1 if FDI, 0 if JV
<i>R&D</i>	R&D expenditure of the parent company (millions USD)
<i>R&D/SALES</i>	R&D expenditure over sales of the parent company
<i>R&D average</i>	Mean R&D expenditure in the parent company industry (millions USD)
<i>R&D relative</i>	R&D expenditure of the parent company over its industry mean
<i>SALES</i>	Sales of the parent company (billions USD)
<i>AGE</i>	Employees average age in the parent company
<i>EU15</i>	Dummy variable, 1 if the destination country belongs to EU15
<i>EURO</i>	Dummy variable, 1 if the destination country currency is Euro
<i>YEAR EU</i>	Year of establishment in Europe
<i>KANAGAWA</i>	Dummy variable, 1 if the Prefecture of origin is Kanagawa
<i>TRANSPORT</i>	Dummy variable, 1 if the parent company belongs to the Transport Equipment industry
<i>OTHER</i>	Dummy variable, 1 if the parent company belongs to the Other Product industry
<i>WHOLESALE</i>	Dummy variable, 1 if the parent company belongs to the Wholesale industry
<i>NON FERROUS</i>	Dummy variable, 1 if the parent company belongs to the Non Ferrous Metals industry
<i>GLASS</i>	Dummy variable, 1 if the parent company belongs to the Glass & Ceramics industry
<i>INSTRUMENTS</i>	Dummy variable, 1 if the parent company belongs to the Precision Instruments industry
<i>R&D/GDP</i>	R&D as percentage of GDP in the host country
<i>POP</i>	Population of the host country (millions)
<i>CORRUPT</i>	Corruption Index of the host country (Kaufmann et al. 2003), ranging from 0 to 5, higher values meaning more corruption
<i>B&F</i>	Banking & Finance Index of the Host Country, as a variant of the overall Economic Freedom Index (Gwartney and Lawson 2004). It measures the relative openness of a country's banking and finance system. Lower values mean more freedom
<i>TRADE</i>	Degree of openness of the host country, measured by (Import+Export)/GDP (billions, GDP measured in USD)

Table A2: Correlation matrix of the core variables

	<i>R&D</i>	<i>R&D/SALES</i>	<i>R&D_relative</i>	<i>R&D_average</i>
<i>R&D</i>	1.0000			
<i>R&D/SALES</i>	0.2543	1.0000		
<i>R&D_relative</i>	0.4121	0.1641	1.0000	
<i>R&D_average</i>	0.5473	0.4620	0.0155	1.0000

CHAPTER 2: FIRM'S INTANGIBLE ASSETS AND MULTINATIONAL ACTIVITY: JOINT-VENTURE VERSUS FDI³¹

Abstract

This paper analyses the choice of Foreign Direct Investment (FDI) versus joint-venture of Italian multinationals in Asia, based on an entirely new firm-level dataset, constructed by the author. The decision to internalise production, rather than relying on a local partner, is driven by the threat of *Dissipation of Intangible Assets*, both at a theoretical and an empirical level. In particular, we show that FDI in Asia is more likely to emerge for Italian firms endowed with better technology and human capital or belonging to high tech sectors.

Keywords: Intangible Assets, Internalisation, FDI, joint-venture, Asia

JEL: F23, C25, O5

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1. Introduction

During the last few decades, firms have increasingly committed themselves to global markets. This has coincided with a surge of activities by Multinational Enterprises (MNEs), as measured by Foreign Direct Investment (FDI)³².

That multinational firms must necessarily transfer some levels of their *Intangible Assets* (IAs), while operating abroad, is close to definitional: an attempt to exploit promising opportunities means a decision concerning the nature of those assets and the methods by which they are to be transferred (Blair and Freeman 2004). IAs may consist either in a stock of goodwill – associated with product quality *reputation* – or in superior *knowledge* – related, for instance, to an idea, a good customer relationship, a new tool, or superior management techniques.

Compared to physical capital, intangible resources are more likely to give rise to FDI because they can be easily transferred back and forth and they enjoy a “public good” nature, being available to additional production facilities at relatively low costs (Markusen 1995). Notice that the same joint-ness feature that enables MNEs to cheaply move IAs expose them to the risk of *dissipation*³³.

While abstracting from any *reputation* consideration, this paper is intended to explore the exact role that dissipation of *knowledge* plays in orienting multinational activity, with a particular attention to the boundaries of the MNE.

³² Throughout the paper, we use the term MNE in a broad sense, calling “multinational” a firm that is servicing a foreign market, not necessarily through Foreign Direct Investment. The label “FDI” is, instead, restricted to the case of wholly-owned subsidiaries, as it is clarified in the Introduction.

³³ *Dissipation*, in this framework, entails a different meaning, depending on the asset under consideration: in the case of *knowledge*, a spillover mechanism is likely to operate, making the local counterpart appropriate production secrets, copy final goods and eventually start a rival firm on the basis of the “stolen” asset; in the case of *reputation*, dissipation comes because the local counterpart benefits from the MNE’s brand image, but puts no effort in maintaining and enhancing it.

Across the wide array of feasible contracts in a foreign country, we focus more specifically on the comparison between FDI and joint-venture (JV), to assess the relative attractiveness of full versus shared ownership of the production affiliate.

On the one hand, international JVs offer the possibility to make profitable use of the local partner capabilities; they may facilitate cooperation with foreign governments, and generate knowledge that could be valuable in future business operations (Desai et al. 2002). These advantages, however, are often offset by the implicit costs of split ownership: proximity³⁴ to Intangible Assets may enable the local company to expropriate the MNE's key resource and start a rival firm. On the contrary, Foreign Direct Investment secures knowledge within the boundaries of a wholly-owned subsidiary (WOS), but typically brings higher costs, because an integrated firm is less efficient than a pair of specialized producers, and lacks expertise and familiarity with the local market.

Although the role of IAs, in assessing the FDI/JV trade off, has been broadly investigated in empirical terms (see, among others: Andersen and Gatignon 1986; Gomes Casseres 1989; Hennart 1991; Agarwal and Ramaswami 1992; Erramilli 1996; Buckley and Casson 1996; Smarzynska 2000; Desai et al. 2002; Pan 2002; Chen and Hu 2002; Herrmann and Datta 2002; Brouthers 2002; Guillen 2003) it remains surprisingly unexplored in its theoretical aspects; indeed, to the best of our knowledge, all the theoretical formalisations based on Intangible Assets (see, for instance: Ethier and Markusen 1996; Markusen 1998, 2001; Saggi 1996, 1999; Fosfuri 2000; Mattoo et al. 2001; Fosfuri et al. 2001; Glass and Saggi 2002a) compare Foreign Direct Investment

³⁴ *Access*, in the Rajan and Zingales (2001)'s terminology.

and licensing, ignoring the case of shared ownership, typical of a joint-venture agreement.

This paper is intended to fill the gap between the theory and the data, and possibly reconcile the two strands mentioned above.

First, we provide a new firm-level dataset, on the whole population of Italian firms with FDIs or joint-ventures in Asia. Data come from an extensive survey, conducted by the author, to derive detailed information on MNEs' Intangible Assets – such as human capital and technology - adding to traditional economic variables. According to the respondents' answers, the main rationale for operating in a WOS is the wish to preserve IAs, while joint-venture establishments ground on the attempt at finding a complementary partner, well acquainted with the local market and efficient in input supply.

As a second step, we build on this evidence, to explore the FDI/JV trade off more rigorously, both in theoretical and empirical terms. On the one hand, we extend the *Dissipation of Intangible Assets* (DIA) framework to incorporate joint-venture contracts; in a two-period, two-country framework, similar to (Etheir and Markusen 1996; Saggi 1999; Mattoo et al. 2001), we show that Foreign Direct Investment is more likely to emerge the higher the threat of Intangible Assets dissipation, resembling the theoretical findings on the FDI/licensing trade off. On the other hand, we exploit our dataset to test these predictions: probit estimates confirm that Italian firms endowed with better technology and human capital are more prone to internalise production activities, rather than establishing joint-ventures in Asia, in lines with the empirical literature mentioned before.

This paper relates to several strands.

Our focus on human capital and technology brings this analysis close to the studies on knowledge transfer costs (see Caves 1974; Teece 1977, 1986; Davidson and Mc Fetridge 1984; Ramachandran 1993; Glass and Saggi 1999). Authors belonging to this field assume that modern economic growth is inextricably linked to the successful international transfer of technology, the extent of which crucially hinges on the costs involved. Transfer costs are shown to depend on a number of transferor's and transferee's characteristics, such as the number of previous applications and the age of the technology, the manufacturing experience and the sales of the recipient party etc. Our contribution differs from these in two aspects: first of all, we take the point of view of the MNE, and consider knowledge dissipation as a negative aspect, while it is regarded as a source of growth in (Caves 1974; Teece 1977, 1986; Davidson and Mc Fetridge 1984; Ramachandran 1993; Glass and Saggi 1999); moreover, technology transfer is not the ultimate focus of our research, but rather one of the factors that eventually influence the entry mode decision of Multinational Enterprises.

The great importance of Intangible Assets and their influence on the most appropriate organisational form is also at the heart of a relatively recent strand in the Theory of the Firm. Indeed, Rajan and Zingales (1998; 2000; 2001) offer an interesting re-thinking of the concept of power, which no longer stems from ownership of physical assets – as in the Property Right Approach (Grossman and Hart 1986; Hart and Moore 1990) - but rather on access to critical resources. While adopting a similar perspective on the role of IAs in driving the international organisational decision, we are more interested in the FDI-JV trade off, than in the choice between horizontal and vertical hierarchies.

As mentioned before, the selection of the topic and the specific modelling moves our analysis close to the theories of the MNE, based on the *Dissipation of Intangible Assets*,

where the risk of losing any of the firm's key resources provides a motive for keeping production internal rather than relying on the market.³⁵ In Horstmann and Markusen (1987), exporting, setting up a wholly-owned subsidiary and licensing are compared as alternative entry modes for a Multinational Enterprise, renowned for its product quality. In this framework, any licensing contract must provide the licensee with the adequate incentives to enhance the multinational's *reputation*: when providing incentives of this sort becomes too costly, the foreign firm decides to internalise production. In (Ethier and Markusen 1996; Markusen 1998, 2001; Saggi 1996, 1999; Fosfuri 2000; Mattoo et al. 2001; Fosfuri et al. 2001; Glass and Saggi 2002a) the dissipation of *knowledge* offers a major rationale for operating in wholly owned subsidiaries, rather than signing a licensing agreement. In this case, the entry mode decision is driven by the extent of a spillover mechanism that might enable the local party to appropriate production secrets, and start a rival firm: the more serious this threat, the more likely the integrated solution. Differently from this literature, we model the choice of FDI versus *joint-venture* - instead of licensing – based on knowledge dissipation.

Finally, our contribution relates to the empirical literature on the choice between WOS and JV, where the Internalisation decision is explained in terms of firm, industry, and country characteristics in discrete dependent variable-models (see, among others: Andersen and Gatignon 1986; Gomes Casseres 1989; Hennart 1991; Agarwal and Ramaswami 1992; Erramilli 1996; Buckley and Casson 1996; Smarzynska 2000; Desai et al. 2002; Pan 2002; Chen and Hu 2002; Herrmann and Datta 2002; Brouthers 2002;

³⁵ Building on Dunning (1993)'s OLI paradigm, theories of the boundaries of the Multinational Enterprise have fruitfully developed along three directions, called: *Theories of the Firm*, *Agency Costs*, *Dissipation of Intangible Assets* (See Markusen 1995; Saggi 2000; Barba Navaretti and Venables 2004 for surveys). For the purpose of the present work, we focus solely on the DIA approach. See chapter 1 for a more detailed survey of the *Dissipation of Intangible Assets* framework, and chapter 3 for a review of recent contributions based on the *Theories of the Firm*.

Guillen 2003). While these papers ground on Coase (1937)'s and Williamson (1985)'s intuitions and qualitatively extend some DIA arguments to the case of joint-venture, the present contribution is intended to provide a simple theoretical formalisation of the JV option, and show that a DIA mechanism - similar to the one highlighted for the FDI-licensing choice – also drives the FDI-JV trade off. We believe that the simple exercise provided in this paper can be regarded as a first attempt at reconciling the theoretical and the empirical analysis on the role of Intangible Assets in shaping the boundaries of Multinational Enterprises. Notice that an additional element of novelty comes from the dataset employed and the related possibility to measure human capital aspects beyond the broadly documented technological ones; indeed employees skills have been rarely considered in previous studies due to the lack of firm-level information.

The rest of the paper is organised as follows: Section 2 presents the simple theoretical model; Section 3 is entirely devoted to the empirical analysis – data description (3.1), methodology (3.2) and Probit estimates (3.3); Section 4 concludes and sets the future agenda.

2. The model

In a partial equilibrium framework similar to (Etheir and Markusen 1996; Saggi 1999; Mattoo et al. 2001), consider a two-country - North (N) and South (S) - two-period -1 and 2 - model in which a multinational firm, located in the North, is willing to produce a final good in the South. To add concreteness to the model, we could think of the North as Italy, of the South as the Asian market, as in the empirical part of the paper. The S market is populated by a single firm, which acts as a monopolist, and sells the same good as the MNE in N . The Multinational Enterprise has to decide whether to produce

in the foreign market via FDI or in joint-venture with the local firm and it cannot change supply mode between the first and the second period³⁶.

By assumption, final good production requires two activities, which we call *input manufacturing* and *final good processing* - according to a linear technology that employs 1 unit of input to obtain 1 unit of output.

Notice that these steps can be performed either by the multinational (through its subsidiary) or by the local enterprise, but the two firms are not equally efficient; based on the experience of Italian firms in Asia, we allow the MNE to have an advantage in processing final goods – due to its superior knowledge - and the other party to do better in input manufacturing. Indeed empirical evidence shows that Italian multinationals tend to contribute know-how and technology while relying on their local partner for input supply.

To capture this idea, without loss of generality, we assume that the per unit cost of each activity is zero, if it is performed by the company that has a relative advantage in it, and α ($\alpha > 0$) otherwise.

As in (Ethier and Markusen 1996; Saggi 1999; Markusen 1998, 2001; Mattoo et al. 2001) demand is linear in the S market; in particular:

$$p = a - Q \tag{1}$$

where p is the price, Q denotes the total quantity, $Q = q_{MNE} + q_{local}$ ³⁷ and the parameter $a > 0$ captures market size; *MNE* and *local* stand for the multinational and the local firm respectively.

As in Fosfuri (2000), firms attach equal weight to every period, i.e. the discount factor is equal to 0.

³⁶ This option is instead considered in Markusen (1998, 2001), where the MNE can choose a different licensee in the second period.

³⁷ Given this functional form, $0 < \alpha < a$.

Operating through Foreign Direct Investment, the Multinational Enterprise keeps all production activities within the boundaries of a wholly-owned subsidiary; in this case it is the same firm that performs both input manufacturing and final good processing, competing in quantities with the local company. Therefore, the Southern market becomes a symmetric Cournot duopoly, with marginal (and average) cost equal to α .

The essence of a joint-venture agreement lays, instead, in the partners' complementary skills³⁸: in this case, each party performs only the activity in which it has a relative advantage, and sales revenues are shared with weights θ ($0 < \theta < 1$) for the MNE and $(1 - \theta)$ for the local firm, in the first period, and $\bar{\theta}$ ($0 < \bar{\theta} < 1$), $(1 - \bar{\theta})$ in the second period. If a JV contract is signed, market S becomes a monopoly, and final good production rests with the joint-venture. Although Multinational Enterprises are free to choose their preferred mode of entry into all the countries considered in our empirical analysis, we are aware of the fact that some Asian governments still impose restrictions to foreign ownership under the joint-venture contract³⁹. Put another way, MNEs can freely decide to establish a wholly-owned subsidiary or to engage in a partnership with a local firm but, in the second case, the host government is likely to fix an upper bound θ for the foreign share. Under these circumstances, it is clear that the multinational firm sets its first period share equal to θ to retain the highest possible part of the joint-venture revenue, provided that the participation constraint of the local partner is satisfied, which

³⁸ Our modelling of the joint-venture contract is quite close to Ramachandran (1993), Mattoo et al. (2001), Glass and Saggi (2002a). Notice that the FDI/joint-venture decision does not necessarily coincide with the Greenfield/Acquisition one. In particular joint-ventures differ from Acquisitions because the local firm is not "bought" by the MNE, and the two enterprises do not "merge" into a new economic entity: they simply make a temporary cooperation agreement in order to produce final goods together. This is the reason why the local partner may deviate in the second period and eventually start a rival firm, as it is explained below, in Section 2.

³⁹ For more details, see: www.ice.it, www.indmin.nic.in.

is always the case in our model. In the second period, $\bar{\theta} \leq \theta$ is chosen by the MNE to avoid Intangible Assets dissipation, as it is clarified below.

Consider, first, the FDI case. After solving the symmetric Cournot game, Equation (2) gives the present value of the MNE profit when final good production is internalised:

$$\Pi_{MNE}^{FDI} = \frac{2}{9}(a - \alpha)^2 \quad (2)$$

By operating on its own, the Multinational Enterprise benefits from keeping entire revenues in both periods, but it entails higher costs in input manufacturing, compared to the local company.

On the contrary, production efficiency is achieved, under a JV agreement, but none of the two parties can appropriate total monopoly revenues, which are, instead, shared. In this case, firms' profits are given by:

$$\Pi_{MNE}^{JV} = \frac{(\theta + \bar{\theta})a^2}{4} \quad (3)$$

$$\Pi_{local}^{JV} = \frac{(1 - \theta)a^2}{4} + \frac{(1 - \bar{\theta})a^2}{4} \quad (4)$$

The key point of the model is that the joint-venture allows for a potential spillover mechanism from the MNE to the local firm: having access to the multinational Intangible Assets – human capital and technology - the partner might learn about the processing procedure so that her cost disadvantage α drops to a lower level $c\alpha$ in the second period, with $0 < c < 1$ ⁴⁰. According to our modelling, c measures the extent of the

⁴⁰ Although licensing provides a more direct channel for technology transfer - because the licensor has to provide the licensee with the whole set of production tools - working side by side in a joint-venture similarly allows the local firm to learn from the MNE. Notice, moreover, that c is strictly greater than zero, meaning that the cost reduction, induced by knowledge dissipation, cannot make the local firm exactly as efficient as the MNE in processing final goods. At the same time c is strictly lower than 1, meaning that a spillover mechanism - although very weak, if $c \rightarrow 1$ - is always at work in the joint-venture.

spillover effect, lower values being associated with higher degrees of knowledge dissipation.

It follows that the local firm has the option of breaking up the JV contract, and start a rival firm, with the “stolen” know-how; such an option does not exist for the Multinational Enterprise, this asymmetry depending on the fact that it has just a poor knowledge of the local market, relative to the partner⁴¹.

In case of defection – denoted by superscript d - the local firm makes profit:

$$\Pi_{local}^d = \frac{(1-\theta)a^2}{4} + \frac{(a-c\alpha)^2}{4} \quad (5)$$

while the multinational, having no other option, earns zero.

