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The International Organisation
of Italian District Firms



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Abstract

The paper provides evidence on the characteristics of district firms that “internationalise”, either through foreign suppliers of FDI. The innovativeness of the contributions relies on the fact that it explicitly analyses companies pertaining to a district and test whether the key elements of firms’ heterogeneity hold.

Our writing starts with a critique of the Melitz model by suggesting that local production systems are characterised by a form of relational heterogeneity which may affect the propensity and ability of firms to succeed in the global arena.

In the second stage we select a sample of Italian district firms to check whether their opening-up internationally proved that *lead firms* are the most capable to deal with a continuously evolving environment. By applying a simple logit model we noticed that the probability of a firm to be internationalised is higher the higher its human capital, the bigger its size and its productivity.

These results provide support for the literature on firms’ heterogeneity, even for district companies. However, this is just a starting point to look for differences between firms pertaining to a district from those who do not when both try to access a foreign market.

Keywords

Italian district firms, internationalisation, heterogeneity

JEL Codes

F12, F23, R32

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1 Introduction

Wide empirical studies on firms' internationalisation are growingly based on firm-level data, following the latest contributions on intra-industry heterogeneity, which emphasise the role of differences in productivity between companies who are able to operate abroad.

This paper aims at supplying additional evidence to this debate, not relying on a large national dataset, but on a smaller sample, that explicitly includes leader firms within a local production system and those that do not. By exploiting this unique characteristic, we decided to analyse some features of district firms which trade with foreign partners or embark on FDI, firms we may label as "internationalised". To the best of our knowledge, the innovativeness of our approach indeed relies on the fact that we are explicitly distinguishing firms pertaining to an industrial district from those that do not, in order to shed some light on the effects of district firms' heterogeneity once internationalised.

2 Trade and heterogeneity: what about districts?

From a theoretical standpoint we may isolate two different explanations to link firms' performances with export status. The first approach argues that export markets select the most efficient firms among a set of potential entrants into foreign trade. This is because either participating in international markets implies being exposed to a greater product competition (Aw and Wang, 1995 [2]) or entering the international markets entails higher sunk costs of entry than operating in the domestic market (Roberts and Tybout, 1997 [8]). Melitz (2003 [7]) applied the self-selection hypothesis in a theoretical model that combines firm heterogeneity with a monopolistic competition framework, delivering the most significant contribution in the study of international trade since the age of the New Trade Theory.

The second approach studying the relationship between exporting and productivity is related to the belief that firms become more efficient after they start exporting. Such an idea is related to the so-called learning-by-exporting mechanism (Clerides, Lach and Tybout, 1998 [3]), as exporting firms may improve their knowledge through the access to new production methods or new technologies from both buyers and suppliers. Moreover, productivity is likely to rise as the international environment may force firms to be more efficient in order to cope with partners' requirements. Yet, at the same time, it could stimulate both product and process innovation, but it may also led to innovation in inter-firm relations.

In this perspective it seems useful to recall the framework of fragmentation as a powerful tool to understand the international organisation of Italian district firms. We are not focusing here on the disintegration of a previously integrated MNE into different production blocks, but rather on a web of small and medium enterprises that spread from a local base to an international one (Arndt and Kierzkowski, 2001 [1]). Such firms are tied together first locally and then globally. Therefore there is room to think about a relational growth (Corò and Grandinetti, 2007 [4]) which is more pronounced as we look at districts as they actually are, namely heterogeneous amongst themselves and also internally, i.e. amongst the firms they are made of (Guelpa and Micelli, 2007 [5]).

For the purpose of our study two distinct features of the heterogeneous firm framework should be carefully analysed. On the one hand, the empirical evidence highlights that size matters to internationalise, i.e. bigger firms have a greater chance to succeed on exporting, importing and embarking in FDI. On the other hand, the width of micro-level studies drives the economic analysis towards somewhat of business-kind of study, which avoids generality and tries to focus on differences amongst firms.

