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A Tale of Three Countries: Italian, Spanish and Swiss Manufacturing Operations in China

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A Tale of Three Countries: Italian, Spanish and Swiss Manufacturing Operations in China

Summary

In this paper we investigate the choice of FDI versus joint-venture, made by Italian, Spanish and Swiss multinationals in China, as shaped by the risk of *Dissipation of Intangible Assets*. Probit estimates, based on an entirely new firm-level dataset, constructed by the author, show that FDI is more likely to emerge when know-how easily spills over - namely for firms endowed with more Intangible Assets or belonging to high tech sectors - in line with the theoretical expectations.

Keywords: Intangible Assets, Internalisation, FDI, Joint-venture, China

JEL Classification: F23, C25, O53

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1. Introduction

GDP growth rate above 8%, huge market dimension, low cost labour force and a population close to one billion and three hundred thousand inhabitants are just some of the reasons that make the People's Republic of China (PRC) enormously attractive for production de-localization.

China has grown quite fast since 1978, when the *Open Door Policy*, promoted by Deng Xiaoping, ushered in a new era of modernization and growth. The transition from a planned to a market economy has resulted in fast development, structural changes and lifestyle improvements, which created new opportunities for Foreign Direct Investment (FDI), and made China the largest recipient of FDI since 2003.

This paper tells the tale of three countries - Italy, Spain and Switzerland – and analyses the manufacturing operations of their multinational enterprises (MNEs) in the PRC. For the purpose the present work, we have built an entirely new *firm-level* dataset, through survey interviews; indeed a multiple choice questionnaire has been sent to the whole population of Italian, Spanish and Swiss MNEs with manufacturing affiliates in China. With a reply rate around 80% of the total, our database documents the experience of 165 parent companies with more than 200 FDIs[1] and joint-ventures in the PRC.

The aim of this study is twofold: first, we provide the reader with a basic overview of the survey, to draw a detailed profile of the actors and comment on their strategic choices; second, we focus more specifically on the entry mode decision of Italian, Spanish and Swiss multinationals in China and regress the joint-venture / FDI trade-off on a number of firm, industry and country characteristics, explored through the questionnaire. In particular, we are interested is showing whether the risk of *Dissipation of Intangible Asset* (DIA) plays any role in orienting such a trade-off.

Intangible Assets (IAs) may consist either in product quality *reputation* or superior *knowledge*; compared to physical assets, they 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). Nevertheless, the same joint-ness feature that makes it easy to employ IAs abroad, exposes the MNE to the risk of *dissipating* its crucial resources, if shared with local firms. So, the *Internalisation issue* - namely the choice of FDI versus relying on a local supplier – has been explained by a trade-off between preventing IAs spillover - through FDI, since production takes place in a wholly-owned subsidiary (WOS) – and benefiting from the local firms' familiarity with their own country, achieved through a partnership (Ethier and Markusen 1996; Markusen 1998, 2001; Saggi 1996, 1999; Fosfuri 2000; Mattoo et al. 2001; Fosfuri et al. 2001; Glass and Saggi 2002a).

Our empirical findings are in lines with these theoretical predictions: Italian, Spanish and Swiss multinationals are more likely to invest directly in China, the higher their level of precious resources.

[1] Notice that, throughout paper, we restrict the label of Foreign Direct Investment to wholly-owned subsidiaries, to denote the case of total ownership, as opposed to the partial one, typical of joint-ventures; the term MNE is instead referred to firms engaged in international operations of any kind, from FDI to licensing and joint-venture.

The rest of the paper is organised as follows: in Section 2 we present a brief literature review regarding the theoretical background; Section 3 is entirely dedicated to the empirical analysis: data description (3.1), methodology (3.2) and Probit estimates (3.3); Section 4 concludes and sets future lines of research.

2. Literature Review

In the last 20 years, the economic literature on Multinational Enterprises has basically developed around Dunning's OLI framework, considering *Ownership*, *Location* and *Internalisation* advantages as an explanation of Foreign Direct Investment (Dunning 1993).

If MNEs were exactly identical to domestic firms, they would not find it profitable to enter the domestic market; since FDI indeed exist, it must be the case that multinational firms possess some kind of advantage easily exploitable through direct investment. *Ownership advantages* refer to some product, know-how, reputation or production process, to which other firms do not have access. *Location advantages* crop up when producing locally implies fewer costs than servicing the domestic market via export. *Internalisation advantages* arise when key resources are better exploited if kept within the boundaries of the multinational firm.

For the purpose of the present paper, we are particularly interested in the *Internalisation issue*[2]; economic theories about it can be grouped into three different approaches, which we call: 1) *Theory of the Firm*; 2) *Agency Costs* and 3) *Dissipation of Intangible Asset*.