It is clear that the MNE can prevent this defection by setting $\bar{\theta}$ such that the local firm’s second period profit, under JV, is not lower than its profit in starting a rival firm; this is the Incentive Compatibility Constraint, which yields the following condition:

$$\bar{\theta} = 1 - \frac{(a-c\alpha)^2}{a^2} \quad (6)$$

In the end, the multinational chooses to integrate, rather than partnering if Π_{MNE}^{FDI} from (2) is greater than Π_{MNE}^{JV} from (3), evaluated at the incentive compatible value of the second period share (6):

⁴¹ In other DIA papers, this asymmetry is captured by a fixed cost incurred by the MNE in operating alone in the local market (see, for instance: Ethier and Markusen 1996; Saggi 1996; Fosfuri 2000; Fosfuri et al. 2001). Appendix A extends the model as to allow for a double-sided spillover mechanism. Results on the role of DIA still hold, but FDI becomes less attractive, *ceteris paribus*. Although such a formalisation provides our analysis with more generality, we believe that the experience of Italian firms in Asia suits the basic version better than the extended one. This is probably due to the fact that our database covers only manufacturing operations, in which the MNE is more exposed to the risk of DIA, compared to the local company. Put another way, the multinational advantage in processing originates from IAs, while the local firm advantage in input providing results from good knowledge of the local market, deep network etc., namely factors that cannot be appropriated by a foreign investor in a short period of time. Chapter 1 explicitly considers double-sided spillover between Japanese parent companies and European affiliates; given the North-North nature of those economic relations it seems more realistic to allow for mutual learning there, compared to the case of Italian operations in Asia, analysed in this paper.

$$\frac{2}{9}(a-\alpha)^2 > \frac{\theta a^2}{4} + \left[1 - \frac{(a-c\alpha)^2}{a^2}\right] \frac{a^2}{4} \quad (7)$$

Equation (7) gives the condition for the MNE to produce within the boundaries of a wholly-owned subsidiary, instead of signing a joint-venture agreement. It is solved in Result 1:

Result 1 (See Appendix A for details)

1) Condition (7) is verified - i.e. $\Pi_{MNE}^{FDI} > \Pi_{MNE}^{JV}$ - when

$$c > c_2 = \frac{a + \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}}{\alpha} \quad \text{or} \quad c < c_1 = \frac{a - \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}}{\alpha} .$$

2) i) If $\theta < F(\alpha, a) = \frac{17(a-\alpha)^2 - 9a^2}{9a^2}$, the MNE always chooses Foreign Direct

Investment;

ii) if $F(\alpha, a) < \theta < G(\alpha, a) = \frac{8(a-\alpha)^2}{9a^2}$, both arrangements may emerge, depending

on the extent of the spillover effect: for lower values of c (i.e. strong spillover effect), the MNE prefers FDI to avoid knowledge dissipation; for higher values of c (i.e. weak spillover effect) JV emerges as an equilibrium outcome;

iii) if $\theta > G(\alpha, a)$, the MNE always choose joint-venture.

iv) The MNE's profit gap, between FDI and joint-venture, increases as long as c decreases (i.e. stronger spillover effect).

Based on our modelling, in choosing between full and shared ownership, the MNE trades off the benefit of retaining total revenues and protecting IAs, with the cost of efficiency losses in terms of input manufacturing.

From Result 1, it is clear that the JV option is never appealing if the upper bound, imposed by the local government, is lower than a threshold $F(\alpha, a)$: in this case, the benefit of production efficiency is more than outweighed by the low fraction of the revenues accruing to the MNE. The risk of dissipating knowledge plays no role under these circumstances, because FDI is per se attractive compared to a partnership in which the foreign firm has just a small stake.

Opposite to this is the situation in which θ is greater than a threshold $G(\alpha, a)$ since the MNE's large share in the partnership makes the joint-venture absolutely appealing from the point of view of the Multinational Enterprise, despite the spillover mechanism that benefits the local partner.

The threat of Intangible Assets dissipation comes at play only for intermediate values of the first period share: when $F(\alpha, a) < \theta < G(\alpha, a)$, θ is not large or small enough to drive the MNE's entry mode decision per se; here we see that FDI prevails for lower values of c (i.e. higher cost reduction for the local firm, induced by knowledge dissipation), while JV emerges, as an equilibrium outcome, for higher values of c (here the spillover effect is so mild that it is completely outweighed by production efficiency considerations).

For the purpose of the empirical analysis, we restrict our attention to this case, because it is the most relevant.

According to Result 1, the profit gap between operating alone or in joint-venture, from the point of view of the MNE, is decreasing in c , in lines with the empirical evidence of Mansfield et al. (1979), Mansfield and Romeo (1980), Andersen and Gatignon (1986), Gomes Casseres (1989), Hennart (1991), Agarwal and Ramaswami (1992) Erramilli (1996), Buckley and Casson (1996), Smarzynska (2000), Desai et al. (2002), to mention just a few. This means that the relative profitability of the integrated solution is very

high when the risk of spillover is high as well, because avoiding DIA is far more important than being efficient in production; as long as the threat of dissipation decreases, the attractiveness of FDI decreases as well since firms, having nothing valuable to protect, earn more being efficient.

Therefore, based on Result 1, we expect to see FDI in circumstances in which know-how easily spills over. This gives precious empirical hints both at firm and sector level. At firm level, if we look at the entire population of Italian investors, those endowed with superior knowledge and better human capital are expected to select Foreign Direct Investment as their preferred mode of entry. This is because firms of this sort have something valuable to protect: given that R&D investment, to achieve high technology level, is a costly activity, firms are reluctant to freely share the fruit of their research with a potentially lower skilled partner. The same is true for human capital: skilled employees become such because of education and regular training that enable them to develop ideas and use sophisticated management techniques. Skilled employees are thus a precious resource but also an extremely costly input, from the point of view of the enterprise: to attract talents, it needs to pay high wages, and to update their knowledge, it has to organize training courses, which are costly as well. It is clear that the more a company invests in human capital, the less prone to operate abroad in a partnership, being exposed to the risk of dissipating its crucial assets.

At sector level, companies can be grouped in different categories of technological development, according to their acquisition of technology (Bell and Pavitt 1993). Based on Result 1, our expectation is that investors belonging to high tech industries have a stronger preference towards FDI, relative to investors from traditional sectors. This

follows, again, from the risk of DIA, which is more serious in IAs-intensive industries, where firms invest a lot in R&D and they patent more.

Although our simple theoretical exercise was motivated by the wish to show a correlation between Intangible Assets and multinational activity, given our modelling it is possible to move the analysis a bit farther and discuss to what extent market size affects the FDI/JV trade off.

Equation (7) is solved for a in Result 2.

Result 2 (See Appendix A for details)

1) Condition (7) is verified - i.e. $\Pi_{MNE}^{FDI} > \Pi_{MNE}^{JV}$ - when

$$a > a_2 = \alpha \left[8 + 9c + \sqrt{\frac{\theta c^2 + 144c + 81\theta c^2 + 72\theta}{8 - 9\theta}} \right] \quad \text{or}$$

$$a < a_1 = \alpha \left[8 + 9c - \sqrt{\frac{\theta c^2 + 144c + 81\theta c^2 + 72\theta}{8 - 9\theta}} \right].$$

2) the MNE's profit gap, between FDI and joint-venture, decreases as long as the market size (a) increases up to a threshold $\hat{a} = \frac{8 + 9c}{8 - 9\theta}$, then it increases.

According to Result 2, FDI is preferred for very high or very low market sizes, while for intermediate values of a , joint-venture establishments provide higher profit to the multinational. A possible explanation refers to the MNE's purpose in operating abroad. Using the terminology of the *Knowledge Capital Model* (see Markusen and Maskus 2001 for a survey), we call *horizontal* purpose the case in which the foreign firm aims at accessing the local market, and *vertical* purpose the case in which the foreign firm aims at saving on production costs. In the first situation, goods are produced and sold in the host market while, in the second one, they are produced in the host market, but exported

abroad. It is clear that joint-ventures provide a more direct access to the local economy than FDI, due to the partner's expertise and familiarity with its own country⁴². At the same time, it is clear that multinational firms need to carefully select their destination country, when driven by market access considerations. On the one hand, they are likely to exclude very small economies, because selling there would not be profitable; on the other hand, they probably want to exclude large economies as well, because it would be impossible to serve the entire market. As a result, joint-ventures are expected to prevail for intermediate values of a , since they are the best way to achieve horizontal purposes, while FDI are more likely to emerge for extreme values of market size.

Moreover, from Result 2, we see that the profit gap between full and shared ownership is decreasing in market size up to a threshold \hat{a} , then it is increasing. This gives precious empirical hints at country level. If we look at the entire set of destination economies, the probability of FDI is expected to go down as long as a increases: larger markets are better accessed with a local partner than alone. Notice that this statement is true for $a < \hat{a}$, but the threshold depends on α , θ , c : huge host economies like the Chinese or the Indian ones, included in our sample, can be below \hat{a} simply because the cost disadvantage of operating there is extremely high or because the profit share accruing to the MNE is large. While the influence of Intangible Assets on the relative attractiveness of FDI was clear cut, the impact of market size seems to be more subtle, and the ultimate answer will come from the data.

⁴² Not surprisingly, the large majority of Italian horizontal operations in Asia are carried on in joint-venture with a local company.

3. Empirical Analysis

In this Section, we test the main findings derived above and empirically assess the choice of FDI versus joint-venture made by Italian multinationals in Asia. For the purpose of the present work, a new firm-level dataset is employed. The discussion is organized in three steps: first we present the data (3.1) and the specification (3.2), and then we comment the econometric estimates (3.3) and their matching with the theoretical priors from Section 2.

3.1 Data

The empirical analysis, conducted by the author between 2001 and 2005, builds on a survey questionnaire, exploring the international choices of more than 300 Italian manufacturing companies with production affiliates in a region of the world that we call *Asia*, including China, India and the South East Asian (SEA) countries - Malaysia, Indonesia, Thailand, Vietnam, Singapore, Philippines, South Korea and Japan.

Although relatively small, we believe that this sample is highly representative of the Italian case, since it accounts for around 90% of all Italian investors in the region of interest⁴³.

The questionnaire, based on multiple choice responses, consists of two sections: first we ask background information to derive a general profile of the parent company; then we investigate the entry mode decision – or *Internalisation issue* - and the major challenges faced in the destination country, for more than 40 questions overall. Additional balance sheet or industry-level data are derived from AIDA (Analisi Informatizzata delle Aziende) and ISTAT (Istituto Nazionale di Statistica).

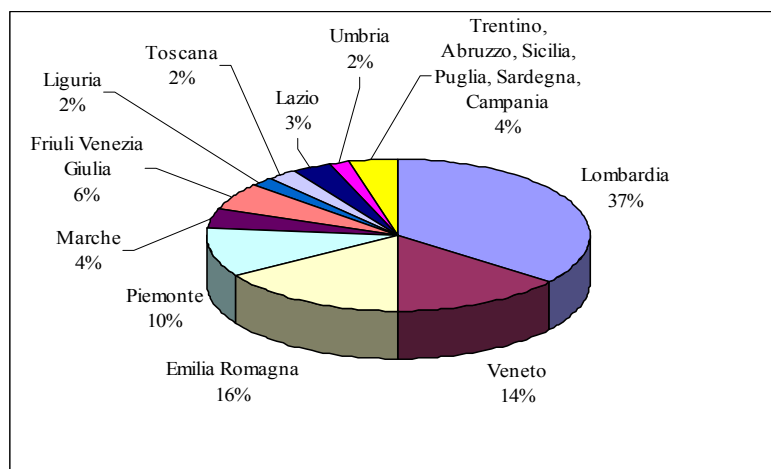
⁴³ The complete list of investors was obtained through intersection of all the available sources: ICE (Istituto Commercio Estero), Reprint-Politecnico, Italian Embassies and Chambers of Commerce in Asia. In lines with the theoretical specification, attention was restricted to manufacturing firms with production activity.

The experiences of Italian MNEs in Asia are very diverse. An initial look at the survey results suggests that it is impossible to draw a single “Italian” profile, because investors differ in many regards.

If we look at the number of employees, we find that medium (45%) and large (29%) companies account for the largest presence in Asia, followed by small (25%) and handcraft (6%) ones⁴⁴; according to sales, 44% of the firms top 50 million Euros, 16% is between 25 and 50 million Euros and 22% below 10 million.

Figure 1 displays the region of origin of Italian parent companies: the largest part of respondents comes from Lombardia (37%), Emilia Romagna (16%), Veneto (14%) and Piemonte (10%) while Southern lands account for a very limited number of MNEs with manufacturing affiliates in Asia.

Figure 1: Region of origin of the Italian parent company

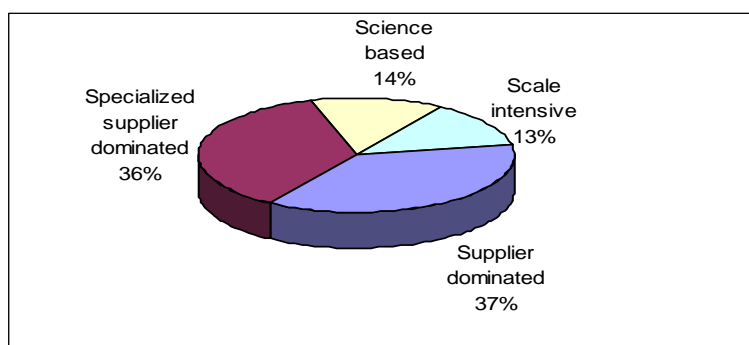


According to the acquisition of technology, companies can be grouped in four categories of technological development (Bell and Pavitt 1993): in traditional “supplier dominated” industries – like textile, leather, shoes, furniture, potteries etc. – technical change comes from supplier of inputs, while technology is transferred in the form of

⁴⁴ Based on ISTAT classification, *large* enterprises have more than 500 employees, *medium* enterprises have 100-499, *small* and *handcraft* ones have 11-99 or less than 10 respectively.

capital goods and components; in “scale intensive” industries – like automobile and chemicals – technical change is generated by the design and operation of complex production systems; in “science based” high-tech industries, technology emerges from corporate R&D and it is heavily dependant on academic research; finally, “specialized supplier dominated” firms provide high performance equipment in the form of components, instruments or software to advance users. From Figure 2, we see that Italian MNEs belong to “supplier dominated” sectors the most (37%), followed by the “specialized supplier dominated” (36%), “science based” (14%) and “scale intensive” (13%) ones.

Figure 2: Sector of the Italian parent company

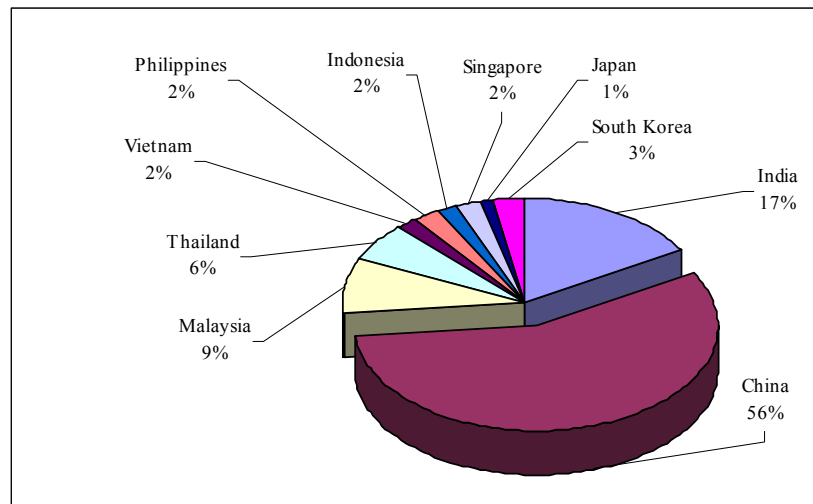


Interviews reveal that firms pay large attention to the human capital of their employees: many of them require English (70%) and computer (94%) skills to everybody, around 40% organizes periodic training courses longer than 6 months and the percentage of employees holding a degree is higher than 25% in 43% of the cases.

Experience in managing international operations seems high as well: many respondents have been engaged in activities abroad – from licensing (9%) to import/export (49%), from franchising to (4%) to FDI (20%) and joint-venture (18%) – in more than 5 countries (80%) and for longer than 10 years (77%) before the present involvement in Asia.

Figure 3 shows the distribution of Italian affiliates: China is the largest recipient - accounting for 56% of FDI and JV establishments in the whole region - followed by India (17%), Malaysia (9%) and Thailand (6%), while Japan occupies the last position.

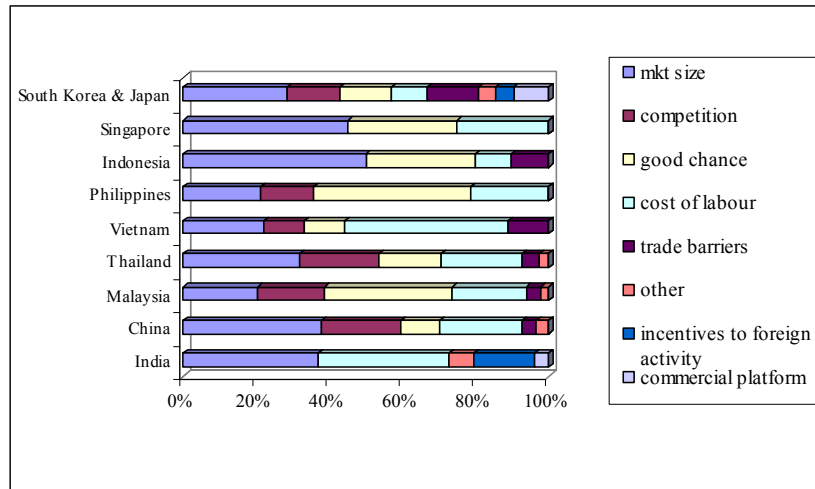
Figure 3: Destination country in Asia



Notice that manufacturing activities in Asia are driven by various purposes, depending on the destination. In particular, market access considerations play a major role in large countries - like China, India and Indonesia - but also in small ones - like Thailand, Singapore and South Korea – which serve as a commercial platform to the entire Asian region (see Figure 4). At the same time, the low cost of labour provides an important rationale for de-locating production in some developing countries like Vietnam, China, India and the Philippines.

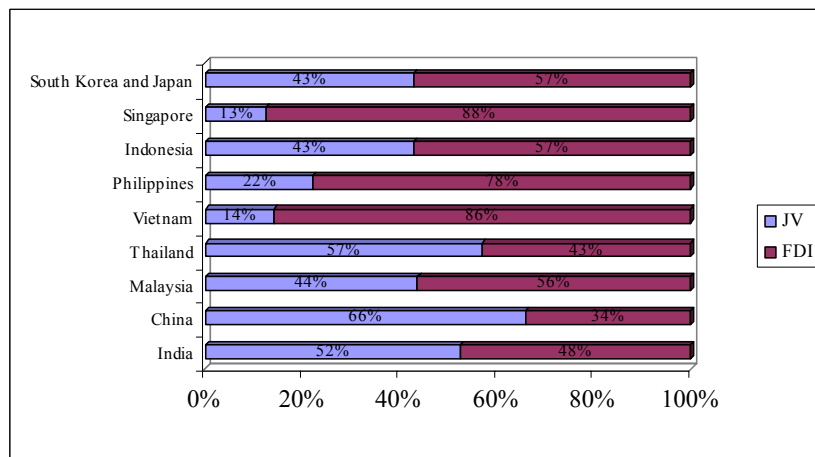
Adding to this, it is worth mentioning that 45% of the goods produced in Asia is intended to satisfy the local demand, while 55% is exported abroad. Evidence shows that the wish to become more competitive, a good chance, the existence of trade barriers elsewhere or special incentives to foreign activity provide further reasons to open subsidiaries.

Figure 4: Investors' purpose is establishing their affiliates in Asia, by country



As far as the *Internalisation issue* is concerned, joint-venture establishments (57%) prove to be the most common mode of entry for Italian companies in Asia. Nonetheless, FDI has been extensively preferred to JV in many countries, such as Singapore, South Korea, Japan, Indonesia, Philippines, Vietnam and Malaysia, suggesting that there might be some country-specific effects at play in the real world (see Figure 5).

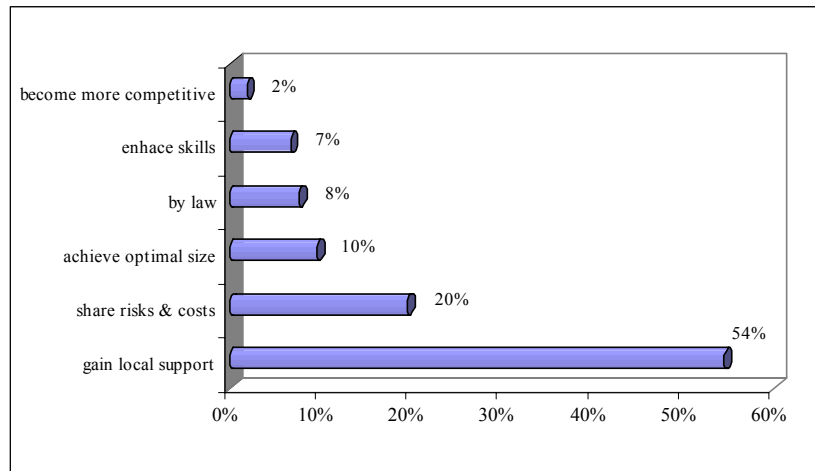
Figure 5: Internalisation choice in Asia, by country



Basing on the survey responses, the reasons to engage in a partnership, rather than operating in wholly-owned subsidiaries, range from gaining local support (54%) to risks and costs sharing (20%), from achieving the optimal size (10%) to skills (7%) and

competitive position (2%) enhancing or law restrictions (8%)⁴⁵ (see Figure 6). This gives a preliminary confirm to the role of complementary skills stressed in the model, with the Asian firm contributing cheap labour force and deep knowledge of the local market and the MNE providing know-how and managerial techniques.

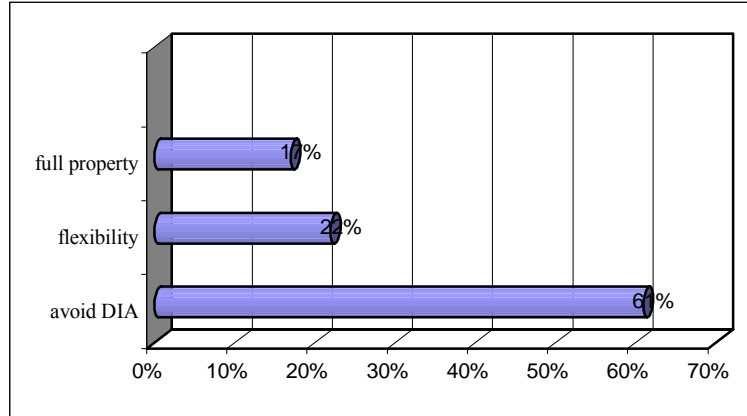
Figure 6: Reason to choose joint-venture over FDI



Among the 43% of respondents that operate in a WOS, a large majority (83%) chooses this mode in order to achieve strong control over technology transfer and high flexibility standards, in lines with our theoretical predictions: especially high tech companies are very reluctant to invest in developing countries since they do not want to share their know-how with a lower skilled partner. Foreign Direct Investment seems the most natural way to avoid this risk, as MNEs simply work alone and they do not consult with a local counterpart on management decisions. For about 21% of the sample, the wholly-owned subsidiary represents an evolution from a former JV, while 6% chooses to operate alone due to the lack of an appropriate local partner, as reported in Figure 7.

⁴⁵ See www.ice.it and www.indmin.nic.in for more details about the restrictions to foreign property in the countries of interest.

Figure 7: Reason to choose FDI over joint-venture



3.2 Specification

Based on the data briefly reviewed in 3.1, we regress the Internalisation decision – FDI versus joint-venture – of Italian multinationals in Asia, within the DIA framework sketched in Section 2.

Our unit of analysis is the production affiliate. The econometric specification is as follows:

$$FDI = F \alpha + C \sigma + \varepsilon \quad (8)$$

$(nx1) \quad (nxm)(mx1) \quad (nxk)(kx1) \quad (nx1)$

FDI is the $(n \times 1)$ dependent variable vector, whose elements take value 1 in case of wholly-owned subsidiary, 0 in case of joint-venture.

To capture the higher degree of complexity of real world, compared to the stylized theoretical framework, explanatory variables are of two types: F is a (nxm) matrix of Firm-level regressors; C is a (nxk) matrix containing host Country characteristics; α and σ are the vectors of parameters associated to firm and country variables respectively, and ε denotes the error term.

Notice that, within F , we distinguish between *core* and *control* regressors: core variables are those measuring Italian firms' Intangible Assets, over which priors have

already been derived; control variables denote other firm-level characteristics that may play a role in shaping the Internalisation decision.

Recall from our previous discussion (Section 1 and 2) that *knowledge* covers both *human capital* and *technological* aspects, so our *core* firm-level regressors refer to *both* types. This is an important novelty, compared to the previous empirical literature: although human capital is often mentioned as a key asset, likely to orient multinational activity, to the best of our knowledge, no attempt in measuring or including it in econometric tests has been made yet. This limitation is probably due to the lack of firm-level information, which poses strict constraints to empirical studies.

As a proxy for *technology*, we employ alternative indicators, such as the value of patents (*PATENT*); the ratio of patents over sales (*PATENT/SALES*); and, similarly to (Blomstrom et al. 1989; Smarzyńska 2000), whether or not the parent firm belongs to a high tech sector (*HIGHTECH*), with a particular focus on the *TELECOM* one. To capture the role of technological leadership, the variable *TECH_relative* is also included: it measures the overall technological endowment of the parent company – as sum of R&D and advertising expenditure - relative to the industry mean (Desai et al. 2002; Smarzyńska 2000). As far as *human capital* aspects are concerned, two measures are adopted: the extent of the training courses that the parent firm periodically organizes for its employees (*TRAINING*), and their level of education (*GRADUATE*).

All these variables refer to the consistency of the parent company's Intangible Assets, so we overall expect a positive sign, basing on the model described before: according to our theoretical findings FDI, induced by the threat of knowledge dissipation, is more likely to emerge when know-how easily spills over – i.e. when firms are endowed with

more technology and human capital or they belong to high tech industries⁴⁶. Moreover, our indicators of IA are characterized by a low degree of correlation, meaning that they capture different dimensions of the firms' key resources (see table b3 in Appendix B).

Firm-level control variables include: sales (*SALES*, as in Blomstrom and Zejan 1991; Meyer 1998; Smarzynska 2000); the destination of the goods produced in Asia (*H_purpose*) – which allows us to distinguish between horizontal and vertical purposes; the importance of firm-level scale economies (*SCALE*); a proxy for the MNE's experience in running foreign operations (*COUNTRIES*, similarly to Herrmann and Datta 2002; Guillen 2003), its location in Italy (*NORTH-EAST*) and a few industry controls (*METAL* and *PRECISION*).

As far as country variables are concerned, we consider: *TRADE*, as a measure of the host market degree of openness (the same measure is employed also in Smith 2001; Arora et al. 2001; Smarzynska 2002); *POP* to describe the local population and proxy market size; a property right index (*PRI*) and an economic freedom index (*EFI*), to capture host country restrictions to foreign ownership (similarly to Rapp and Rozek 1990; Maskus and Penubarti 1995; Lee and Mansfield 1996; Smarzynska 2002); and a dummy, specifying whether or not the host country belongs to the South East Asian region (*SEA*).

⁴⁶ For the sake of completeness, we should mention that the role of technological leadership – captured by the variable *TECH_relative* – is not so clear-cut. On the one hand, investors enjoying a technological lead in their respective sectors are perceived as more attractive JV partners by local firms and governments; therefore, they are more able to negotiate more favourable terms of agreement. Moreover, the technological gap between foreign leaders and domestic producers may be so large that, even in case of knowledge transfer, the threat of IA dissipation is minimal. On the other hand, the technology gap may not be enough to prevent knowledge dissipation, so investors possessing technological advantage over other firms in their sector may potentially incur in greater losses from knowledge dissipation than investors with less sophisticated technologies. Therefore, the impact of *TECH_relative* might be positive or negative (Smarzynska 2000).

Appendix B contains more information about the variables included in the econometric specification, provides summary statistics of the continuous regressors and the correlation matrix of the core-type ones.

Given the binary nature of the dependent variable *FDI*, regressions are carried out within a Probit framework.

3.3 Results

Probit estimates are shown in Table 1.

Reminding the theoretical priors, derived in Section 2, it is worth noticing that all the core variables are significant with the expected sign and they remain so across different specifications; this provides a first important result and suggests quite a good matching between the theory and the data⁴⁷.

In particular, moving from the simplest specifications on the left – where *FDI* is regressed only on core-type variables – to the richer specifications on the right – where control variables are also included - we see that with an increase in the Italian firms' Intangible Assets, the probability of internalising production, rather than operating in joint-venture, increases as well.

Indeed, *HIGHTECH*, *TELECOM*, *PATENT*, *TECH_relative*, *PATENT/SALES*, *GRADUATE* and *TRAINING* all display the expected positive sign; this means that wholly-owned subsidiaries are more likely to be settled by Italian companies operating in high tech sectors, holding patents in Italy, being technological leaders in their respective field and possessing well trained and cultured employees. These results are broadly consistent with the existing empirical literature (see, among others, Smarzynska 2000; Desai et al. 2001; Brouthers 2002; Chen and Hu 2002) and they add precious

⁴⁷ This evidence is also consistent with an explanation à la Antras and Helpman (2004): since foreign direct investment is a very costly mode of entry, the most productive firms – in terms of human capital and technology - get engaged in FDI, while the least productive ones prefer to operate via joint-venture.

information about the role of human capital, as a key resource driving the *Internalisation* choice of Italian companies in Asia.

As far as control variables are concerned, *METAL* and *PRECISION* turn out to be significant, with a positive sign, meaning that parent firms engaged with production of metal goods or precision instruments, watches and optical appliances have higher probability to operate through FDI. *SALES* is significant, as well, with a negative sign (as in Blomstrom and Zejan 1991; Meyer 1998)⁴⁸, suggesting that larger enterprises tend to share ownership with an Asian partner, rather than operating alone. This has probably to do with the bargaining power of the Italian investor: the larger the MNE, the stronger its position in negotiating favourable JV conditions. Not surprisingly, firm-level scale economies (*SCALE*) encourage FDI, since the integrated solution helps to exploit the cost advantage of production on a larger scale. Estimates also show that investors coming from *NORTH-EAST* are more prone to operate in wholly-owned subsidiaries, while experience in running foreign operations (*COUNTRIES*) and horizontal purpose (*H_purpose*) push towards joint-venture establishment. Indeed, being used to manage foreign operations might help to protect Intangible Assets more effectively and to avoid the risk of knowledge dissipation. At the same time, it is clear that investors wishing to penetrate the local market – horizontal purpose - are more likely to operate in joint-venture, to take advantage of the partner knowledge of the host country⁴⁹, whereas investors aiming at producing in Asia but exporting final goods elsewhere – vertical purpose – do not need a local counterpart and better protect their assets through WOS.

⁴⁸ A different result is obtained in (Pan 2002; Chen and Hu 2002), where sales are shown to be positively correlated with the probability of entering a foreign market alone.

⁴⁹ This is perfectly in lines with the questionnaire responses reviewed in Section 2.1: gaining local support – in terms of interacting with local authorities, marketing final products etc. - has proved to be the main reason for Italian MNEs to undertake JV projects in Asia.

According to our data, country variables also play a role in driving the FDI-JV trade off, as suggested by the survey answers. In particular, *TRADE*, *EFI* and *PRI* are significant with a positive sign, meaning that the higher the degree of openness and economic freedom and the lower the property right (PR) protection, the more appealing the integrated solution. These results are not surprising: multinational enterprises clearly prefer to operate alone if PRs are not adequately preserved, to avoid dissipation; FDI are also favoured by an open and free environment, where economic conditions are transparent and so there is no need for local support. Similar results can be found in (Pan 2002; Chen and Hu 2002; Smarzynska 2002). Notice, also, that operations in South East Asian countries – captured by the dummy *SEA* – are more likely to be conducted via FDI than in joint-venture.

In the end, we find that the size of the recipient country – measured by *POP* – is significant and negative, which suggests that larger countries tend to be accessed through joint-ventures rather than wholly-owned subsidiaries. This result seems quite plausible, since Italian firms usually choose large host countries when driven by horizontal purposes, in which case they seek the support of a local partner. Put another way, the probability of internalising production decreases as long as the population increases, in lines with our theoretical expectation. Recall from Result 2 that the derivative of the profit gap with respect to a is negative up to a threshold, that depends on some parameter values. Our empirical evidence suggests that huge host economies, like the Chinese or the Indian, still fall below \hat{a} due to high cost disadvantages of operating there or large profit shares accruing to the MNE. Indeed we observe a negative correlation between *POP* and the probability of Foreign Direct Investment.

Notice that these estimates might potentially suffer from selection bias since our sample, although highly representative of the Italian case, is just a fraction of the universe. Selection bias could originate from our focus on Italy, as the only home country, and Asia as the only recipient region, adding to fact that we do not include in the analysis firms that did not invest abroad or firms that adopted entry modes different from FDI and JV.

Data constraints make it extremely hard to overcome these problems in a rigorous way, however we believe that the estimates, shown in Table 1, provide quite a realistic approximation of the reality.

First of all, notice that the geographic dimension of the selectivity issue vanishes when we compare these results with the already established empirical literature and with our estimates on the boundaries of Japanese firms⁵⁰: irrespective of the home and host country, the risk of dissipating Intangible Assets is highly correlated with FDI establishments.

Second, Foreign Direct Investment and joint-venture turn out to be the only alternatives chosen by Italian firms in Asia, so it was not a matter of choice to set the comparison between the two.

Third, recall that the ultimate goal of this research is to provide a link between IAs and the relative attractiveness of FDI, therefore we interpret the econometric estimates more as a general indication of what is related to the Internalisation issue than a precise comparison among the marginal effects of the included regressors. In principal, we could allow for a previous step in which MNEs choose whether or not to go abroad before they select the entry mode; however such a step is deliberately ignored in the

⁵⁰ See chapter 1.

theoretical part of the paper, to keep the formalisation as simple as possible, so we preferred to maintain a better match between the theory and the data. Moreover, based on interviews, we are quite confident that the extent of firms' Intangible Assets is related to the choice of FDI versus joint-venture, rather than the decision to invest abroad: our database documents the experience of extremely variegated companies, some of them being very high tech, some other being completely traditional, but they all operate in Asia. This is the reason why we believe that technology and human capital are more likely to orient the Internalisation issue than the location one.

Finally, notice that in presenting our estimates, we resist any generalizing attempt and consider them as a simple exercise to check whether the experience of Italian firms in Asia is consistent with the theoretical expectations derived in Section 2. It is and it effectively summarizes the content of many interviews we conducted with the real actors at play.

Table 1: Probit estimates⁵¹

	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>	<i>FDI</i>
<i>GRADUATE</i>	0.142 (0.024)**	0.128 (0.042)**	0.189 (0.003)***	0.193 (0.004)***	0.165 (0.014)**	0.159 (0.018)**	0.130 (0.05)*
<i>TRAINING</i>	0.249 (0.01)**	0.256 (0.008)***	0.257 (0.012)**	0.216 (0.046)**	0.268 (0.012)**	0.273 (0.01)**	0.257 (0.02)**
<i>HIGHTECH</i>				0.138 (0.022)**	0.138 (0.026)**	0.134 (0.031)**	
<i>PATENT</i>	0.026 (0.090)*		0.027 (0.087)*	0.052 (0.04)**			
<i>TECH_relative</i>					0.086 (0.03)**	0.086 (0.031)**	

⁵¹ Marginal effects and P-value in round brackets displayed. * means significant at 10%, ** significant at 5%, *** significant at 1%.

Pseudo R² is a typical measure for goodness of fit in discrete-dependent-variable models. The expression for Pseudo R² is $1 - 1/[1 + 2(\log L_1 - \log L_0)/N]$, where N is the total number of observations, L₁ is the maximum log-likelihood value of the model of interest, and L₀ the maximum value of the log-likelihood function when all the parameters, except the intercept, are set equal to 0. P-value[^] denotes the P-value of the joint null-hypothesis.

<i>PATENT/SALES</i>	0.103 (0.050)*					0.092 (0.053)*	
<i>TELECOM</i>	0.398 (0.009)***			0.449 (0.004)***	0.453 (0.004)***	0.465 (0.003)***	
<i>METAL</i>						0.107 (0.041)**	
<i>PRECISION</i>						0.446 (0.027)**	
<i>SALES</i>			-0.101 (0.026)**	-0.107 (0.025)**	-0.106 (0.027)**		
<i>H_purpose</i>		-0.139 (0.017)**	-0.106 (0.082)*				
<i>COUNTRIES</i>		-0.171 (0.017)**	-0.133 (0.083)*	0.200 (0.01)**	-0.203 (0.009)***	-0.160 (0.036)*	
<i>SCALE</i>		0.208 (0.000)***	0.214 (0.000)***	0.228 (0.000)***	0.223 (0.000)***	0.227 (0.000)***	
<i>NORTH-EAST</i>			0.199 (0.027)**	0.246 (0.005)***	0.248 (0.004)***		
<i>PRI</i>			0.202 (0.057)*				
<i>EFI</i>			0.381 (0.001)***			0.185 (0.000)***	
<i>POP</i>					-0.026 (0.000)***		
<i>TRADE</i>		0.263 (0.002)***					
<i>SEA</i>				0.305 (0.000)***			
<i>Obs.</i>	356	354	356	349	344	344	347
<i>p-value[^]</i>	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
<i>Pseudo R²</i>	0.0377	0.0576	0.1131	0.1700	0.1736	0.1764	0.1647

4. Conclusion

Multinational Enterprises may penetrate into a foreign market through alternative channels – from export to FDI, from joint-venture to licensing - each of them involving a different degree of Intangible Assets transfer from the parent to the local firms.

This paper studies the relative attractiveness of Foreign Direct Investment versus JV, namely the choice of full versus shared ownership of the production affiliate, in terms of DIA.

Although the role of Intangible Assets, in assessing the FDI/JV trade off, has been broadly investigated in empirical terms (see, among others: Andersen and Gatignon 1986; Gomes Casseres 1989; Hennart 1991; Agarwal and Ramaswami 1992; Erramilli 1996; Buckley and Casson 1996; Smarzynska 2000; Desai et al. 2002; Pan 2002; Chen

and Hu 2002; Herrmann and Datta 2002; Brouthers 2002; Guillen 2003) it remains substantially unexplored in its theoretical components, since authors usually compare Foreign Direct Investment and licensing (see, for instance: Ethier and Markusen 1996; Markusen 1998, 2001; Saggi 1996, 1999; Fosfuri 2000; Mattoo et al. 2001; Fosfuri et al. 2001; Glass and Saggi 2002a), ignoring the case of shared ownership, typical of a joint-venture agreement.

This paper is a first attempt at filling the gap between the theory and the data.

For the purpose of the present research, we have been building a new firm-level dataset, on the whole population of Italian firms with FDIs or joint-ventures in Asia. According to the survey, wholly-owned subsidiaries are motivated by the wish to preserve knowledge, while joint-venture establishments ground on complementary skills.