The first view embraces recent contributions in which the boundaries of a Multinational Enterprise are 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 (see, among others: Grossman and Helpman 2002, 2003, 2004; Antras and Helpman 2004; Antras 2003; Feenstra and Hanson 2003, 2004; Ottaviano and Turrini 2003, Marin and Verdier 2002, 2003).

The second approach - called *Agency-Costs* - focuses on the principal (MNE) / agent (local firm) problem deriving from potential diverging goals between the two parties. When designing an appropriate incentive scheme, to induce agent's effort, becomes too costly for the multinational firm, it may opt for a wholly-owned subsidiary rather than relying on a local company (Horstmann and Markusen 1996).

[2] For a survey, see Markusen 1995, Barba Navaretti and Venables 2004, Saggi 2000.

The third explanation stems from the risk of *Dissipation of Intangible Asset*s, namely *reputation*, related to the product quality and *knowledge*, characterized by some technology or managerial techniques.

The term *dissipation* thus 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 may not put any effort in maintaining and enhancing it.

Irrespective of the asset involved, the main message that comes out from the DIA approach is that the risk of losing any of the firm's key resources provides a motive for keeping production internal (FDI) rather than partnering with a local firm.

In particular, Ethier and Markusen (1996) show, in a two-period model, that MNEs are more likely to choose Foreign Direct Investment, the more important the Intangible Assets, the lower the discount factor, 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 among export, licensing and direct investment in order to serve a foreign market. 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.

Mattoo et al. (2001) set up a model in which a foreign enterprise can choose between FDI and the acquisition of an existing domestic firm. 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 welfare. Differently from the other models, in which operating within firm's boundaries provides a solution against asset dissipation, here the multinational may find it optimal to export, in order to protect its technology.

A similar view is taken in Fosfuri et al. (2001), where export comes without any knowledge dissipation, while FDI involves technology transfer through the training of a local worker. In particular, 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, a low level of absorptive capability by the local firm is shown to reduce the potential for FDI generating spillover.

In Saggi (1996, 1999), 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.

This analysis is extended in Glass and Saggi (2002a) where the *Internalisation issue* is shown to play a role in determining the rate and magnitude of innovation. Notice that the licensing contract, here, 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 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 large[3].

To the best of our knowledge, theoretical studies on the boundaries of the Multinational Enterprise, inspired by the *Dissipation of Intangible Asset,* only consider export and licensing as an alternative to Foreign Direct Investment.

However, given the broadly documented relevance of joint-ventures in China (see, for instance, Luo 2000; Li and Li 1999), in this paper we are rather interested in the comparison between total (FDI) and partial (JV) ownership, based on the risk of knowledge spillover.

We believe that an extension of the DIA approach, to incorporate the joint-venture case, is quite reasonable: although licensing implies a more direct channel for technology transfer - because the licensor has to provide the licensee with the whole set of production

[3] 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.

tools – working side by side in a joint-venture similarly allows the local firm to learn from the MNE, thus exposing it to the risk of losing key resources. A similar approach is followed in many empirical studies on the *Internalisation issue* (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) in which integrated production is shown to prevail, compared to JV, when the threat of spillover is high, namely for firms endowed with superior technology or operating in high tech sectors, resembling the theoretical findings on the FDI/licensing trade-off.

3. Empirical analysis

In this Section, we empirically assess the choice of FDI versus joint-venture made by Italian, Spanish and Swiss multinationals in China.

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 between 2001 and 2005, builds on a survey questionnaire, exploring the international choices of 165 Italian, Spanish and Swiss manufacturing companies with 265 production affiliates in China.

Although relatively small, we believe that this sample is highly representative, since it accounts for 80% of all Italian, Spanish and Swiss investors in the region of interest[4].

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 *Internalisation issue* and the major challenges faced in the destination country, for more than 40 questions overall.

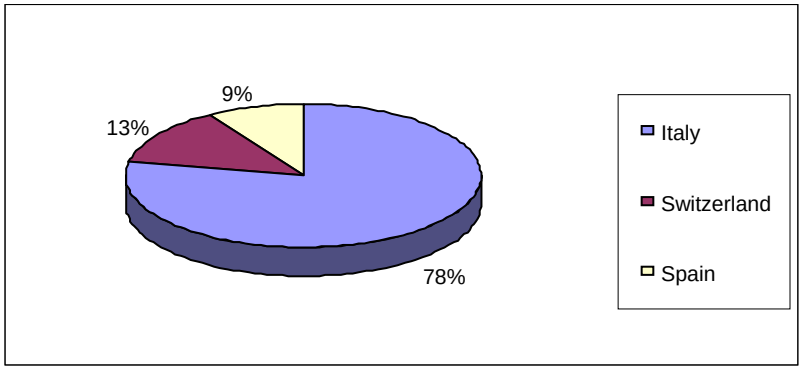
Additional balance sheet or industry-level data are derived from AIDA (Analisi Informatizzata delle Aziende), ISTAT (Istituto Nazionale di Stastistica), and AMADEUS.