Building on this evidence, we explore the FDI/JV trade off more rigorously, both in theoretical and empirical terms. First of all, a simple extension of the DIA framework allows us to incorporate shared ownership as an alternative to the full property. By assumption, Foreign Direct Investment avoids knowledge dissipation, but involves efficiency losses; on the contrary, JV is efficiency enhancing, but firms retain only a share of total revenues and knowledge is subject to dissipation. In a two-period, two-country framework, we show that Foreign Direct Investment is more likely to emerge the higher the threat of Intangible Assets dissipation, resembling the theoretical findings on the FDI/licensing trade off.

Second, these findings are tested with the data on Italian operations in Asia; probit estimates confirm that Foreign Direct Investment is preferred when know-how easily spills over – i.e. when firms are endowed with more human capital and technology, they belong to high tech industries, or turn out to be technological leaders in their respective

sector. Notice that our focus on human capital aspects, beyond the broadly documented technological ones, represents an important novelty with respect to the existing literature, since employees skills are rarely considered in empirical studies, due to the lack of firm-level data.

Given our promising results, we think that it is worth carrying out further research within the DIA framework, to better investigate its impact on multinational activity. Future steps include the treatment of the whole array of feasible contractual arrangements - namely joint-venture, licensing, export and FDI – in a single unitary model and the provision of further empirical evidence to control for possible selection bias.

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Appendix A

Appendix A contains the main derivations of Section 2. An extension of the model is also provided, allowing for a double-sided spillover mechanism between the multinational and the local firm.

A1 Proof of Result 1

1) Consider Equation (7), which gives the condition for the MNE to internalise, rather than partnering:

$$\frac{2}{9}(a-\alpha)^2 > \frac{\theta a^2}{4} + \left[1 - \frac{(a-c\alpha)^2}{a^2}\right] \frac{a^2}{4} \quad (7)$$

This is equivalent to:

$$\alpha^2 c^2 - 2a\alpha c + \frac{8(a-\alpha)^2 - 9\theta a^2}{9} > 0 \quad (a1)$$

Call:

$$c_1 \equiv \frac{a - \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}}{\alpha} \quad (a2)$$

$$c_2 \equiv \frac{a + \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}}{\alpha} \quad (a3)$$

It is clear that $c_1 < c_2$. Solving (a1) for c , we find that it is verified - i.e. $\Pi_{MNE}^{FDI} > \Pi_{MNE}^{JV}$ - for⁵² $c > c_2$ or $c < c_1$. \square

2) Since $0 < c < 1$, we need to control whether c_1 and c_2 belong to the interval $(0,1)$ or not, to draw conclusion on the prevalence of FDI versus JV in the relevant parameter space.

Lemma 1 and Lemma 2 provide useful information with this regard.

Lemma 1: $c_2 > 1$, where c_2 is given by (a3).

Proof:

$$\frac{a + \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}}{\alpha} > 1 \quad (\text{a4})$$

This is equivalent to:

$$\frac{a + \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}} - \alpha}{\alpha} > 0 \quad (\text{a5})$$

Since $0 < \alpha < a$, the Denominator of (a5) is positive, so we need to focus on the Numerator only:

$$(a - \alpha) + \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}} > 0 \quad (\text{a6})$$

(a6) is always verified for $0 < \alpha < a$ because it is the sum of two positive terms: $(a-\alpha)$ and the square root, therefore $c_2 > 1$ always. \square

⁵² Notice that $\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}$ is positive for $0 < \alpha < a$ and $0 < \theta < 1$,

so $\sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}$ exists and it is a real number.

Lemma 2: $c_1 > 1$ if $\theta < F(\alpha, a) = \frac{17(a-\alpha)^2 - 9a^2}{9a^2}$; $0 < c_1 < 1$ if $F(\alpha, a) < \theta < G(\alpha, a)$

$= \frac{8(a-\alpha)^2}{9a^2}$; $c_1 < 0$ if $\theta > G(\alpha, a)$; where c_1 is given by (a2).

Proof:

Consider, first, the condition for $c_1 > 0$:

$$\frac{a - \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}}}{\alpha} > 0 \quad (\text{a7})$$

Given that $0 < \alpha < a$, the Denominator is surely positive, so we need to study only the

Numerator:

$$a - \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9}} > 0 \quad (\text{a8})$$

which is equivalent to:

$$a^2 > \frac{9\theta a^2 + 9a^2 - 8(a-\alpha)^2}{9} \quad (\text{a9})$$

Call:

$$G(\alpha, a) \equiv \frac{8(a-\alpha)^2}{9a^2} \quad (\text{a10})$$

Given that $0 < \alpha < a$, it is clear that $0 < G(\alpha, a) < \frac{8}{9}$.

From (a9), we see that $c_1 > 0$ if $\theta < G(\alpha, a)$; $c_1 < 0$ if $\theta > G(\alpha, a)$.

Consider, now, the condition for $c_1 < 1$ ⁵³:

⁵³ If $\theta > G(\alpha, a)$, then $c_1 < 0 < 1$; if $\theta < G(\alpha, a)$, then it makes sense to check whether c_1 is lower or higher than 1.

$$\frac{a - \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a - \alpha)^2}{9}}}{\alpha} < 1 \quad (\text{a11})$$

This is equivalent to:

$$\frac{a - \alpha \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a - \alpha)^2}{9}}}{\alpha} < 0 \quad (\text{a12})$$

Given that $0 < \alpha < a$, the Denominator is surely positive, so we need to study only the Numerator:

$$a - \alpha \sqrt{\frac{9\theta a^2 + 9a^2 - 8(a - \alpha)^2}{9}} < 0 \quad (\text{a13})$$

Call:

$$F(\alpha, a) \equiv \frac{17(a - \alpha)^2 - 9a^2}{9a^2} \quad (\text{a14})$$

Given that $0 < \alpha < a$, it is clear that $-1 < F(\alpha, a) < \frac{8}{9}$.

From (a13), we see that $c_1 < 1$ if $\theta > F(\alpha, a)$; $c_1 > 1$ if $\theta < F(\alpha, a)$.

Notice that $F(\alpha, a) < G(\alpha, a)$. To see this, consider the condition:

$$\frac{17(a - \alpha)^2 - 9a^2}{9a^2} < \frac{8(a - \alpha)^2}{9a^2} \quad (\text{a15})$$

This is equivalent to:

$$9(a - \alpha)^2 - 9a^2 < 0 \quad (\text{a16})$$

which is always true for $0 < \alpha < a$.

It follows that: $c_1 > 1$ if $\theta < F(\alpha, a)$; $0 < c_1 < 1$ if $F(\alpha, a) < \theta < G(\alpha, a)$; $c_1 < 0$ if $\theta > G(\alpha, a)$.

□

Recall from above that (7) is verified - i.e. $\Pi_{MNE}^{FDI} > \Pi_{MNE}^{JV}$ - for $c > c_2$ or $c < c_1$, and combine this result with Lemma 1 and Lemma 2. Recall also that $0 < c < 1$, by assumption of the model. It follows that:

i) If $\theta < F(\alpha, a)$, then $c_1 > 1$ from Lemma 2; given that $c_2 > 1$ from Lemma 1, (7) is always true for $0 < c < 1$ (See Figure a1: the horizontal line depicts values of c ; the bold traits indicate the interval in which (7) is true; according to the model assumption, c is defined only between 0 and 1, i.e. in the white area):

Figure a1: FDI versus JV ($c_1 > 1$)

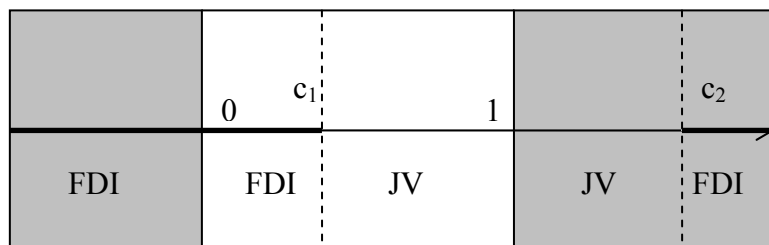


This means that – in the model range for c - Foreign Direct Investment is always preferable to joint-venture because it provides the MNE with higher profits.

□

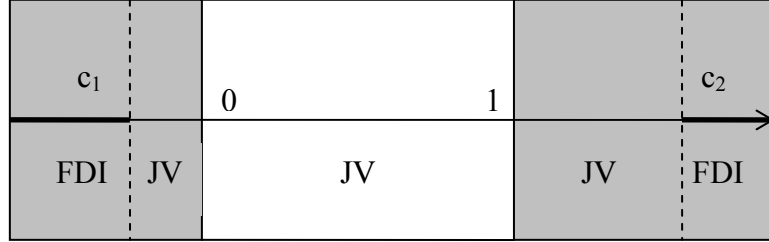
ii) If $F(\alpha, a) < \theta < G(\alpha, a)$, then $0 < c_1 < 1$ from Lemma 2; given that $c_2 > 1$ from Lemma 1, for $0 < c < 1$ (7) is verified – namely FDI entails higher profit than JV - for $0 < c < c_1$ (See Figure a2):

Figure a2: FDI versus JV ($0 < c_1 < 1$)



iii) If $\theta > G(\alpha, a)$, then $c_1 < 0$ from Lemma 2; given that $c_2 > 1$ from Lemma 1, (7) is never true for $0 < c < 1$ (See Figure a3):

Figure a3: FDI versus JV ($c_1 < 0$)



This means that $\Pi_{MNE}^{FDI} < \Pi_{MNE}^{JV}$ for $0 < c < 1$, and FDI is never chosen. \square

iv) Now we focus on the profit gap, between FDI and JV, from the point of view of the MNE ($\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV}$), and show that it increases as long as c decreases.

From (2), (3) and (6), we see that the profit gap equals:

$$(\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV}) \equiv \frac{2}{9}(a - \alpha)^2 - \frac{\theta\alpha^2}{4} - \left[1 - \frac{(a - c\alpha)^2}{a^2} \right] \frac{a^2}{4} \quad (\text{a17})$$

Now compute the derivative of $(\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV})$ with respect to c :

$$\frac{\partial(\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV})}{\partial c} = -\frac{\alpha}{2}(a - c\alpha) < 0 \quad (\text{a18})$$

For $0 < \alpha < a$ and $0 < c < 1$, (a18) is negative, namely a decrease in c (more cost reduction through knowledge spillover) increases the profit gap, for the MNE, between FDI and joint-venture. \square

A2 Proof of Result 2

1) Consider Equation (7), which gives the condition for the MNE to internalise, rather than partnering:

|

$$\frac{2}{9}(a-\alpha)^2 > \frac{\theta a^2}{4} + \left[1 - \frac{(a-c\alpha)^2}{a^2}\right] \frac{a^2}{4} \quad (7)$$

This is equivalent to:

$$a^2(8-9\theta) - a(16\alpha + 18c\alpha) + 8\alpha^2 + 9c^2\alpha^2 > 0 \quad (a19)$$

Call:

$$a_1 \equiv \alpha \left[\frac{8+9c - \sqrt{9c^2 + 144c + 81\theta c^2 + 72\theta}}{8-9\theta} \right] \quad (a20)$$

$$a_2 \equiv \alpha \left[\frac{8+9c + \sqrt{9c^2 + 144c + 81\theta c^2 + 72\theta}}{8-9\theta} \right] \quad (a21)$$

It is clear that $a_1 < a_2$. Solving (a19) for a , we find that it is verified - i.e. $\Pi_{MNE}^{FDI} > \Pi_{MNE}^{JV}$ - for⁵⁴ $a > a_2$ or $a < a_1$.

Since $a > 0$, we need to control whether a_1 and a_2 are positive or not, to draw conclusion on the prevalence of FDI versus JV in the relevant parameter space.

Lemma 3 and Lemma 4 provide useful information with this regard.

Lemma 3: $a_2 > 0$ if $\theta < \frac{8}{9}$, where a_2 is given by (a21).

Proof:

$$\alpha \left[\frac{8+9c + \sqrt{9c^2 + 144c + 81\theta c^2 + 72\theta}}{8-9\theta} \right] > 0 \quad (a22)$$

⁵⁴ Notice that $9c^2 + 144c + 81\theta c^2 + 72\theta$ is positive for $0 < \alpha < a$ and $0 < \theta < 1$, so $\sqrt{9c^2 + 144c + 81\theta c^2 + 72\theta}$ exists and it is a real number.

Notice that $0 < \alpha < a$, and the Numerator of (a22) is surely positive, so we need to focus on the Denominator only: it is positive if $\theta < \frac{8}{9}$. \square

Lemma 4: $a_1 > 0$ if $\theta < \frac{8}{9}$, where a_1 is given by (a20).

Proof:

$$\alpha \left[\frac{8 + 9c - \sqrt{9c^2 + 144c + 81\theta c^2 + 72\theta}}{8 - 9\theta} \right] > 0 \quad (\text{a23})$$

Remember that $0 < \alpha < a$. The Denominator is positive if $\theta < \frac{8}{9}$. Now we study the

Numerator:

$$8 + 9c - \sqrt{9c^2 + 144c + 81\theta c^2 + 72\theta} > 0 \quad (\text{a24})$$

which is equivalent to:

$$(8 + 9c)^2 > 9c^2 + 144c + 81\theta c^2 + 72\theta \quad (\text{a25})$$

This is solved for $\theta < \frac{8}{9}$.

Recall from Result 1 that the *Dissipation of Intangible Assets* comes at play only in case ii), namely for $F(a, \alpha) < \theta < G(a, \alpha)$. This is our relevant parameter space, since it provides the background for the empirical analysis. To draw conclusions on the role of market size in orienting the FDI/JV trade off, we need to study $G(a, \alpha) < \frac{8}{9}$.

$$\frac{8(a - \alpha)^2}{9a^2} < \frac{8}{9} \quad (\text{a26})$$

This is equivalent to:

$$\alpha(\alpha - 2a) < 0 \quad (\text{a27})$$

which is always verified for $0 < \alpha < a$.

It follows that in the relevant case, $F(a, \alpha) < \theta < G(a, \alpha)$, $\theta < \frac{8}{9}$ therefore FDI is preferred for $a < a_1$ or $a > a_2$. \square

2) Now we focus on the profit gap, between FDI and JV, from the point of view of the MNE ($\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV}$), and show how it varies as long as a decreases.

Recall that the profit gap equals:

$$(\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV}) \equiv \frac{2}{9}(a - \alpha)^2 - \frac{\theta a^2}{4} - \left[1 - \frac{(a - c\alpha)^2}{a^2} \right] \frac{a^2}{4} \quad (\text{a17})$$

Now compute the derivative of ($\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV}$) with respect to a :

$$\frac{\partial(\Pi_{MNE}^{FDI} - \Pi_{MNE}^{JV})}{\partial a} = \frac{8a - 8\alpha - 9a\theta - 9c\alpha}{18} \quad (\text{a28})$$

In the relevant case $\theta < \frac{8}{9}$, so the derivative is positive for $a > \hat{a} = \frac{8 + 9c}{8 - 9\theta}$. This means

that as long as the market size increases (up to the threshold \hat{a}) FDI becomes less appealing. \square

A3 Extension

In the basic version of the model there is an asymmetry between the multinational and the local firm: in case of defection, while the first has no other option, the second can restart production by means of the “stolen” assets. Given that the MNE earns 0 in this circumstance, it follows that it always wants to prevent defection.

Here we extend the model as to allow for a double-sided spillover mechanism, that produces an equal⁵⁵ cost reduction to both firms.

⁵⁵ This assumption seems quite realistic for our purposes, since we deal with manufacturing operations in the empirical part.

The only difference, with respect to the basic version, is that the Southern market becomes a symmetric Cournot duopoly (with marginal cost $c\alpha$) in case of defection.

Equations (5'a) and (5'b) give the present value of the two firms' profits in this circumstance:

$$\Pi_{local}^d = \frac{(1-\theta)a^2}{4} + \frac{(a-c\alpha)^2}{9} \quad (5'a)$$

$$\Pi_{MNE}^d = \frac{\theta a^2}{4} + \frac{(a-c\alpha)^2}{9} \quad (5'b)$$

The MNE wants to prevent defection if $\Pi_{MNE}^d \leq \Pi_{MNE}^{JV}$, i.e.:

$$\frac{\theta a^2}{4} + \frac{(a-c\alpha)^2}{9} \leq \frac{\theta a^2}{4} + \frac{\bar{\theta}^2}{4} \quad (a29)$$

This gives:

$$\bar{\theta} \geq \frac{4(a-c\alpha)^2}{9a^2} \quad (a30)$$

Suppose that (a30) holds. To prevent defection, the MNE sets $\bar{\theta}$ such that the local firm's second period profit, under JV, is not lower than its profit in starting a rival firm; this is the Incentive Compatibility Constraint, which yields the following condition:

$$\bar{\theta} \leq 1 - \frac{4(a-c\alpha)^2}{9a^2} \quad (6')$$

In the end, the multinational chooses to integrate, rather than partnering if Π_{MNE}^{FDI} from (2) is greater than Π_{MNE}^{JV} from (3), evaluated at the incentive compatible value of the second period share (6')

$$\frac{2}{9}(a-c\alpha)^2 > \frac{\theta a^2}{4} + \left[1 - \frac{4(a-c\alpha)^2}{9a^2}\right] \frac{a^2}{4} \quad (7')$$

Compare (7) with (7'): the left hand side is the same, while the right hand side of (7') is larger. This means that, *ceteris paribus*, FDI becomes less attractive when the MNE has the possibility to learn from the local partner. Results on the role of DIA still hold, since c enters (7) and (7') the same way.

Now suppose that (a30) does not hold. In this case, the MNE prefers defection rather than JV. To induce defection, it sets $\bar{\theta}$ as to violate (6'). Therefore, it sets the highest possible value for the second period share, $\bar{\theta} \rightarrow 1$, which is not compatible with (a30) not holding. As a result, defection never takes place.

Although this richer formalisation provides our analysis with more generality, we believe that the experience of Italian firms in Asia suits the basic version better than the extended one. This is probably due to the fact that our database covers only manufacturing operations, in which the MNE is more exposed to the risk of DIA, compared to the local company. Put another way, the multinational advantage in processing originates from IAs, while the local firm advantage in input providing results from good knowledge of the local market, deep network etc., namely factors that cannot be appropriated by a foreign investor in a short period of time.

Appendix B

Appendix B contains a description of the variables included in the econometric specification (Table b1), it provides summary statistics of the continuous regressors (Table b2) and the correlation matrix of the core-type ones (Table b3).

Table b1: Variables description

<i>Variable</i>	<i>Description</i>
<i>FDI</i>	Dummy variable, 1 if FDI, 0 if JV. Type: regressand. Source: interviews
<i>GRADUATE</i>	Dummy variable, 1 if the percentage of employees with a degree, in the parent firm, is larger than 25%, 0 otherwise. Type: firm-level <i>core</i> regressor; it is a proxy for the human capital of the parent firm. Source: interviews
<i>TRAINING</i>	Dummy variable, 1 if the parent firm organizes training courses for the employees longer than 6 months, 0 otherwise. Type: firm-level <i>core</i> regressor; it is a proxy for the human capital of the parent firm. Source: interviews
<i>HIGHTECH</i>	Dummy variable, 1 if the parent firm belongs to a “high tech” sector, i.e. a sector in which the average R&D expenditure is more than 500,000 Euro. Type: firm-level <i>core</i> regressor; it is an indicator of technology of the parent firm. Source: personal elaborations from ISTAT (Istituto Nazionale di Statistica) data.
<i>PATENT</i>	Patents of the parent firm (millions Euro). Type: firm-level <i>core</i> regressor; it is an indicator of technology of the parent firm. Source: AIDA (Analisi Informatizzata delle Aziende, it is a dataset that comprises balance sheet information of more than 200,000 Italian companies with sales larger than 500,000 Euro)
<i>TECH_relative</i>	Total value of the parent firm’s technology – R&D expenditure + advertising expenditure - over its industry mean. Type: firm-level <i>core</i> regressor; it is an indicator of technology of the parent firm; in particular it captures the role of technological leadership. Source: personal elaborations from ISTAT and AIDA
<i>PATENT/SALES</i>	Patent over sales of the parent firm. Type: firm-level <i>core</i> regressor; it is an indicator of technology of the parent firm. Source: personal elaborations from ISTAT and AIDA
<i>TELECOM</i>	Dummy variable, 1 if the parent firm belongs to the TELECOM sector, 0 otherwise. We call TELECOM the ATECO (NACE REV 1.1) 32 sector, characterized by production of TV and radio equipments. According to ISTAT, this is the manufacturing sector with largest R&D investments in Italy. Type: firm-level <i>core</i> regressor; it is an indicator of the level of technology of the parent firm. Source: personal elaborations from ISTAT data.
<i>METAL</i>	Dummy variable, 1 if the parent firm belongs to the METAL sector, 0 otherwise. We call METAL the ATECO (NACE REV 1.1) 28 sector, characterized by production of metal goods. Type: firm-level <i>control</i> regressor. Source: personal elaborations from ISTAT data.
<i>PRECISION</i>	Dummy variable, 1 if the parent firm belongs to the PRECISION sector, 0 otherwise. We call PRECISION the ATECO (NACE REV 1.1) 33 sector, characterized by production of precision instruments, watches and optical appliances. Type: firm-level <i>control</i> regressor. Source: personal elaborations from ISTAT data.
<i>SALES</i>	Sales of the parent company (billions Euro). Type: firm-level <i>control</i> regressor. Source: AIDA
<i>H_purpose</i>	Dummy variable, 1 in case of horizontal purpose – i.e. the goods produced in Asia are addressed to the local market – 0 in case of vertical purpose – i.e. the goods produced in Asia are exported elsewhere. Type: firm-level <i>control</i> regressor.

	Source: interviews
<i>COUNTRIES</i>	Dummy variable, 1 if the parent firm was engaged in international operations with more than 5 foreign countries before the FDI in Asia, 0 otherwise. It is a proxy for the firm's experience in running foreign operations. Type: firm-level <i>control</i> regressor. Source: interviews
<i>SCALE</i>	Dummy variable, 1 if firm-level scale economies are important for the parent firm, 0 otherwise. Type: firm-level <i>control</i> regressor. Source: interviews
<i>NORTH-EAST</i>	Dummy variable, 1 if the parent firm's headquarter is located in the North-East of Italy, 0 otherwise. Type: firm-level <i>control</i> regressor. Source: interviews
<i>PRI</i>	Property Right Index: it scores the degree to which private property rights are protected and the degree to which the government enforces laws that protect private property. In addition, it analyzes the independence of the judiciary, the existence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts. It ranges from 1 to 5, higher values associated with less protection. Type: country-level regressor. Source: Miles et al. (2004)
<i>EFI</i>	Economic Freedom Index: it measures the degree of economic freedom present in five major areas - Size of Government, Legal Structure and Security of Property Rights, Sound Money, Freedom to Trade with Foreigners, and Regulation of Credit, Labor, and Business. It ranges from 0 to 10, higher values associated to more freedom. Type: country-level regressor. Source: Gwartney et al. (2004)
<i>POP</i>	Population of the host country (millions of inhabitants). Type: country-level regressor. Source: http://humandevlopment.bu.edu/
<i>TRADE</i>	Degree of openness of the host country, measured by (Import+Export)/GDP. Type: country-level regressor. Source: personal elaborations from http://humandevlopment.bu.edu/
<i>SEA</i>	Dummy variable, 1 if the host country belongs to the South East Asian region, i.e. Indonesia, Malaysia, Thailand, Japan, South Korea, Philippines, Vietnam and Singapore, 0 otherwise. Type: country-level regressor. Source: interviews

Table b2: Summary statistics of continuous variables

<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std.Dev.</i>	<i>Min</i>	<i>Max</i>
<i>PATENT</i>	356	0.6086301	2.012699	0	14.96469
<i>TECH_relative</i>	344	3.936645	10.88662	0	82.71236
<i>PATENT/SALES</i>	356	0.1761435	0.7417115	0	7.073824
<i>SALES</i>	356	0.262313	0.8978276	0.006	6.311476
<i>PRI</i>	356	3.491573	0.7817905	1	5
<i>EFI</i>	349	5.834098	0.7429829	5.3	8.6
<i>POP</i>	356	9.279096	5.341437	0.435389	12.98848
<i>TRADE</i>	356	0.2521991	0.3908543	0.0433201	2.413163

Table b3: Correlation matrix of the core variables

	<i>GRADUATE</i>	<i>TRAINING</i>	<i>HIGHTECH</i>	<i>PATENT</i>	<i>TECH_relative</i>	<i>PATENT/SALES</i>	<i>TELECOM</i>
<i>GRADUATE</i>	1.0000						
<i>TRAINING</i>	0.0794	1.0000					
<i>HIGHTECH</i>	0.1090	0.1141	1.0000				
<i>PATENT</i>	0.2276	-0.0414	0.0252	1.0000			
<i>TECH_relative</i>	0.1875	-0.0090	-0.1426	0.4270	1.0000		
<i>PATENT/SALES</i>	0.1162	-0.0112	0.1724	0.6036	0.1054	1.0000	
<i>TELECOM</i>	0.1516	-0.0628	0.2133	-0.0420	-0.0664	-0.0019	1.0000

CHAPTER 3: FROM THE THEORY OF THE FIRM TO FDI AND INTERNALISATION: A SURVEY⁵⁶

Abstract

This paper surveys recent contributions on the Internalisation issue, based on different theories of the firm, to show how the make-or-buy decision, at an international level, has been assessed through the opening up of the “black box” - traditionally explored by the theorists of the firm – and the simultaneous endogenization of the market environment – as in the International Economics tradition.

In particular, we consider three paradigms – Grossman-Hart-Moore treatment of hold up and contractual incompleteness, Holmstrom-Milgrom view of the firm as an incentive system, Aghion-Tirole conceptualisation of formal and real authority in organisations – and show how they have been embedded in industry and general equilibrium models of FDI to explain the boundaries of global firms.

JEL: F23, D21, D23

Keywords: FDI, Internalisation, Integration, Outsourcing, Theory of the Firm

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1. Introduction

Recent years have witnessed important changes both in the world economy and in the nature of the firm.

Trade economists agree on the fact that a new feature of globalisation is the dramatic increase in foreign direct investment (FDI) and trade in intermediate goods which, in turn, reflects the new way firms organize their activities. As Abraham-Taylor (1996), Campa-Golberg (1997), Yeats (2001) have documented, firms in many countries are sub-contracting abroad an increasing range of activities – from product design and intermediate good production, to assembly, marketing and after sales services – meanwhile, the same and other firms have been engaging in FDI, so that already in the 1990s, more than 40 percent of US imports of goods took place within the boundaries of multinational firms (Zeile 1997), and roughly one third of world trade now occurs intra-firm (Antras 2003).

One of the most important changes involves the increasing interconnectedness of production processes in a vertical trading chain that stretches across many countries, with each country specializing in a particular stage of production, rather than manufacturing final goods from start to finish.

“Outsourcing”, “slicing up the value chain”, “disintegration of production” are just a few labels for the same phenomenon of vertical specialisation that pushes modern corporations towards a global structure (Hummels et al. 2001; Feenstra 1998; Feenstra-Hanson 1996).

Meanwhile, the enterprise itself has become the theatre of a massive reorganization, whose keywords sound like downsizing, decentralisation and empowerment of workers, resulting in flatter hierarchies and new balances inside the firm (Holmstrom-Kaplan

2001); while traditional conglomerates were shaped by ownership of physical assets, modern organisations increasingly recognize the importance of human capital and talent, as the new stakeholders of the firm (Rajan-Zingales 2000).

What accounts for these changes in the world economy, on the one hand, and in the nature of the enterprise, on the other?

Vertical specialisation takes two primary forms since international operations may be organized either “internally” – in wholly-owned subsidiaries – or “externally” – under arm’s length contracts with independent local producers: what we call *Internalisation* pertains the choice between Integration and Outsourcing.

The make-or-buy decision of a Multinational Enterprise (MNE) is usually explained in terms of costs and benefits of using the market. Internalising typically brings direct cost penalties, because a local supplier would have better knowledge, expertise and cost advantage, with respect to an integrated firm; however, relying on the market may be highly risky due to technology transfer (see, among others: Teece 1977, 1986, Rugman 1986), informational asymmetries (Ethier 1986), moral hazard (Rugman 1985, 1986, Horstmann-Markusen 1996), and reputation concerns (Horstmann-Markusen 1987b).

In the last 20 years, the literature on Multinational Enterprises has basically developed around Dunning’s OLI framework, which groups the motives to undertake foreign direct investment in three categories: *Ownership*, *Location* and *Internalisation* advantages (Dunning 1993).

If MNEs were exactly identical to domestic firms, they would not find it profitable to enter the domestic market, due to the high cost of doing business abroad; since FDIs indeed exist, it must be the case that multinational firms possess some inherent advantages easily exploitable through direct investment.

Ownership advantages correspond to some product, know-how, reputation or production process to which other firms do not have access. *Location advantages* arise when it is profitable to produce directly in the domestic market, rather than producing at home and exporting abroad. *Internalisation advantages* represent the most abstract concept within the OLI framework and generically refer to corporate governance issues, such as the boundaries of the firm.

The literature on MNEs has first combined Ownership and Location considerations (see, for instance Helpman (1984, 1985), Markusen (1984), Helpman-Krugman (1985), Horstmann-Markusen (1987a, 1992) Brainard (1993), while the Internalisation issue⁵⁷ has received only a later explanation in the dissipation of firms' intangible assets (see, among others, Ethier-Markusen 1996, Markusen 2001, Fosfuri et al. 2001, Glass-Saggi 2002, Horstmann-Markusen 1987b, Fosfuri 2000)⁵⁸.

This paper surveys more recent contributions on the debate between Integration and Outsourcing, based on different theories of the firm, to show how the make-or-buy decision, at an international level, has been assessed through the opening up of the “black box” - traditionally explored by the theorists of the firm – and the simultaneous endogenization of the market environment – as in the International Economics tradition. In our view, this represents an interesting and innovative perspective, in that the firm – originally taken as given – becomes the centre of the analysis, and its internal hierarchy is carefully explored, and related to the market dynamics.

In particular, we consider three paradigms – 1) Grossman-Hart-Moore (G-H-M) treatment of hold-up and contractual incompleteness; 2) Holmstrom-Milgrom (H-M)

⁵⁷ For extensive surveys, see Markusen (1995), Barba Navaretti-Venables (2004). To the best of our knowledge, no survey exists on the specific topic of Internalisation, while the reader would surely benefit from reading Antras (2004), where several model of FDI are presented in details.

⁵⁸ See chapter 1 for a more detailed survey of this literature.

view of the firm as an incentive system; 3) Aghion-Tirole (A-T) conceptualisation of formal and real authority in organisations – and show how they have been embedded in industry and general equilibrium models to explain the boundaries of global firms.

Within each of the three approaches, we first describe the original paradigm, in order to provide the reader with the underlying intuition, the keywords and the specific terminology; then we consider their application to a context of FDI.

While this is our roadmap, across the burgeoning literature on Internalisation, in presenting the papers within each field we do not necessarily follow a chronological order, rather we consider each contribution as a further step towards a comprehensive characterisation of firms' organisational solutions, moving from the simple domestic ownership decision to a more complete formalisation of location and ownership concerns in a unitary framework.

Figure 1 displays the four organisational forms that enterprises can choose, as a result of the intersection between location and ownership decisions.

In conducting the survey, we try to follow this scheme and show how, and to what extent, a box similar to Figure 1 has been filled, based on each paradigm.

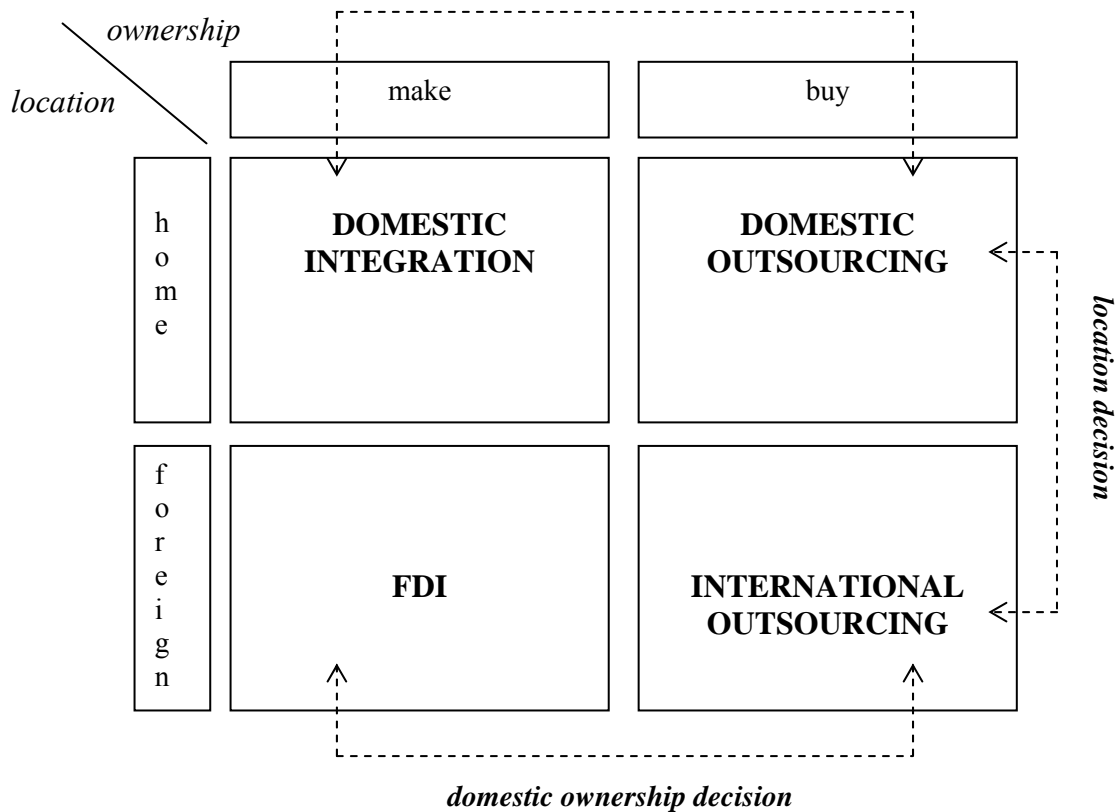
With a few exceptions (Antras 2003; Feenstra-Hanson 2003, 2004), this review covers only theoretical aspects since, to the best of our knowledge, empirical tests have not been performed yet.

The rest of the paper is organized as follows: Section 2 describes the main approach, based on hold up, contractual incompleteness and the property right theory of the firm; Section 3 groups together alternative explanations of the boundaries of the firm – namely Holmstrom-Milgrom and Aghion-Tirole – which are briefly described, and

comments their applications to Internalisation; Section 4 concludes the analysis and suggests future lines of research.

Figure 1: Organisational forms

domestic ownership decision



2. Hold up

In this section, we present the first Theory of the Firm-approach to FDI and Internalisation, based on transaction costs, hold up and contractual incompleteness.

After summarizing the spirit of Grossman-Hart-Moore (2.1), we discuss how it has been employed in industry and general equilibrium models to assess the boundaries of multinational enterprises (2.2).

2.1 Paradigm 1: Hold up, Contractual Incompleteness and the Property Right Theory of the Firm

What we call paradigm 1 builds on the notion of transaction costs and contractual incompleteness. Formerly spelled by Coase (1937) and lately operationalised by Williamson (1985), these concepts received the first formal treatment in Grout (1984), Grossman and Hart (1986), Hart and Moore (1990), where a *hold up* mechanism was introduced and rigorously modelled.

In an ideal world, the relationship between two parties would be easily governed by a *complete contract*, namely a contract that specifies all the contingencies that may affect the contractual relationship⁵⁹.

Unfortunately such a contract does not exist in reality, mainly because of three reasons (Salaniè 1997; Tirole 1999):

- *Unforeseen contingencies*, in the sense that bounded rationality may force the parties to neglect some key variables whose effect on the relationship they find difficult to predict;
- *Cost of writing contracts*, in terms of time and money, since real world negotiation is a long and complex process which mobilizes managers and lawyers. So, it must be the case that, at some point, the cost of taking into account a very unlikely contingency outweighs the benefit of adding a specific clause in the contract;
- *Cost of enforcing contracts*, due to the inability of a third party to verify ex post the values taken by certain variables and eventually settle the disputes that may arise.

⁵⁹ This is not the only dimension of contractual incompleteness: in Battigalli-Maggi (2002), adding to missing contingencies, contractual incompleteness may take two distinct forms: *discretion* – meaning that the contract is not precise in describing the parties' behaviour – and *rigidity* – meaning that the parties' obligations are not sufficiently contingent on the external state. This model differs from Dye (1985) where the presence of rigidity is explained by assuming that the cost of writing contracts is increasing in the number of its contingencies, and discretion is not formalized.

Real world is thus the land of *incomplete contracts* that turn out to be vague or silent on a number of key features (Tirole 1999) and have gaps, missing provisions or ambiguities (Hart 1995): real word contracts simply provide a starting point for the two parties' relationship, but they can be completed only ex post through renegotiation.

Consider, for example, the economic exchange between an upstream firm, which we call input supplier (IS), and a downstream firm, which we label as final good producer (FP). Suppose that the two parties are independent and they need to make a *relation-specific investment* in order to manufacture final products, namely a prior investment that creates value if their relationship extends over time, but does not if their relationship breaks. As a result, firms FP and IS are bound together and they cannot switch to an alternative partner in the event of disagreement.

This becomes a particularly serious problem when it is not possible to write a complete contract because each party may fear that, after making the relation-specific investment, the other party denies the due payment, claiming that some contingencies, uncovered by the contract, have occurred. Given that their investment is already sunk, at the renegotiation stage, firms fear to be *held up*, and tend to under-invest.

What happens, instead, if the final good producer and the input supplier merge and they become a single enterprise?

Suppose, for instance, that the demand for final products increases, so that FP needs more inputs.

If the two parties are independent, the final good producer must secure IS's permission to increase supply; IS can threaten to make its assets and labour unavailable and FP may have to pay a large sum to persuade the partner to increase input supply.

The situation changes if IS is a subsidiary of FP, so that FP owns IS. In this case, if the input supplier refuses to provide additional components, the final good producer may dismiss IS management and hire someone else to supervise the factory. Put another way, the input supplier can only threaten to make its labour unavailable, while the final good producer, given its stronger position as an owner, may be able to force extra supply at lower costs.

Anticipating the way surplus is divided, based on Nash-bargaining, FP has more incentives to make relation-specific investment when it owns IS, rather than in the non-integrated case; the opposite is true for the input supplier. Integration thus increases the incentive to invest of the acquiring party, and decreases that of the acquired party.

Notice that, if contracts are complete, the allocation of property rights only matters for distributive purposes; if contracts are, instead, incomplete who owns what is a crucial point in order to take actions whenever an unforeseen contingency occurs, because ownership of physical assets determines residual control rights.