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

[4] The complete list of investors was obtained through intersection of all the available sources: ICE (Istituto Commercio Estero), Reprint-Politecnico, Italian, Spanish and Swiss Embassies and Chambers of Commerce in China. In lines with the theoretical specification, attention was restricted to manufacturing operations.

Figure 1 displays the composition of the sample: Italy has a predominant position in China, with 78% of total affiliates, followed by Switzerland (13%) and Spain (9%).

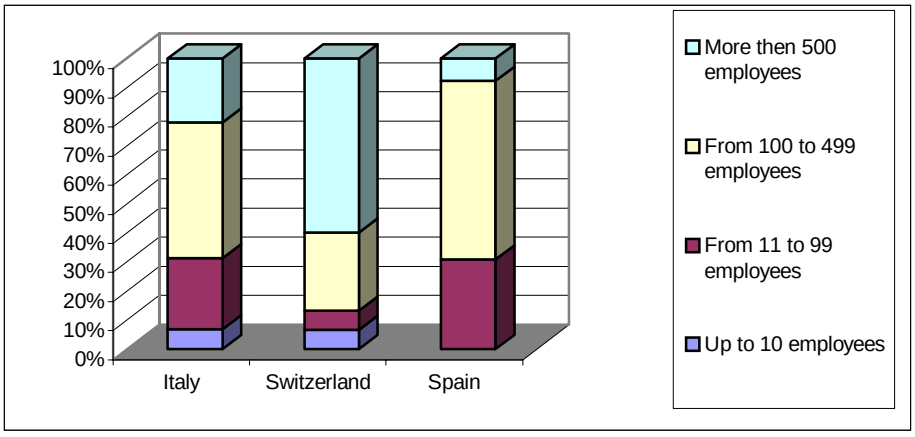
Figure 1: Composition of the sample



According to their size, Swiss companies tend to be very large, with more than 500 employees, while the Italian and Spanish investors are mainly small – 11-99 employees - and medium - 100-499 employees - enterprises (Figure 2).

As far as sales are concerned, 45% top 50 million Euros, 15% is between 25 and 50 million Euros and 21% below 10 million.

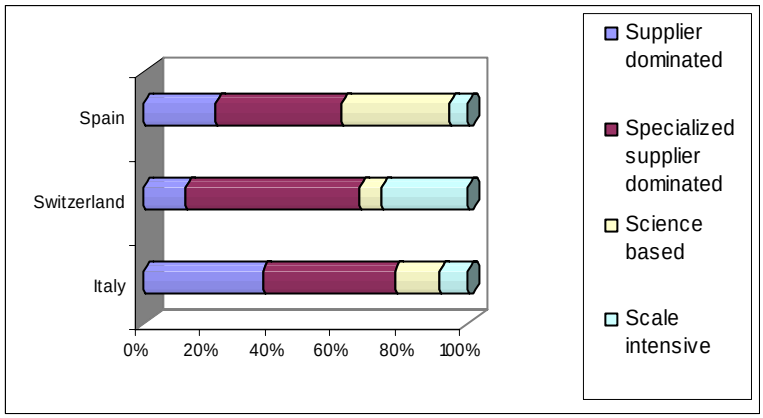
Figure 2: Size of the parent companies, by number of employees



Based on the acquisition of technology, firms 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 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.

Figure 3: Sector of the parent company



From Figure 3, we see that the specialized supplier dominated sector is the most important for all the three nationalities, followed by the scale intensive in Switzerland, the supplier dominated in Italy and the science based in Spain.

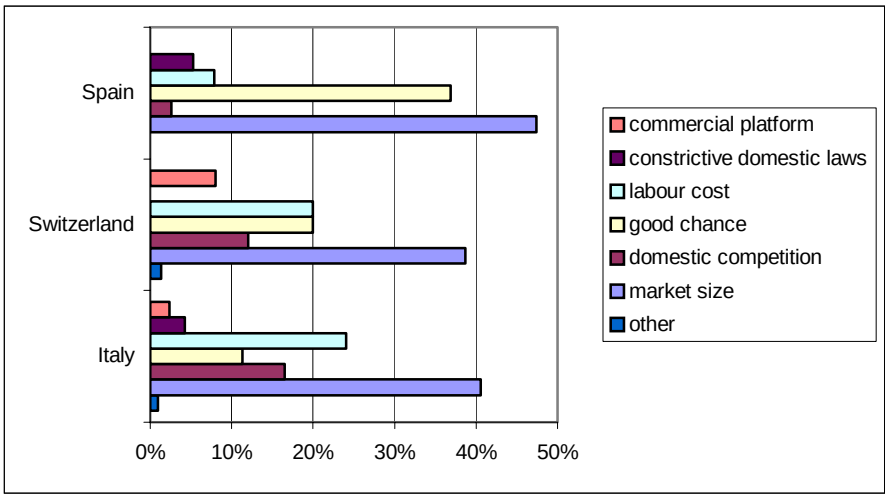
Interviews reveal that firms pay large attention at the human capital of their employees, as a key IA: many of them require English (70%) and computer (97%) skills to be held by the entire workforce of the parent company, while the percentage of employees holding a degree is higher than 25% in almost half of the cases. As far as training courses are concerned, we found out that they are organized for all the employees by 80% of the Swiss, 60% of the Spanish and 40% of the Italian companies.