2.2 From paradigm 1 to FDI and Internalisation

The previous discussion served the purpose of illustrating, in a few words, the mechanism underlying paradigm 1. Given the large number of contributions based on the G-H-M framework, this Section is organized in four subsections, following the classification of Figure 1.

A common feature of the models reviewed below is that the multinational enterprise is the final good producer and it has two options for obtaining intermediate inputs: it can either manufacture them within firm's boundaries – which we call *Integration* - or buy them from an independent supplier – which we call *Outsourcing*. Adding to this, production of final goods requires a relation-specific investment in manufacturing

components, which may lead to a hold up problem, as discussed above. Depending on whether IS is a domestic or a foreign enterprise, and whether it belongs to FP or not, four contractual arrangements may emerge: *Domestic Integration*, *FDI*, *Domestic Outsourcing*, *International Outsourcing*.

2.2.1 Domestic ownership decision: Domestic Integration versus Domestic Outsourcing

Although not explicitly related to the literature on incomplete contracts and hold up, Ethier (1986) has been recognized as an important predecessor of the debate between Integration and Outsourcing. In this seminal contribution, the decision to keep certain activities within firm's boundaries is explained in terms of information exchange between two agents. In particular, MNE's Internalisation choice is endogenized in a general equilibrium framework in which informational and transaction concerns are clearly spelled and their implications on the contractual agreement are rigorously derived.

A few years after this early intuition, McLaren (2000) makes the first attempt to extend the contractual incompleteness framework - to allow for multilateral relations among agents - and embed paradigm 1-analytical tools in an industry equilibrium model where the *domestic ownership decision* – Integration versus Outsourcing – endogenously emerges as an equilibrium outcome⁶⁰.

⁶⁰ A similar extension of the G-H-M framework to multilateral relations is due to Bolton-Whinston (1993), where a single upstream firm may interact with a multiplicity of downstream firms to sell its product, but the industry structure is exogenous. This setting yields a new complication in terms of firm's scope: when a number of buyers rely on a single source of supply, shortages may make the input supplier only able to satisfy some buyers. The supply insurance concern thus provides a motive for vertical integration. In Kranton (1996), market and non market transactions are compared as alternative ways of obtaining intermediate goods: in the first case, FP deals with a generic supplier, in the second one, inputs come from a specific IS, either within firm's boundaries or through *reciprocal exchange* - namely an informally enforced agreement to obtain goods or services in exchange for future compensation in kind. In particular, personal transactions are shown to dominate when suppliers produce inputs specific to a buyer, and the two firms repeatedly interact.

While microeconomic models, summarized in paradigm 1, simply consider the link between a single producer and a single potential supplier, neglecting the interdependence among firms operating in the same sector, in McLaren (2000), all firms' entry, contracting and pricing decisions are optimal, given the choices made by the others. This leads to a simple feedback mechanism in which a firm's choice, by affecting the market conditions, influences other firms' decision about the organizational form.

This paper is specifically written to assess the impact of globalisation on vertical integration that is shown to be replaced by downsizing and outsourcing, as international openness increases.

Consider an industry composed of n downstream firms producing final goods, and n upstream firms, manufacturing specialized intermediate components. Each FP may use, at most, one input, and each IS may produce, at most, one component; moreover, input suppliers may decide whether to manufacture components that are fully tailored to a particular final product⁶¹ – which is called *maximal specialisation technology* – or flexible ones – under a *flexibility technology* – that may be easily employed for alternative uses. Fully tailored components allow final good producers to reduce variable costs more than flexible ones.

The model is organized in three stages: 1) merger; 2) intermediate goods production; 3) market exchange.

In the initial merger stage, each FP is given the option of making a take-it-or-leave-it offer to an input supplier: if the offer is accepted, the two firms become integrated; this solution is characterized by high governance costs, related to the difficulties of

⁶¹ This is an example of relation-specific investment, using our previous terminology.

managing a large conglomerate; if, instead, the offer is not accepted, FP and IS work independently and, due to contractual incompleteness, they cannot write an ex-ante contract, governing the exchange of intermediate components.

In the second stage, input suppliers decide over the technology to be adopted, they make a relation-specific investment and manufacture intermediate components: once the inputs have been produced, IS-firms bring them to the open market – at stage 3 – where final good producers place bids, and intermediate goods are sold to the highest bidder. Notice that this timing allows for a potential hold up problem for the upstream firm, because its investment is already sunk at the market stage.

A trade off between governance and transaction costs clearly emerges: operating alone entails the cost of managing a larger enterprise, while partnering with an independent supplier exposes the multinational firm to the risk of underinvestment, due to hold up concerns.

An important element of novelty is introduced, here, compared to the original G-H-M intuition, as a result of the new multilateral relation-setting: the outside option probability of an input supplier – i.e. the probability of finding an alternative user for its components – increases as the number of non integrated firms increases, adding a mechanism of interactions among firms that could not be captured in a simple bilateral framework. This *market thickness principle* is even reinforced in moving from closed to open economy, because input suppliers benefit from higher probabilities of selling their intermediate goods in a world where final products are immobile⁶², but inputs can be traded across countries.

⁶² Immobility of final goods is assumed to isolate the market thickness principle from the standard product-market competition effect

Grossman-Helpman (2002) provides an alternative extension of the G-H-M framework to allow for multilateral relations among agents. As a result of the endogenization of the industry environment, agents first need to decide whether to enter the market as vertically integrated firms, specialized input suppliers or specialized final good producers; then specialized firms must look for a partner in order to work; matches occur randomly, and those who do not find a partner exit the market. After specialized firms get matched, the game proceeds along the steps of production of intermediate goods - based on relation-specific investments by IS - Nash-bargaining, production and sales of final goods.

The choice between Integration and Outsourcing lays, at a first level, on the traditional comparison between governance and transaction costs: according to the model assumptions, a vertically integrated firm is less efficient in the production of intermediate goods and entails higher fixed costs – including entry, product design, and the cost of running a larger company; a pair of specialized producers suffers, instead, from transaction costs, due to the contractual incompleteness governing their relationship.

In the basic version of their model, Grossmann and Helpman (2002) assume that intermediate inputs are fully tailored to a particular product, which implies the absence of outside option for the two parties and a potential hold up concern by the specialized input supplier, that tends to under-invest.

Adding to this, by endogenizing the industry structure, the authors are able to capture the impact of a new factor, such as the degree of substitutability among a given industry's final goods, and to highlight a more complex influence of IS's bargaining power, on the relative prevalence of Integration versus Outsourcing.

The first effect is twofold: according to the model, as final goods become less differentiated, specialized firms have higher probability of getting matched, which encourages Outsourcing; then, depending on some parameter values, an increase in the degree of substitutability may increase or decrease the operating profits of specialized firms, pushing towards Outsourcing in the first case, and Integration, in the second one. Therefore, the overall impact of product differentiation is ambiguous.

The second effect is more subtle: an increase in the bargaining power of IS, by increasing the profit share accruing to the specialized input producer, and reducing the distortion caused by imperfect contracting, pushes towards Outsourcing; at the same time, an increase in the bargaining power of IS, by increasing the number of intermediate good producers and reducing the number of final good producers, lowers the probability of matching between specialized firms, thus encouraging Integration. What they show is that Integration dominates for very low or very high values of IS's bargaining power, while for intermediate values, Outsourcing emerges.

In Grossman-Helpman (1999, 2002), an interesting extension of this model is discussed, by removing the crucial assumption that inputs must be fully tailored to a particular final good and allowing for endogenous specialization of components. Now both parties have an outside option and, in selecting input specificity, intermediate good producers trade off the benefits of having a highly specialized component - which is of maximal value to the customer for whom it was designed - with the benefits of a more standard component that, due to its flexibility, is more valuable for alternative uses.

As far as the ownership decision is concerned, all previous results hold; this new formalisation, however, allows the authors to capture the additional role of a parameter indicating the importance of input specificity in the industry under consideration. The

more sensitive the manufacturing costs to detailed characteristics of inputs, the more costly the inefficiency arising from partial specialization, which tends to reduce the viability of Outsourcing; at the same time, an increase in specificity reduces the equilibrium volume of intermediate goods and enhances the bargaining power of each IS-firm in its bilateral relation with a final producer: this makes entry by specialized input producers more profitable and may push equilibrium towards Outsourcing in cases where costs are highly sensitive to input specifications.

The great novelty of McLaren (2000) and Grossman-Helpman (1999, 2002) is that they provide a bridge between ideas, originally developed in a context of Theory of the Firm, and the International Economics setting of industry equilibrium, although they model only the domestic dimension of Internalisation.

2.2.2 Location decision: Domestic Outsourcing versus International Outsourcing

A further step, towards a deeper understanding of the trade off between FDI and arm's length trade, is made in Grossman-Helpman (2004a), where the *location decision* is endogenized in a general equilibrium model.

The crucial assumption that it is too expensive to manufacture components, by a firm itself, rules out the Integration solution but it allows the authors to concentrate on the location issue that was previously ignored.

Outsourcing, here, means more than buying raw materials: in order for arm's length trade to occur, final good producers need to find a partner – as close as possible to their input requirements – and convince the partner to make a relation-specific investment in customisation – i.e. adaptation of components to final goods.

A two countries, two goods model is designed, in which intermediate inputs and the homogeneous consumption good can be produced everywhere, while only the North has

the know how to process intermediate components, through a simple technology that requires one unit of customized input to produce one unit of differentiated product.

All final good producers are thus located in the North and they simply decide whether to outsource production of inputs within the same country – *Domestic Outsourcing* – or in the South – *International Outsourcing*.

The game proceeds in three steps: entry, search and bargaining; while stage 1 and 2 simply resemble our previous discussion, stage 3 is worth explaining in a few words, because some elements of novelty are introduced.

Bargaining occurs in two steps: first of all, the parties bargain over the supplier's investment in customisation, i.e. the development of a prototype and the compensation for it; the longer the distance between IS's expertise and the input requirements, posed by FP, the more expensive the customisation⁶³. Bargaining over the investment is governed by an incomplete contract setting: differently from previous models - where contracts were simply complete or incomplete – here the *extent* of contractual incompleteness is explicitly taken into account through a parameter that indicates the fraction of IS's investment verifiable by a third party, thus reflecting the state of the legal system in the two countries. Notice that the prototype is valuable only inside the relation, leaving both parties with no outside option. A second stage-bargaining follows, and firms discuss over the order contract, namely the quantity and price of an input: this stage is governed by complete contracts because, after IS has sunk its investment in the prototype, the partners have coincident interests and they can therefore write an efficient contract on the exchange of components.

⁶³ As in the extension of Grossman-Helpman (1999, 2002), a two-dimensional representation of the space of input characteristics is given along a circle in which all points are input requirements of final producers and expertise of suppliers.

In trading off Domestic versus International Outsourcing, final good producers are shown to consider a number of factors, namely country size, search technology, customizing technology and contracting environment⁶⁴.

First of all, the model predicts that, as the South expands, its market becomes “thicker” and, other things being equal, its share of world outsourcing grows because firms prefer to search in a thick market, where the probability of finding a suitable partner is higher.

As far as the search technology is concerned, we need to distinguish between two cases: while a worldwide improvement in search technology has no effect on the outsourcing decision, a disproportionate progress in communication, PC usage or else in the South increases international Outsourcing because firms prefer to search in a country where infrastructure for communication are more developed.

Similar results are derived for the customizing technology that determines a partner’s willingness to undertake the needed investment in a prototype: a worldwide improvement in customizing technology does not affect the location decision, while a disproportionate progress in one country tends to push outsourcing there.

Finally, Grossman-Helpman (2004a) focuses on the contracting environment and find that a global increase in the fraction of investment verifiable by a third party favours Domestic Outsourcing, while an improvement in the Southern legal system, while raising outsourcing from the North, may well increase or decrease International Outsourcing.

2.2.3 International ownership decision: FDI versus International Outsourcing

Feenstra-Hanson (2003) considers firms’ decision to undertake *FDI* versus *International Outsourcing* in terms of managerial incentives and property rights. Their

⁶⁴ Notice that this trade off is not resolved through the usual comparison between transaction and governance costs, because final good producers are engaged in the location, not the ownership decision.

paper is intended to capture the motivations underlying Export Processing Operations (EPO) in China⁶⁵, which played a major role in the 1990s, accounting for more than 50 per cent of total exports from China.

Two alternative models of EPO – one based on the Grossman-Hart-Moore framework, the other one designed in the spirit of Holmstrom-Milgrom – are built, and predictions are derived and empirically tested.

In what follows, we focus on the property right model, while postponing the other one to Section 3⁶⁶.

Consider the economic relation between a multinational and a local enterprise, linked by export processing operations. Production of final goods is due to the local firm, it requires intermediate components – that can be purchased by either of the two parties – and takes place within the local factory, under Integration or Outsourcing. Organizational forms result from the intersection of two dimensions: who owns the factory and who controls input purchase.

Notice that export processing operations require effort investments by both parties, in order to find cheap inputs, prepare the processing factory, and marketing final products; by assumption, the third type of effort rests with the multinational, the second type with the local company, while the first one lies with either of the two parties, depending on the assembly regime.

The timing is as follows: 1) the multinational makes the decision on who owns the factory and who controls input purchase; 2) effort investments are made; 3) input purchase and processing take place, and final goods sales follow.

⁶⁵ Under this arrangement, firms import parts and components from abroad, process them into final goods, and then export the final goods abroad (Feenstra-Hanson 2003).

⁶⁶ Feenstra-Hanson (2004) combines both aspects in a single model, which will be discussed in Section 3.1.2.

Contractual incompleteness governs the relationship between the multinational and the local firm, and the two parties divide the ex post surplus through Nash Bargaining with outside option. In addition, asset specificity is relaxed, in the sense that inputs controlled by either party can be utilized at the same cost in another factory, but efforts are only partially transferable when the relationship breaks down.

Solving the model, Feenstra and Hanson show that the total surplus of the project, depending on the effort exerted by the two parties, is a sub-modular function, therefore it is often optimal to split ownership and control between the multinational and the local company.

While the theoretic part of the paper is extremely simple⁶⁷, we believe that the main achievement of Feenstra-Hanson (2003) lays in the empirical analysis, since the G-H-M literature accounts for a very few attempts at testing theoretical propositions with real world data (see Baker-Hubbard (2001), Whinston (2001) for a survey of empirical works).

The modularity of the surplus function cannot be tested directly, because we do not observe the value of surplus from outsourcing activity so the authors follow Whinston (2001) and move to a simple stochastic specification, by assuming that ownership and control are chosen to maximize the total surplus of the project plus an i.i.d. error term, that varies across contractual arrangements.

Empirical evidence, based on data from the Customs General Administration of the People's Republic of China, strongly supports Feenstra-Hanson (2003) theoretical predictions, confirming that ownership and control tend to be shared between a foreign

⁶⁷ Notice that the international dimension of the analysis is completely taken as given, without any attempt at building an industry or general equilibrium model, nor at considering a multi-agent setting: what the authors do, here, is just to derive a theory of the firm-model, where the comparison between FDI and International Outsourcing, instead of *Domestic* Integration and *Domestic* Outsourcing, simply arises from the fact that a *foreign* and a *local* firm are involved, by assumption.

firm – that typically owns the Chinese factory – and a local firm – that typically controls input purchase.

Grossman-Helpman (2003) offers a richer theoretic characterization of the *international ownership decision* in a general equilibrium framework, under the crucial assumption that it is cheaper to produce components in the South, while final goods are designed and assembled in the North, which rules out any domestic organisational choice.

They build on Grossman-Helpman (2002), as far as the internalisation trade off is concerned, and Grossman-Helpman (2004a), for the international dimension modelling and general equilibrium setting.

The choice between FDI and International Outsourcing results, at a preliminary analysis, in the standard trade off between governance and transaction costs: a pair of specialized firms is more efficient in manufacturing components, while an integrated firm may correct IS under-investment, in a setting of incomplete contracts.

The timing is the same as before, and Nash bargaining covers again the investment and the order contract, as in Grossman-Helpman (2004a). No party has an outside option because FP may approach any supplier, but just one: by assumption, if the negotiation fails, none of the two firms has time to find another partner. Contractual incompleteness, governing the bargaining over the investment contract, is again captured by a parameter, reflecting the state of the legal system.

The general equilibrium setting allows the authors to study the effect of a number of key variables – other than governance and transaction costs – on the relative prevalence of FDI versus International Outsourcing.

In particular, they derive equilibria in which some firms outsource to the South, and some other undertake FDI, depending on the distance between IS and FP in the space of

characteristics: if the final good producer and the input supplier are close to each other, they are likely to engage in Outsourcing, if they are instead far away, they choose FDI.

They also find that an increase in the productivity advantage of specialized producers, an increase in industry size, and a better legal system favour the relative prevalence of Outsourcing, while an increase in the relative wage in the South encourages FDI.

Ottaviano-Turrini (2003) introduces outsourcing contracts in an otherwise standard model of multinational firms, based on the proximity-concentration trade off (see, for example: Krugman (1983); Horstmann-Markusen (1992); Markusen-Venables (2000)), in order to explain the decision to undertake FDI or export⁶⁸, in terms of distance and market size.

Production of a differentiated consumption good consists of two activities: upstream manufacturing of intermediate inputs, and downstream assembly.

They explicitly rule out the location decision, by considering a local market where final goods are supplied only by foreign firms, which make their organizational decisions in two steps. First of all, they choose whether to export final products to the local market, or to engage in FDI; it is crucial to notice that FDI, in this paper, covers the two possibilities of “self production” and “outsourcing”: in the first case, intermediate components are manufactured at home by the multinational firm and shipped to local assembling lines – it is the *FDI* à la Grossman-Helpman-Antras – while, in the second case, the multinational firm outsources input production to a local supplier – it is the

⁶⁸ FDI and export are treated, here, as substitutes, but it does not need to be the case: in Rob-Vettas (2003), a dynamic modelling is provided to generate the time-paths of export and FDI. Due to demand uncertainty and irreversibility of investments, multinationals are shown to use export, to explore future demand, and lately turn to FDI to supply the products more economically, once demand is known. Notice that uncertainty is introduced also in Hanson (1995), but in a completely different way: Mexican firms are assumed to choose their ownership arrangement (at a domestic level) by trading off the minimization of the hold up risk, under Integration, and the diversification of the natural risk, under Outsourcing.

International Outsourcing à la Grossman-Helpman-Antras⁶⁹. Firms that engage in FDI then decide, as a second step, whether to self produce or outsource.

In choosing between export and FDI, final good producers trade off the low governance costs, associated to the first option, with the low trade costs, implied by the second one, resembling the standard proximity-concentration argument: firms invest abroad when the gain from avoiding transportation costs out-weights the cost of maintaining capacity in multiple markets.

In choosing between self-production and outsourcing, multinational firms trade off the low cost of managing distant operations, related to the first option, with the low trade costs of arm's length trade, in a context of contractual incompleteness and double-sided hold up problem⁷⁰. This arises because both parties make relation-specific investments under outsourcing: intermediate goods, supplied by IS, are fully tailored to a particular final product and FP, by assumption, needs to make a relation specific investment in the assembly line; while the multinational firm has an outside option, in case of self-production, a local input producer has none, whatever the organizational solution adopted in the second stage.

The main result of the model is that trade costs affect both steps of organizational decision: if they are high, the proximity-concentration trade off dominates and FDI are

⁶⁹ In both cases, production of final goods is due to the multinational firm and it takes place in the local market: the only difference lays in production of intermediate components, which is due to an independent supplier and takes place in the local market under Outsourcing, while it is due to the multinational firm and takes place in the home market, under self-production.