The international experience of European MNEs seems to be similar throughout the sample and noticeably elevated. Around 80% has had business activities – from import-export to FDI and joint-venture, from licensing to franchising (2%) - in more than five countries, for longer then 10 years (76%), before the present involvement in the PRC.

The decision to operate in China can be driven by a lot of purposes, from the huge market dimension to the low cost labour force, from the need to avoid tight competition or constrictive laws at home, to the wish to establish a commercial platform in Asia or to take a good chance[5]. According to Figure 4, market seeking considerations played the major role, followed by a good chance for Spanish companies, and the low cost labour force for the Italian ones, while Swiss firms seemed to be equally interested in both dimensions.

[5] A typical example of "good chance" is the event in which the European firm accidentally meets a partner for a joint-venture during international expositions.

Figure 4: Investor's purpose in establishing in China



Adding to this, it is worth considering the destination of the goods produced in China: while Swiss firms export most of their production (87%), Spanish companies mainly attempt at satisfying local demand (57%)[6] and Italian enterprises locate middle way between the two extremes, both producing for the Chinese market (48%) and to export abroad (52%).

Figure 5: Major problems crossed by our European investors in China

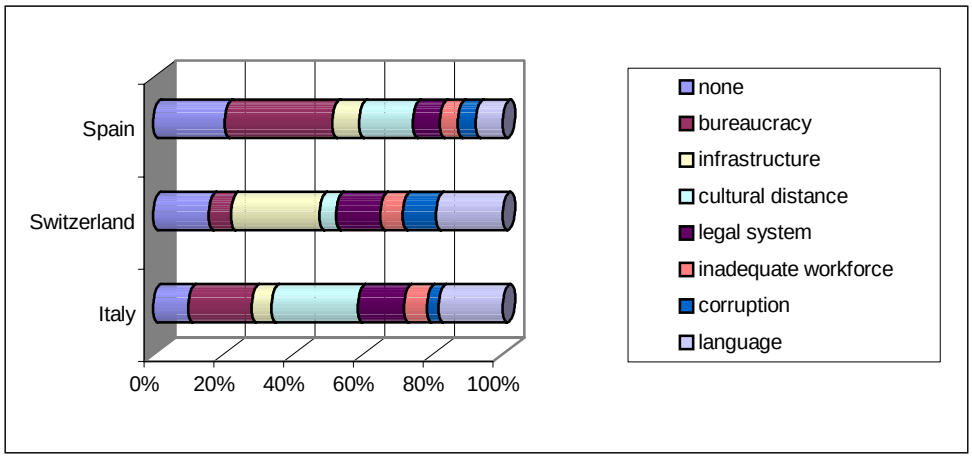


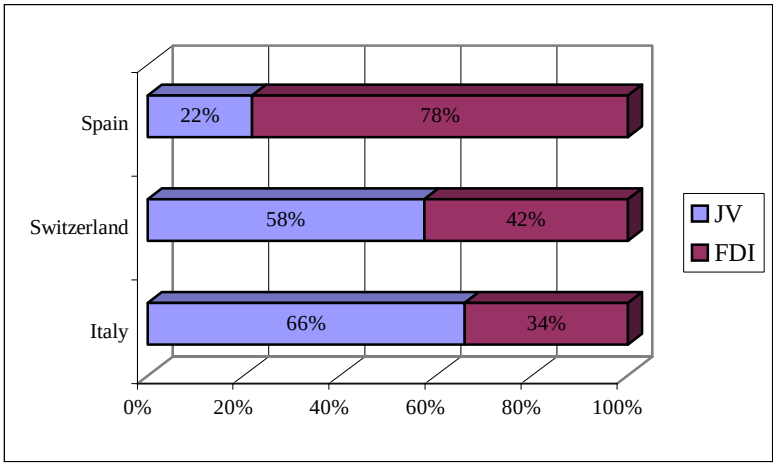
Figure 5 summarizes the main problems faced by European MNEs in China, showing a good deal of variation across countries: while Italian investors have mostly suffered from cultural distance (25%), the Swiss have complained about the lack of good infrastructures (25%) and the Spanish about the complicacy of bureaucracy (31%). Linguistic difficulties and the absence of a clear and transparent legal system have been met quite often by all

[6] Using the terminology of the *Knowledge Capital Model* (see Markusen and Maskus 2001 for a survey), we call *vertical* purpose the first case, aimed at saving on production costs – i.e. MNEs produce in the local market, because it is cheaper, but they sell abroad - and *horizontal* purpose the second one, aimed at accessing the local market – i.e. MNEs produce and sell within the local market.

the three. Notice that only a small percentage of enterprises have not complained at all, suggesting that operating in China is still far away from being simple and straight forward, from a Western perspective.

For the purpose of the present work, it is particularly interesting to consider the mode of entry, selected by European respondents. Figure 6 displays our main findings: while Italian (66%) and Swiss (58%) dominating choice falls on the joint-venture option, the Spanish seem to have a strong preference towards total ownership (78%).

Figure 6: Internalisation choice in China



Basing on the survey answers, the reasons to engage in a partnership, rather than operating in wholly-owned subsidiaries, range from gaining local support to risks and costs sharing, from achieving the optimal size to skills and competitive position enhancing (Figure 7). China is still perceived as a difficult and faraway destination, so that operating in a joint-venture seems to be the easiest way to survive and succeed there. Indeed, the need to find a partner, well acquainted with the domestic context, able to speak and negotiate with the Chinese suppliers and customers, and good in dialoguing with the local authorities is particularly stressed by Italian and Swiss respondents.

Among the firms that operate in a WOS, a large majority chooses this mode in order to achieve strong control over technology transfer and high flexibility standards (see Figure 8), in lines with our theoretical expectations: especially high tech companies are very reluctant to invest in developing countries since they do not want to share 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 need to consult with a local counterpart on management decisions. For about 30%, the wholly-owned subsidiary

represents the evolution from a former JV[7], while 3% chooses to operate alone due to the lack of an appropriate local partner. This evidence seems to be consistent with our extension of the *Dissipation of Intangible Assets* framework: the wish to preserve technology and managerial techniques is stressed as a key driver of FDI, by European firms with manufacturing operations in China.

Figure 7: Reasons to choice joint-venture over FDI

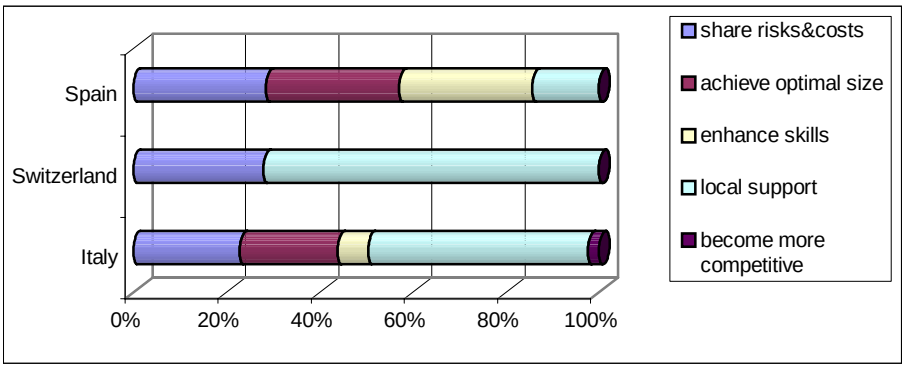
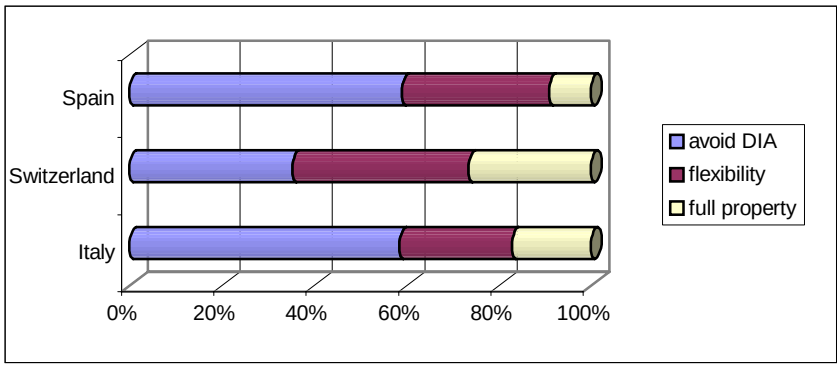


Figure 8: Reasons to choice FDI over JV



3.2 Specification

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

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

$$\underset{(nx1)}{FDI} = \underset{(nxm)}{F}\ \underset{(mx1)}{\alpha} + \underset{(nxl)}{I}\ \underset{(lx1)}{\tau} + \underset{(nxk)}{C}\ \underset{(kx1)}{\sigma} + \underset{(nx1)}{\varepsilon}$$

[7] Historically, the joint-venture represents the first contractual agreement that allows foreign property of Chinese firms (the Law on Equity Joint-Venture was approved in 1979). Wholly Foreign-Owned Enterprises were introduced only in the 1980s, making MNEs free to choose between partial and total ownership when investing in the PRC. Restrictions to such a choice, depending on the desired business or the sector have been completely abolished year by year (Cavalieri 2003).