⁷⁰ Similarly to Ottaviano-Turrini (2003), Helpman et al. (2004) bases on a proximity-concentration argument to explain the choice between FDI and export, through a multi-country, multi-sector general equilibrium model. Instead of depicting an incomplete contract setting, intra-industry heterogeneity of firms à la Melitz is assumed and it interacts with distance in driving the way of serving a foreign market. Only the most productive firms are shown to engage in foreign activities and, among them, only the most productive undertake FDI; the extent of intra-industry heterogeneity is proved to affect the volume of FDI sales over export, both theoretically and empirically. The proximity-concentration hypothesis is employed also in Brainard (1997), and combined with the factor-proportion hypothesis to stress empirically the role of distance in explaining the trade off between FDI and export.

chosen when the distance between the home and the local market is large; if they are low, the contractual incompleteness trade off dominates: on the one hand, export seems more appealing, on the other hand, the outside option resulting from self production is also strengthened which makes outsourcing more profitable from the point of view of the final good producer.

Ottaviano-Turrini (2003) shows that, if market size is large enough, this *outside option effect* may prevail over the proximity-concentration argument, eventually leading to a non-monotonic relation between FDI and distance, in countries with large markets⁷¹: put another way, foreign direct investments may emerge both for high and low values of trade costs, in line with the empirical evidence.

While the papers reviewed so far concentrate on ownership *or* location concerns, Antras (2003) makes a first attempt at studying these two dimensions together, in a coherent and unitary framework, in which the choice of FDI, relative to International Outsourcing, crucially hinges on the capital abundance of the supplying country and the capital intensity of the traded input.

The background for the *ownership* decision is represented by the Property Right Theory of the Firm while Helpman-Krugman (1985) modelling of imperfect competition and product differentiation provides the analytical tools for the *location* issue.

Notice that Antras (2003) introduces a couple of interesting variations of the G-H-M paradigm that are worth commenting. First of all, as in the original spirit of Grossman-Hart (1986), Hart-Moore (1990), Nash bargaining takes place also within an integrated

⁷¹ Since the outside option effect is entirely due to the hold up problem, non monotonicity disappears under contractual completeness, as it is shown in the paper.

firm; second, a notion of transferability of the investment decisions⁷² is introduced and its impact on the two parties' outside option is discussed.

In the model, two sets of differentiated consumption goods can be produced by means of two inputs – labour and physical capital – according to a simple technology that employs those inputs to manufacture specialized components that are linearly assembled into final products; by assumption, only high quality specialized components may be used to produce final goods while low quality ones – although they can be obtained at a negligible cost – cannot be converted into final products. These assumptions allow for a richer set of components: while in previous models the only input was labour, here production of final goods requires also physical capital. While labour must be supplied by IS, physical capital may be contributed by either of the two parties, based on the investment sharing-mechanism.

The game is organized in five stages: 1) choice of ownership and decision on who rents capital; 2) simultaneous and non-cooperative choice of inputs; 3) production of intermediate goods; 4) generalized Nash bargaining 5) production and sales of final goods.

Differently from previous models, an integrated firm is assumed to be as efficient as a pair of specialized producers: the only difference between the Outsourcing and the Integration case lays in the residual control rights. In the first case, IS is “owner”, in the sense that he has control over the amount of input produced so, if FP fires the supplying firm, it loses also the inputs produced whereas, in the second case, IS is not owner,

⁷² What Antras (2003) argues is that, when the input supplier's default option is very low, the allocation of residual control rights may not be enough to induce sufficient levels of investment, resulting in a severe hold up problem that may be alleviated if the final good producer contributes to the supplier relation-specific investment.

namely he has no control right over the input, which means that FP may fire the managers of the supplying firm, seizing at least a fraction of its production.

To understand how the model works, in this more complex setting, it is crucial to distinguish between two cases: when the supplier incurs all variable costs, a standard hold up problem emerges and IS's under-investment is related to the weakness of its ex post bargaining power; when, instead, there is investment sharing, a two-sided hold up problem arises because the investment in physical capital is specific to the pair so also FP feels locked in.

Put another way, there is an asymmetry between FP and IS in terms of outside option, depending on the ownership structure: while the input supplier has zero outside option whatever the organisational form, in case of Integration, if the two parties do not agree over the exchange, FP secures itself an outside option by firing IS but seizing his production.

By embedding this richer apparatus in a general equilibrium framework à la Helpman-Krugman (1985), Antras (2003) derives two interesting results, from the interaction between comparative advantages and transaction costs minimization: first of all, capital-intensive goods – characterized by high cost sharing - are transacted within the boundaries of multinational firms, while labour-intensive goods tend to be traded at arm's length; moreover, transactions with capital-abundant countries take place through FDI, while transactions with capital-scarce countries are arranged through International Outsourcing. These results find a strong support in the data: by regressing the share of intra-firm imports over total US imports, on industry and country characteristics, factor endowment and factor intensity turn out to be statistically significant in all the different specifications of the econometric model.

Although Antras (2003) makes a preliminary introduction of location issues, his paper still focuses on the comparison between Integration and Outsourcing at an international level, as it is clear from the data used for econometric tests. The choice of FDI versus arms' length trade depends, in part, on country characteristics, so we can predict that different organizational forms will prevail in transacting with different countries, based on their capital-abundance.

However, this framework does not allow us to make the last step and explain why a firm should decide whether to outsource *or* integrate *either* domestically *or* abroad: this step is made in Antras-Helpman (2004) where location and ownership decisions are endogenized in the same general equilibrium framework.

2.2.4 Ownership and location decisions: Domestic Integration versus FDI versus Domestic Outsourcing versus International Outsourcing

In Antras-Helpman (2004), final good producers are located in the North, by assumption, and they choose an “organizational form” in order to obtain intermediate components. Organizational forms consist of an *ownership* structure – Integration versus Outsourcing – and a *location* decision – Home versus Foreign – so that four alternatives emerge: *Domestic Integration, FDI, Domestic Outsourcing or International Outsourcing*.

The model bases on two strands of literature: Melitz⁷³ (2003) inspires the location solution, abandoning the representative agent framework and allowing for firm

⁷³ Melitz (2003) models the relationship between a sector exposure to international trade and its structure and performance, allowing for heterogeneity across firms in the same sector. He finds that the exposure to international trade leads more productive firms to export and less productive firms to exit the market; a further increase in the industry's exposure to trade induces an intra industry reallocation in favour of more productive firms. This explains why international trade may generate aggregate productivity gains without necessarily improving the productive efficiency of individual firms.

heterogeneity, in terms of productivity, while Antras (2003)'s incomplete contract-background is employed to address the ownership decision.

An important novelty is introduced here, in that production of final goods requires two inputs⁷⁴ – headquarter services and manufactured components – each of them controlled by one of the two parties. In particular, headquarter services can be produced only in the North and only FP firms have the know how to contribute them, while manufactured components can be produced in either country, according to a linear technology that employs one unit of labour to obtain one unit of input; since wage rate is lower in the South than in the North, production of manufactured components is cheaper there⁷⁵. Under these assumptions, final good producers, in the North, supply headquarter services by themselves, but they need to contract with a manufacturer – either in the North or in the South – for the provision of manufactured components.

Antras and Helpman model a five-stage game based on: 1) entry and simultaneous decisions of ownership and location; 2) search, upon which fixed organizational costs - higher in the North, and in Outsourcing - are paid; 3) production of intermediate goods; 4) ex post Nash bargaining; 5) production of final goods.

As in Antras (2003), Nash bargaining occurs both in case of Integration and Outsourcing, but the distribution of surplus is sensitive to the mode of organization: under Outsourcing, no party has an outside option; under Integration, the final good

⁷⁴ In Antras (2003) two inputs – labour and capital - are needed to obtain intermediate goods, but only *one* type of intermediate good - depending on the final good - is required; here, instead, *two* kinds of intermediate goods - manufactured component and headquarter service - are needed to be converted into final products.

⁷⁵ This assumption means that the technology to obtain the manufacture component is the same, whatever the ownership structure - as in Antras (2003) – while the only difference in efficiency is “spatial”, because, whatever the ownership structure, producing components in the South is cheaper than in the North.

producer has a stronger position because, in case of disagreement, it can fire IS, while seizing a fraction of manufactured components.

In choosing between Domestic and Foreign suppliers, final good producers trade off the benefits of lower variable costs in the South, with the benefits of lower fixed organizational costs in the North; in choosing between Integration and Outsourcing, they trade off the benefits of ownership from vertical integration, with the benefits of better incentives for the manufacturer under outsourcing.

Notice that this model is particularly rich in that it considers three lines of heterogeneity: sectors differ in headquarter service-intensity, so that we distinguish between high and low tech industries; firms differ in their productivity level, and countries differ in terms of organizational and variable costs.

By exploiting these lines of heterogeneity in a general equilibrium framework, the authors come to an interesting conclusion. In low tech sectors, Integration never occurs: firms with higher productivity outsource in the South, while firms with lower productivity outsource in the North; in high tech sectors, we may observe any of the four organizational forms: firms with higher productivity buy inputs from the South, firms with lower productivity, buy inputs from the North; among firms that buy inputs from the same country, higher productivity enterprises integrate, lower productivity enterprises outsource.

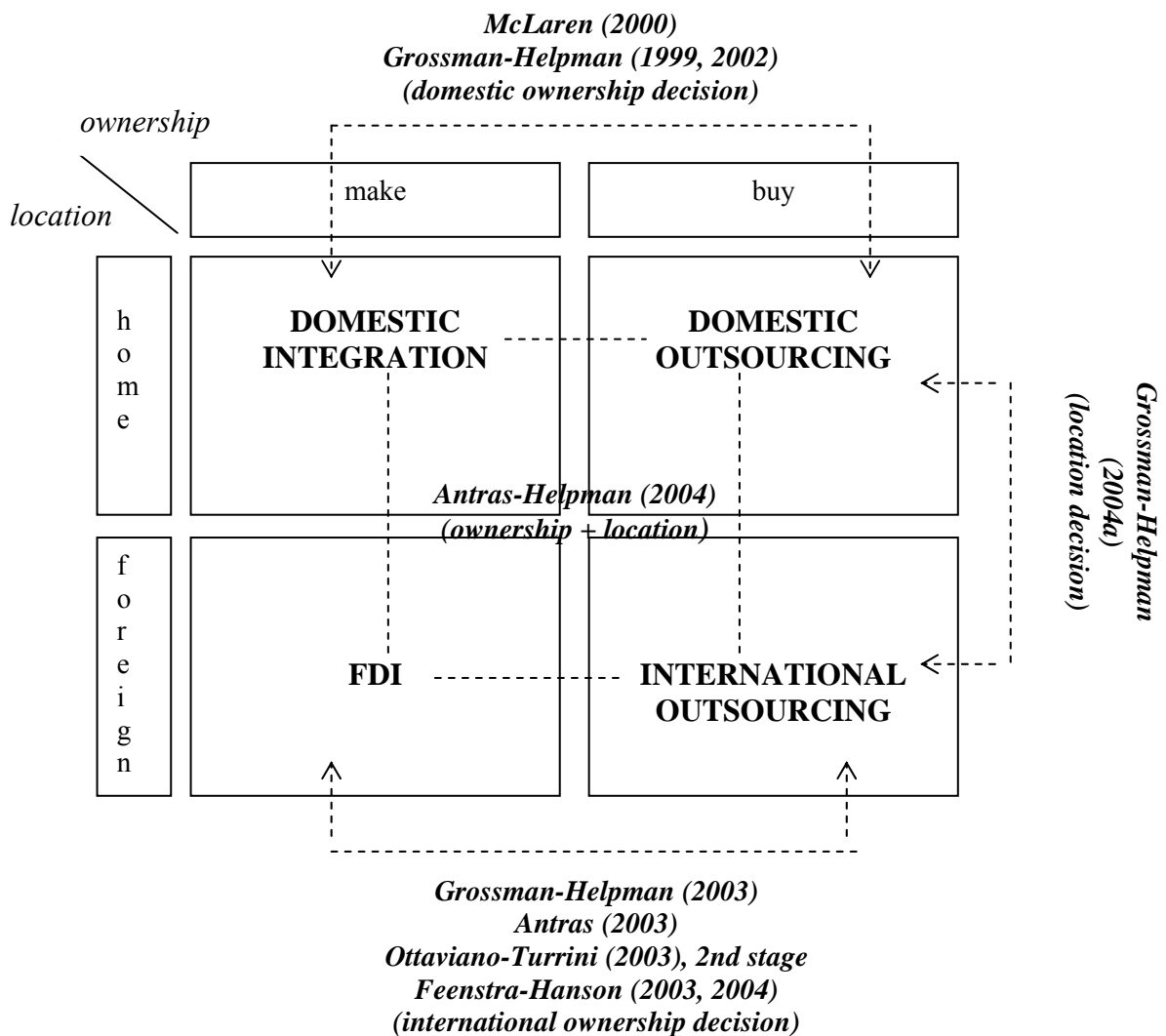
The degree of productivity dispersion and the headquarter service intensity are shown to be relevant, as well, in determining the relative prevalence of the four organizational solutions. In particular, Antras-Helpman (2004) proves that sectors with more dispersion of productivity rely more on imports and, among the high tech producers that acquire inputs in a particular country, the number of integrated firms is higher the more

dispersed the productivity; moreover, high tech sectors rely less on imports and, among high tech producers that acquire inputs in a particular country, the number of integrated firms is higher, the more headquarter-intensive the sector.

In endogenizing both location and ownership concerns, this paper offers the richest characterization of the organizational choice in the set of models reviewed so far.

Figure 2 summarizes paradigm 1-based models, according to their specific theme.

Figure 2: Organisational forms in paradigm 1-based models



3. Alternative approaches

In this section, we discuss a few models of FDI and Internalisation, based on alternative theories of the firm, in which worker's incentives play a central role in designing the optimal organizational form.

Keeping the same structure as before, we first describe the basic intuition from the underlying theories of the firm - summarized in paradigm 2 and paradigm 3 – then we present models of FDI in which that intuition has been employed to study the make-or-buy decision, at an international level.

3.1.1 Paradigm 2: The firm as an Incentive System

Holmstrom-Milgrom (1994) provides a view of the firm as an incentive system. According to them, the standard make-or-buy decision cannot be fully explained in terms of ownership of assets – as in the Grossman-Hart-Moore framework – *or* monitoring and worker compensation – as in Alchian-Demsetz (1972), Holmstrom (1982) – *or* employer's discretion over his employees activities – as in Coase (1937) and Simon (1951): indeed, a comprehensive analysis of the boundaries of the firm requires a combination of asset ownership *and* contingent rewards *and* job descriptions, because they all have an influence on workers' incentives, and the way they exert effort. Consider our typical situation in which final good production requires intermediate components: inputs can be produced either internally, by an employee – under the employer's direction, using the employer's tools and usually being paid a fixed wage – or externally, by an independent contractor who chooses his tools and methods and who is paid proportionally to the quantity supplied. As in Holmstrom-Milgrom (1994), we call the first case *inside procurement*, or employment contract, and the second one *outside procurement* or supply contract: notice that the former resembles Integration,

while the latter represents Outsourcing, according to our previous terminology (Section 2).

The authors argue that these two arrangements emerge as a result of two alternative systems for managing incentives, across the wide array of tasks for which a single worker is responsible.

Broadly speaking, firms may use three main types of instruments to motivate workers: 1) asset ownership, which consists in letting an agent own a set of productive assets; 2) contingent reward, according to which workers are paid based on their measured performance; 3) job descriptions, namely the specification of job rules, working hours and similar policies to restrict or enhance workers' freedom from direct control.

Holmstrom-Milgrom (1994) makes the crucial assumption of *task substitutability*, according to which workers view the different tasks, for which they are responsible, as substitutes. This intuitively suggests a complementarity link among the three instruments described above: increasing agents' incentives for just one task could cause the worker to devote too much effort on that specific task, while neglecting other aspects of his job, therefore the three instruments should be balanced, to keep the various incentives in balance, as well.

Building on Holmstrom-Milgrom (1987), the authors develop a theoretical framework in which the optimal incentive problem is solved in terms of a set of exogenous parameters that tend to favour internal or external procurement.

The main result of their model – in line with the empirical evidence reported by Anderson-Schmittlein (1984) and Anderson (1985) - is that outside procurement (Outsourcing) tends to be characterized by high powered incentives – namely high asset ownership, high commission rates, more freedom and more emphasis on direct sales

measurement – whereas inside procurement (Integration) emerges when workers earn a fixed wage and use firms' tools.

3.1.2 From paradigm 2 to FDI and Internalisation

As we discussed in Section 2.2, Feenstra-Hanson (2003) models firms' decision to undertake *FDI* versus *International Outsourcing* in terms of managerial incentives and property rights. We have already focused on their G-H-M-based formalisation so, in what follows, we move our attention to the one designed in the spirit of Holmstrom-Milgrom (1994).

Recall the economic situation in which a multinational and a local firm are linked by export processing operations; production of final goods requires intermediate components – that can be purchased by either of the two firms – and takes place within the local factory, under either an employment or a supply contract. Since this setting is completely analogous to the one sketched in Section 2.2.2, we simply refer to our previous description.

Differently from Holmstrom-Milgrom (1994), where efforts were related to managers only, here the effort to market final products rests with the multinational, the effort to prepare the processing factory rests with the local company, while the effort to find cheap inputs lies with either of the two parties, depending on the assembly regime; according to the formulation of the problem, the decision on who owns the factory and who controls input purchase are the only instruments to design the local firm's incentives.

As far as the ownership dimension is concerned, in case of FDI (employment contract) the multinational pays the local firm an amount, provided that the latter has exerted

effort; in case of Outsourcing (outside procurement) the multinational agrees to pay a transfer price if the local firm delivers one unit of the processed input.

Feenstra-Hanson (2003) shows that the total surplus of the project, depending on the exerted effort, is a super-modular function, therefore, in this framework, it is often optimal for the same firm to own the processing factory and to control the inputs: ownership and control are proved to be complementary instruments, as in H-M; however, the same empirical evidence, reported in Section 2.2, is strongly inconsistent with this theoretical prediction since export processing operations are shown to be characterized by foreign ownership of the processing factory, and Chinese control over input purchase.

In another paper (Feenstra-Hanson 2004), the same authors make an interesting attempt at combining both the property right *and* the incentive system approach in a single model. In this richer framework, whether ownership and control should rest with the same party or not, depends on some parameter values: when human capital specificity is low, value added and the bargaining weight of the multinational are high, the foreign firm can ameliorate the hold up problem by transferring input control to the Chinese company, whose incentive to make relation specific-investments increases; on the contrary, when human capital specificity is high, value added and the bargaining weight of the multinational are low, ownership and control should be given to the same party.

Chinese data support the finding that ownership and control are shared between the foreign and the local firm, and this evidence appears even more clearly when the authors consider subsets of data on export through Hong Kong.

As we have already stressed in Section 2.2.2, Feenstra-Hanson makes an interesting step in comparing (2003) and combining (2004) different theories of the firm, but their

contribution on the Internalisation issue lays more on the empirical analysis than in the theoretical one, since the international dimension is completely taken as given.