FDI is the dependent variable vector, whose elements take value 1 in case of wholly-owned subsidiary, 0 in case of joint-venture.

Explanatory variables are of three types: *F* is a matrix of *Firm*-level regressors; *I* and *C* are, respectively, a matrix of *Industry* and *Country* characteristics; α, τ and σ are the parametric vectors associated to firm, industry and country variables and ε denotes the error term.

Notice that, within *F*, it is worth distinguishing between *core* and *control* regressors: core variables are those measuring MNEs' Intangible Assets, over which we have some expectations (see Section 2); control variables denote other firm-level characteristics that may play a role in shaping the Internalisation decision.

Recall from our previous discussion (Sections 1 and 2) that *knowledge* covers both *human capital* and *technological* aspects, so our *core* 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, it is rarely included in econometric tests, due to the lack of firm-level information. Here, as a proxy for *human capital*, two different indicators are adopted, such as the extent of the training courses, organized by the parent company, for its employees (*TRAINING*), and their level of education (*GRADUATE*).

As far as *technology* is concerned, our measures include: the value of patents (*PATENT*)*;* the ratio of patents over sales (*PATENT/SALES*) and, similarly to (Blomstrom et al. 1989; Smarzyinska 2000), whether or not the parent firm belongs to a high tech sector (*HIGHTECH*), with a particular focus on the *TELECOM* one[8]; *PATENT*HIGHTECH* is a measure the value of patent, for firms belonging to *HIGHTECH* sectors.

These variables strictly refer to the MNE's Intangible Assets and therefore, based on the DIA framework, we expect an overall positive sign: 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 industries.

Firm-level controls include: sales (*SALES*, as in Blomstrom and Zejan 1991; Meyer 1998; Smarzynska 2000); the number of employees (*EMPLOY*) and the destination of the goods produced in China (*HFDI*) – which allows us to distinguish between horizontal and

[8] Notice that in earlier studies (see, among others: Desai et al. 2002; Smarzynska 2000) R&D expenditure is also employed as a proxy for technology. Due to data missing we preferred to base on patents, at firm-level, while the R&D expenditure, at country-level, is included as a control (*RDE*).

vertical purposes; similarly to (Herrmann and Datta 2002; Guillen 2003), *COUNTRIES* is a proxy for the MNE's experience in running foreign operations.

Matrix *I* contains a few industry controls - such as *METAL*, *PRECISION*, *SCALE INTENSIVE* and *HT SUPPLIER DOMINATED* – while matrix *C* covers both home and host country characteristics. In particular, it includes the location of the affiliate in China (*SHANGAI*, *JIANGSU*, *GUANGDONG* and *ZEHIJANG*) - to capture the high degree of variation within the destination market; the location of the parent company in Europe (*SPAIN*); the level of Research & Development expenditure (*RDE*); the high tech exports, as percentage of total merchandise exports (*HTE*); and the dimension of the population (*POP*) in the home country, to take into account potential differences across Italian, Spanish and Swiss investors.

Table 1 summarizes all the information about the variables described above.

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

Table 1: Variable description

Variable	***Description***
FDI	Dummy variable, 1 if FDI, 0 if JV. Type: regressand. Source: interviews.
GRADUATE	Dummy variable, 1 if the percentage of employees with a degree is larger than 25%, 0 otherwise. Type: firm-level *core* regressor; it is a proxy for the human capital of the parent firm. Source: interviews.
TRAINING	Dummy variable, 1 if the parent firm organizes training courses for the employees longer than 6 months, 0 otherwise. Type: firm-level *core* regressor; it is a proxy for the human capital of the parent firm. Source: interviews.
HIGHTECH	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 *core* regressor; it is an indicator of technology of the parent firm. Source: personal elaborations from ISTAT (Istituto Nazionale di Statistica) data.
TELECOM	Dummy variable, 1 if the parent firm belongs to the TELECOM (NACE REV 1.1, 32) sector, 0 otherwise. Type: firm-level *core* regressor; it is an indicator of the level of technology of the parent firm. Source: personal elaborations from ISTAT data.