This step is achieved in Grossman-Helpman (2004b) that builds on paradigm 2, and analyses the emergence of four organisational forms – resulting from the intersection of *ownership* and *location* decisions - as an industry equilibrium outcome: production of intermediate components may rest with a manager, within the domestic firm's boundaries (*Domestic Integration*), or operating in a foreign subsidiary (*FDI*); alternatively, it may rest with an independent entrepreneur, giving rise to *Domestic Outsourcing*, if he operates in the North, or *International Outsourcing*, if he operates in the South.⁷⁶

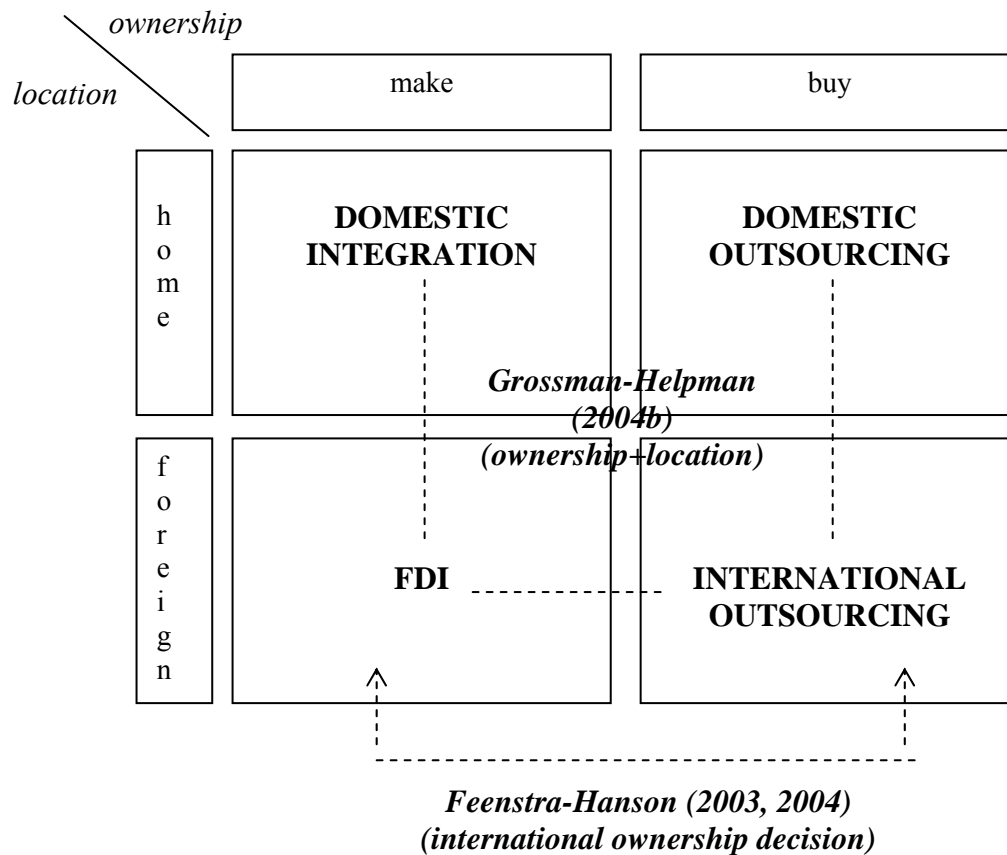
In choosing between supply and employment contract, final good producers trade off monitoring and cost considerations: since input manufacturing requires effort, Integration allows FP to monitor, at least, a fraction of the tasks for which IS is responsible, while under Outsourcing no monitoring is possible at all; since input manufacturing is a costly activity, under Integration, such a cost is born by FP, while it accrues to IS in case of Outsourcing.

In order to add the location dimension to the previous analysis, the authors distinguish between two countries – the North, where inputs are assembled into final products and the South – and they assume that monitoring is easier in North and that manufacturing costs are lower in the South.

⁷⁶ This setting entails an interesting difference, with respect to the models reviewed in Section 2, because input production rests with IS only, and FP, even under Integration, cannot manufacture the needed components by itself. In Feenstra-Hanson (2003) inputs are not *manufactured*, but *bought*, by either of the two parties, while final good production rests with the local firm, differently from Grossman-Helpman (2004b) and the models reviewed in Section 2. Notice that, among paradigm 1 based-models, Grossman-Helpman (2004a) makes a similar assumption – by saying that it is too expensive to manufacture components within firms' boundaries - to rule out ownership concerns and concentrate only on location issues; in Grossman-Helpman (2004b), due to the different framework (paradigm 2), this hypothesis is completely compatible with a richer characterisation of the organisational decision, where ownership and location are combined.

Based on firms heterogeneity à la Melitz, Outsourcing is shown to be preferred by the most and least productive final good producers, while Integration emerges for intermediate values of productivity; moreover, among firms that integrate, those that decide to keep their divisions close to the headquarter are potentially more productive than those that engage in FDI.

Figure 3: Organisational forms in paradigm 2-based models



By designing an industry equilibrium model, Grossman and Helpman (2004b) are able to assess the impact of reduced transportation costs and improvements in monitoring in the South on the relative prevalence of different organisational forms. They show that trade liberalisation may boost the prevalence of Outsourcing or FDI - depending on whether the industry is one in which Outsourcing is done by the least or the most productive firms - while improvements in monitoring distant managers result in an

increased market share for multinational corporations, and a decline in the market shares of components produced under Domestic Integration and Domestic Outsourcing. Although inspired by a different theory of the firm, this paper is quite close to Antras-Helpman (2004) since it offers a complete characterisation of Internalisation - as a result of ownership and location concerns.

Figure 3 summarizes paradigm 2-based contributions, according to their specific themes.

3.2.1 Paradigm 3: Formal and Real Authority in Organisations

Aghion-Tirole (1997)'s famous theory of the firm arises from an interesting re-thinking of the concept of "authority".

In the G-H-M framework, authority originates from ownership of physical assets, giving the owner control rights – or *formal authority* - over decisions concerning the use of her own asset. However, in the real world, formal authority does not necessarily confer *real authority*, namely effective control over decisions.

The separation between formal and real authority, that emerges in Aghion-Tirole (1997), crucially hinges on informational asymmetries between a principal (P, she) and an agent (A, he), who is hired to collect information and potentially implement a project, while congruence parameters measure the extent to which A and P have aligned interests in terms of preferred projects.

For each party, at least one project is associated to a negative payoff, so that an uninformed party has no incentive to pick a project at random, rather she prefers to rubber-stamp the informed party's proposal, or do nothing, in case they are both uninformed.

P and A are assumed to collect information simultaneously, in a setting of incomplete contracts - because the allocation of formal authority is the only point that can be set ex ante. Two organisational arrangements may emerge in this setting, depending on whether the principal or the agent has formal authority: the first case is called P-organisation (Integration, according to our previous terminology), the second one A-organisation (Outsourcing).

The two parties' optimal efforts, in acquiring information, are strategic substitutes: the higher the initiative by A, the lower the effort exerted by P and vice versa; moreover, each player is shown to put higher effort when she has formal authority, because she cannot be overruled by the other party.

The choice between P-organisation and A-organisation is thus governed by a trade off between control and initiative: the benefit of delegation lays in the increased effort by the agent, but this comes at the cost of reducing P's control; anticipating this, the principal tends to under-invest in information acquisition.

Notice that this model provides a two-way interaction between authority and information: information acquisition is endogenously affected by formal authority and endogenously affects real authority within organisations.

3.2.2 From paradigm 3 to FDI and Internalisation

Marin-Verdier (2002; 2003a; 2003b) focus on recent stylised facts to explain the enormous changes that globalisation has prompted in the nature of the firm: on the one hand, conglomerates have broken down, and decision making has become more and more decentralized; on the other hand, human capital has increasingly replaced physical capital as the key asset within modern corporations.

To account for these epochal changes, the authors combine A-T⁷⁷ view of the firm, with Dixit-Stiglitz (1977) modelling of monopolistic competition, in a general equilibrium analysis to study the *domestic ownership decision*. In particular, three organisational solutions emerge in their analysis: P-form (Integration, under which the principal has formal power, and the agent exerts effort), A-form (Outsourcing, under which the agent has formal power), and O-form (under which the principal has formal power but the agent exerts no effort).

In the partial equilibrium framework, decisions are taken according to the following sequence: 1) the principal allocates formal power to herself or to the agent, giving rise to the organisational solution; 2) the two parties collect information simultaneously; 3) the party who does not have formal authority makes a project proposal; 4) the party with formal power selects her favourite projects if informed, rubber-stamps the other party's suggestion if she is uninformed, while no project is undertaken when neither party has information.

Moving backward, low profit and high profit firms are shown to opt for a P-organisation, while at intermediate profit levels, the optimal choice switches from P-form to A-form to O-form to A-form. Notice that the organisational mode matters for incentives only at intermediate profit levels: at low profits, the principal monitors little because his stake is small, therefore P-form dominates because it gives sufficient incentives to the agent and more power to the principal; a similar reasoning applies to the case of high profits, since P's stake is so large that he would intervene a lot even under A-form, leading to minimum effort by the agent under both arrangements; since the principal has more control under P-form than A-form, he chooses the first option.

⁷⁷ Also Puga-Trefler (2002) builds on A-T intuition to develop a model in which incentives play a key role - as in Marin-Verdier (2002; 2003a; 2003b) - and organisational forms result from the intersection of two dimensions - who creates knowledge and who controls knowledge.

While no trade off between control and initiative emerges for high and low profits, for intermediate profit levels such a trade off shapes firms' organisational decisions: at the beginning, A-form dominates to give the agent sufficient initiative but, as the profit increases, the gains from having an active agent are overcome by the loss of control by the principal, and the O-form becomes the optimal solution.

By endogenizing profits through the usual free entry condition, the previous discussion is embedded in a general equilibrium framework to show that an increase in market competition brings about outsourcing and merger waves, with firms passing from P-form to A-form to O-form.

Notice that an equilibrium with Outsourcing emerges, as in Grossman-Helpman (2002), at intermediate levels of competition, but the reason is quite different: here a feedback mechanism arises due to *strategic complementarity* among firms⁷⁸, while in Grossman-Helpman (2002) Internalisation has nothing to do with the trade off between control and initiative, rather it lays on the comparison between governance and transaction costs.

Although inspired by different paradigms, we believe that the two papers have a similar role in the literature on FDI and Internalisation, because they both bridge ideas - traditionally developed within the Theory of the Firm - with a setting of International Economics, where the international dimension is not yet explicitly delineated.

Notice, in fact, that the organisational choice modelled in Marin-Verdier (2002) is nothing but the *domestic ownership decision* studied in Grossman-Helpman (2002): even if we consider changes in the *international* market competition, they are shown to affect the relative prevalence of *Domestic Integration* versus *Domestic Outsourcing* - namely the make-or-buy decision within a given country, not across different locations.

⁷⁸ In the sense that the relative attractiveness of Integration versus Outsourcing depends on the organisational decisions taken by the other players in the market.

In Marin-Verdier (2003a) a new element is added to the previous formalisation, in that - following Rajan-Zingales (2000) - the emergence of the *human capital firm* is carefully analysed and its implications on the organisational decisions are derived in details. While traditional corporations were usually large, vertically integrated, and characterized by physical assets, the human capital organisation is defined in terms of human capital and talent, which are responsible for innovation and creation of new ideas. Differently from physical capital - which can be legally linked to the firm through ownership - human capital is inalienable and lays with the persons, who need to be provided with the right incentives not to leave the organisation they work for.

Why has human capital become so important in the last few decades? Marin-Verdier (2003a) identifies a novel explanation⁷⁹ based on changes in the organisation of the corporations: firms respond to improved opportunities of human capital outside providing incentives for talents to prevent them from leaving their companies.

In particular, they show that trade integration⁸⁰ leads to a “war for talent” which is strictly related to the *domestic ownership decision*.

Their model bases on paradigm 3, as far as the firm description is concerned, while the trade setting is derived from Helpman-Krugman (1985).

⁷⁹ Other explanations pointed out, for example, the recent improvements in financial markets which has made physical capital easier to obtain, thus reducing its importance within organisations (Rajan-Zingales 2002); the diffusion of Information and Communication Technologies that require high skilled-employees (Lawrence and Slaughter 1993); or the trade integration with low wage countries (Leamer 1993).

⁸⁰ The link between trade integration and talent is explored also in Manasse-Turrini (2001), where Rosen’s (1981) technological view of the firm is embedded in a general equilibrium model, based on monopolistic competition. In the authors’ view, globalisation may occur via trade integration (i.e. fall in trade barriers and lower transportation costs) or via technological change (namely innovations in product and communication technologies that enable suppliers to reach a larger mass of consumers and improve the perceived quality of their products). In the model, firms that employ talented workers manage to produce high quality goods and gain larger profits; due to the presence of fixed market access costs, only high performing firms engage in export. An increase in income inequality is shown to be associated with export growth only when globalisation takes place through reduced trade barriers.

Consider two countries – the North, rich in human capital, and South, rich in labour – and two goods – one of which is human capital intensive, heterogeneous and produced in monopolistic competition à la Dixit-Stiglitz (1977) under A-form, P-form or O-form, while the other one is labour intensive, homogeneous and produced in perfect competition.

Under autarchy, Marin-Verdier (2003a) shows that the equilibrium mode of organisation depends on countries' factor endowment: where the labour/human capital ratio is small, Integration dominates, where it is large, the O-form dominates; for intermediate values, Outsourcing emerges.

In the open economy version of their model, the labour/human capital ratio changes due to factor price equalisation, pushing towards Outsourcing: trade integration puts pressure on the demand for skills in rich countries, because it creates a war for talent, and it leads an economy wide shift from low skill intensive organisation (P-form and O-form) to high skill intensive organisations (A-form). Although organisational convergence towards Outsourcing is more likely the more the distance between two countries, in terms of labour/human capital, the previous result applies also in case of countries that have similar factor endowment, but differ in corporate cultures under autarchy.

We believe that this paper makes three steps further Marin-Verdier (2002) because: 1) the role of human capital is captured and its interaction with the market environment is clearly spelled; 2) the international context is explicitly drawn, by means of a North-South model à la Helpman- Krugman; 3) while Marin-Verdier (2002) concludes that similar countries, with different corporate cultures, may eventually converge to the

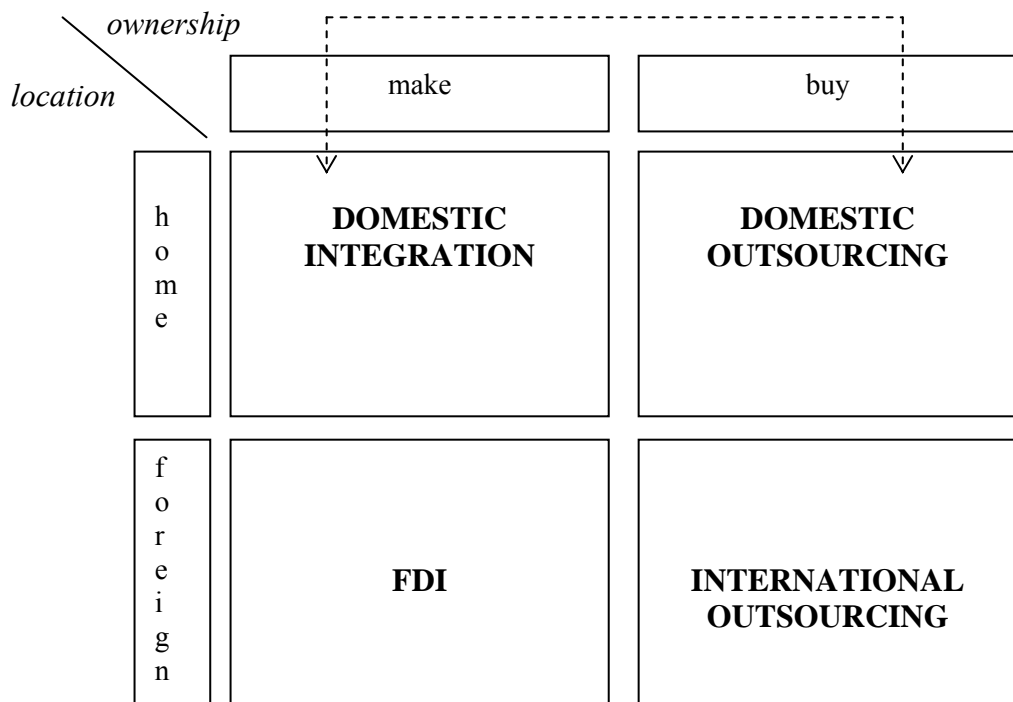
same organisational form, but leave such a form indeterminate, this paper also predicts the destination of convergence.

However, the Internalisation issue remains unexplored in its international dimension, and only the domestic ownership decision is modelled, by finding that a world wide war for talent – which is the key force at play – influences firms’ decision between Domestic Integration and Domestic Outsourcing.

Figure 4 summarizes paradigm 3-based contributions, according to their themes.

Figure 4: Organisational forms in paradigm 3-based models

Marin-Verdier (2002, 2003a, 2003b)
(domestic ownership decision)



4. Conclusion

In the present paper, we have provided a unitary framework to analyse recent contributions on the boundaries of Multinational Enterprises, based on tools derived from the Theory of the Firm.

These contributions share a common feature in bridging ideas, originally developed in Microeconomics, with the international setting of trade and FDI, so that the make-or-buy decision of multinational corporations is assessed through the opening up of the “black box”- traditionally explored by the theorists of the firm - and the simultaneous endogenization of the market environment - as in the International Economics tradition.

Our key, in reading the burgeoning literature on Internalisation has been to recognize the existence of three paradigms, based on well-established theories of the firm – Grossman-Hart-Moore treatment of hold up and contractual incompleteness, Holmstrom-Milgrom view of the firm as an incentive system, Aghion-Tirole conceptualisation of formal and real authority in organisations – and show how they have been embedded in equilibrium models to explain the boundaries of MNEs.

In presenting the papers, within each field, we did not follow a chronological order, rather we moved from the simpler specifications where only *ownership* – Integration versus Outsourcing - or *location* – Home versus Foreign country - decisions were analysed, to richer formalisations that accounted for the intersection of the two dimensions, giving rise to the four alternatives of *Domestic Integration*, *Domestic Outsourcing*, *FDI* and *International Outsourcing*.

While paradigm 1 based-approach has fruitfully developed in a number of interesting directions offering, with Antras-Helpman (2004), a complete characterisation of the interactions between ownership and location choices (Section 2.2.4), paradigm 3 based-approach is the least mature, since the domestic ownership decision is the only issue that has been treated so far, following Aghion-Tirole (1997) theory of formal and real authority (Section 3.2).

Despite the important achievements that the literature surveyed here has reached, we believe that a few tesserae are still missing in drawing the complete picture.

To the best of our knowledge, no attempt has been made at combining all the three paradigms in a unitary framework to see how hold up concerns may eventually interact with incentive problems, and how this richer apparatus can be settled in equilibrium models. In Feenstra-Hanson (2004), paradigm 1 and 2 are treated as complements, rather than substitutes, but the authors only build a simple theory of the firm-model, without endogenizing the market environment.

Moreover, the whole set of models reviewed focus only on vertical FDI – aimed at saving on costs - while neither the hold up mechanism nor the incentive issue has been applied to a situation of horizontal FDI – aimed at selling in the local market.

This, together with the need of empirical tests to complement such a theoretical literature, represents one of the main challenges for future work on Internalisation.

Finally, we believe that a future agenda should include also the study of a richer menu of contractual arrangements, other than FDI versus partnering: except for Ottaviano-Turrini (2003) no attempt has been made at comparing the attractiveness of a broader array of alternatives - including export, integration and various forms of Outsourcing – but still their model takes the international dimension as given, considering only ownership concerns, and ruling out the location dimension.

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