PATENT	Patents of the parent firm (millions Euro). Type: firm-level *core* 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 lager than 500,000 Euro) and AMADEUS.
PATENT/SALES	Patent over sales of the parent firm. Type: firm-level *core* regressor; it is an indicator of technology of the parent firm. Source: personal elaborations from ISTAT, AIDA and AMADEUS.
*PATENT*HIGHTECH*	Patents of the parent firm (millions Euro), belonging to HIGHTECH sectors. Type: firm-level *core* regressor; it is an indicator of technology of the parent firm. Source: Interviews, AIDA and AMADEUS.
SALES	Sales of the parent company (billions Euro). Type: firm-level *control* regressor. Source: AIDA and AMADEUS.
EMPLOY	Number of employees of the parent company. Type: firm-level *control* regressor. Source: AIDA and AMADEUS.
HFDI	Dummy variable, 1 in case of horizontal purpose – i.e. the goods produced in China are addressed to the local market – 0 in case of vertical purpose – i.e. the goods produced in China are exported elsewhere. Type: firm-level *control* regressor. Source: interviews.
COUNTRIES	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 *control* regressor. Source: interviews.
METAL	Dummy variable, 1 if the parent firm belongs to the METAL (NACE REV 1.1, 28) sector, 0 otherwise. Type: industry-level *control* regressor. Source: personal elaborations from ISTAT data.
PRECISION	Dummy variable, 1 if the parent firm belongs to the PRECISION (NACE REV 1.1, 33) sector, 0 otherwise. Type: industry -level *control* regressor. Source: personal elaborations from ISTAT data.
SCALE INTENSIVE	Dummy variable, 1 if the parent firm is engaged in the scale-intensive sector, 0 otherwise (Bell and Pavitt 1993). Type: industry-level *control* regressor Source: interviews.
HT SUPPLY DOMINATED	Dummy variable, 1 if the parent firm is a HIGHTECH company (see above definition) in supply dominated sector, 0 otherwise (Bell and Pavitt 1993). Type: industry-level *control* regressor Source: interviews.
SPAIN	Dummy variable, 1 if the parent firm's headquarter is located in Spain, 0 otherwise. Type: country-level *control* regressor. Source: interviews.
SHANGHAI	Dummy variable, 1 if the subsidiary is located in Shanghai, 0 otherwise. Type: country-level *control* regressor.

	Source: interviews.
JIANGSU	Dummy variable, 1 if the subsidiary is located in Jiangsu, 0 otherwise. Type: country-level *control* regressor. Source: interviews.
GUANGDONG	Dummy variable, 1 if the subsidiary is located in Guangdong, 0 otherwise. Type: country-level *control* regressor. Source: interviews.
ZEHIJANG	Dummy variable, 1 if the subsidiary is located in Zehijang, 0 otherwise. Type: country-level *control* regressor. Source: interviews.
POP	Population of the home country (millions of inhabitants). Type: country-level *control* regressor. Source: http://humandevelopment.bu.edu/
RDE	National Research and Development Expenditure of the home country, as a percentage of Gross National Income. Type: country-level *control* regressor. Source: personal elaborations from http://humandevelopment.bu.edu/
HTE	High Tech exports as a percentage of total merchandise exports of the European country. Type: country-level *control* regressor. Source: personal elaborations from http://humandevelopment.bu.edu/

3.3 Results

Probit estimates are shown in Table 2.

Reminding the theoretical priors, summarized 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 data, making sense of our DIA extension to the case of joint-venture.

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 controls are also included - we see that with an increase in the European firms' Intangible Assets, the probability of internalising production, rather than operating in joint-venture, increases as well.

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

The size of the parent company – measured by *EMPLOY* and *SALES* – does not turn significant in any specification.

Moreover, from Table 2, it seems that investors coming from Spain (*SPAIN*) are more prone to operate in wholly-owned subsidiaries, while experience in running foreign operations (*COUNTRIES*) and horizontal purpose (*HFDI*) 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 eager to do so in joint-venture, to take advantage of the partner knowledge of her own country.

As far as industry 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. At a broader level, we can observe that scale intensive multinationals (*SCALE INTENSIVE*) prefer the JV contract, while technological leaders in the supplier oriented sector (*HIGHTECH SUPPLIER DOMINATED*) have a clear propensity for the integrated solution. This is not surprising, since scale economies are often associated with large companies, characterized by strong bargaining power, whereas supplier dominated firms are generally smaller and might have problems avoiding IAs spillover.

Among the country variables included in our regressions[9], it is interesting to see that manufacturing operations in Shanghai (*SHANGHAI*) tend to be conducted via FDI, while the opposite is true for *JIANGSU*, *GUANGDONG* and *ZEHIJANG*. No evidence has been found related to the dimension of the home country (*POP*), while the level of national R&D Expenditure (*RDE*) and the percentage of high tech exports (HTE) proved to play some role, the former pushing towards FDI, the latter towards JV, although the marginal effect is very low, compared to core variables[10].

[9] Other country variables (not shown) were included in our econometric tests but, given the geographical proximity and the economic similarity of Italy, Spain and Switzerland, they resulted insignificant, because of the lack of cross country variation.

[10]Notice that Spain is the country with the lowest level of high tech exports as a percentage of total merchandise exports, in our sample, and indeed it shows the wicker tendency towards joint-venture establishment.

Table 2: Probit estimates[11]

	FDI	FDI	FDI	FDI	FDI	FDI	FDI	FDI
GRADUATE	0,181 (0,022)**	0,166 (0,034)**	0,161 (0,048)**	0,152 (0,071)*	0,155 (0,069)*	0,170 (0,050)*	0,159 (0,062)*	0,159 (0,070)*
TRAINING	0,333 (0,007)***	0,337 (0,006)***	0,271 (0,039)**	0,291 (0,035)**		0,395 (0,004)***	0,319 (0,022)**	0,351 (0,017)**
HIGHTECH			0,119 (0,090)*					
TELECOM				0,382 (0,060)**	0,354 (0,085)*			0,405 (0,043)**
PATENT	0,070 (0,045)**		0,054 (0,098)*		0,118 (0,029)**			0,125 (0,032)**
*PATENT*HIGHTECH*				0,127 (0,026)**				
PATENT/SALES		0,454 (0,002)***					0,406 (0,013)**	
EMPLOY			0,026 (0,683)				-0,009 (0,176)	
SALES			-0,020 (0,449)			-0,003 (0,288)		
HFDI			-0,129 (0,051)*	-0,122 (0,099)*	-0,148 (0,039)**		-0,138 (0,051)*	
COUNTRIES							-0,312 (0,002)***	
METAL			0,220 (0,082)*	0,281 (0,022)**	0,289 (0,018)**		0,305 (0,017)**	0,279 (0,022)**
PRECISION					0,346 (0,073)*			
SCALE INTENSIVE			-0,217 (0,078)*			-0,238 (0,096)*		-0,234 (0,073)*
HT SUPPLY DOMINATED						0,456 (0,001)***		0,437 (0,001)***
SPAIN						0,500 (0,001)***		
SHANGHAI				0,370 (0,000)***	0,351 (0,000)***		0,382 (0,000)***	0,347 (0,000)***
JIANGSU						-0,361 (0,000)***		-0,232 (0,080)*
GUANGDONG						-0,228 (0,011)**		
ZEHIJANG					-0,244 (0,081)*	-0,274 (0,048)**	-0,268 (0,046)***	
POP								0,034 (0,282)
RDE						0,046 (0,019)**		
HTE				-0,051 (0,085)**	-0,057 (0,057)*			
Obs	236	234	234	236	236	257	234	236
p-value	0,000***	0,000***	0,000***	0,000***	0,000***	0,000***	0,000***	0,000***
Pseudo R^2	0.0916	0.0708	0.1586	0.1962	0.1981	0.2116	0.2117	0.2405

4. Conclusion

This paper is an attempt to explore the FDI/joint-venture choice of Italian, Spanish and Swiss multinationals in China, as shaped by the risk of dissipating their Intangible Assets.

[11] Marginal effects and P-value in round brackets shown. * significant at 10%, ** significant at 5%, *** significant at 1%.

By telling the tale of these countries, we intended to document their experience in the PRC, and discuss to what extent the DIA approach can be applied to the FDI/JV trade-off, adding to the traditional FDI/licensing one.

Basing on survey data, our estimates show that Foreign Direct Investment is the most preferred mode of entry for European firms endowed with superior technology and higher skilled employees, meaning that the threat of knowledge spillover not only drives their choice of total versus partial ownership, but it also plays a major role in orienting such a decision, compared to home country characteristics. Put another way, irrespective of their origin, parent firms characterized by a higher degree of IAs show a clearer preference for total ownership, to secure their resources against a potential Chinese partner. These results are completely aligned with the theoretical predictions derived for the standard comparison between FDI and licensing (Ethier and Markusen 1996; Markusen 1998, 2001; Saggi 1996, 1999; Fosfuri 2000; Mattoo et al. 2001; Fosfuri et al. 2001; Glass and Saggi 2002a).

We believe that these findings, although preliminary, are promising enough to encourage further research on joint-ventures within the DIA field: in theoretical terms, future steps should include the creation of a model to incorporate the JV among the contractual arrangements that MNEs can sign when entering into a foreign market; in empirical terms, further evidence is also needed to add a multiple-host country perspective and control for possible selection bias.

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