The first feature should probably push off international markets a great part of Italian companies, which are mainly of small and medium size. Thus, the model, and the empirical evidence as well, is a sentence to death for our domestic industrial system. However we should also notice

that what has been labelled as the “Third Italy” represented a source of great competitiveness in the past, playing now a more modest role. Such industrial model relied upon a brand new way of managing inter-firm relations, which took place within local productive systems, or, in other words, within, industrial districts. So far, the analyses of international trade based on firm heterogeneity have not taken into account this kind of organisational phenomenon that attracted a great deal of scholarship since the end of the ’70s. The presence of external economies of scale, emerging from Marshall’s (1920 [6]) pioneering contribution, was and it still is at the core of cluster’s nature. What seems to be fundamental in the study we are carrying on is to consider that district firms, although smaller than their non-district peers, present some other peculiarities that allow them to perform with success not only domestically but also abroad. The embeddedness of relations within a local context forces firms to cope with their counterparts’ requirements, thus pushing towards higher efficiency and higher productivity. It is also true that districts are not only made up of competitive behaviour, but there is also cooperation, a tendency which may provide stimulus for improvement, but also for staticity.

Yet, the modern industrial district opened up not only to other domestic actors, but also internationally as this brings to the milieu the chance to exploit fruitful upward and backward linkages.

In the rest of the paper, we apply the most recent advancements in the theory of international trade to a sample of district firms, and we get some results that are in line with the relevant empirical literature on heterogeneity. We wish to stress that the sample is made up of only district firms and the outcomes we got should be interpreted as a first step in introducing some explanatory variables able to capture the complex and dynamic nature of relations that might be the source of an intra-industry resource reallocation that international trade brings along. A further step would require looking at the linkage between size and productivity and evaluate which tools might be useful to measure how inter-firm linkages affect productivity.

3 Data and empirical results

The sample analysed is composed of about 1.000 firms. The source is a survey lead from TeDIS¹ center of the VIU (Venice International University) that has been carrying out research activities since 1999 when it was founded within VIU as a research and training center. TeDIS carries out applied research activities on innovation and competitiveness of enterprises and SMEs (small and medium enterprises) in industrial districts. A core TeDIS research area is the study of industrial districts and SMEs embedded in local manufacturing contexts and their evolution process in relation to network technologies. The objective of the research is to analyse the level of convergence between the district economic model of development and ICT opportunities. Through its activities, the most important is the annual TeDIS Survey, a research program that analyses the diffusion of network technologies and the most challenging evolutionary trends within the Italian industrial districts according to a quantitative approach.

The survey covers 1,004 firms analysed in the year 2008. The study we propose here is based on a subsample of district firms (50% of total sample) and is focused on a specific section of the survey that highlights the international organisation of firms.

In order to analyse empirically the international organisation of Italian industrial district firms we provide some basic estimation of the average values of the following variables. This is to stress which features are more significant to explain differences between firms that rely on foreign supply and/or FDI, compared to those having only national economic linkages.

1. Turnover class
2. Size of the firm

¹Technologies in Distributed Intelligence Systems.

3. Human Capital
4. Trade marks
5. Existence of an R&D structure within the firm
6. Existence of a Design structure within the firm
7. Performance variables (ratio of earnings on value added 2006, 2007, Productivity 2006, 2007).

In order to obtain accurate estimates of the average variables we treated the observation to:

- replace missing values using the donor matching technique. This allows to replace a missing value with the average value expressed by firms with similar structural characteristics².
- discard those firms presenting outliers values in performance variables. The presence of outliers may lead to biased results in the estimation process.

Results of the descriptive statistics are summarized in Tab. 1.

Variables	No Off-Shoring & FDI		Off-Shoring & FDI	
	Mean (Std Dev)	Sign	Mean (Std Dev)	Sign
Turnover Class	2 (0.85)	2.74	3 (0.86)	3.14
Size	1 (0.57)	2.57	2 (0.7)	2.5
HK	0.27 (0.15)	1.81	0.34 (0.17)	2.01
Trade Marks	0.39 (0.49)	0.8	0.65 (0.48)	1.35
R&D	0.44 (0.5)	0.88	0.66 (0.48)	1.39
Design	0.39 (0.49)	0.8	0.44 (0.5)	0.88
Earn. va ratio 07	4.84 (2.7)	1.79	5.17 (2.99)	1.73
Earn. va ratio 06	4.96 (2.62)	1.89	5.6 (3.22)	1.74
Prod 07	53 (11.66)	4.54	57 (13.4)	4.28
Prod 06	51 (11.6)	4.38	52 (12.08)	4.28

Table 1: Descriptive Statistics

The above table provides some descriptive statistics on a wide range of variables, but not all of them will be applied in our empirical model. At this stage we provide just a brief description of the most significant dimensions that feature the whole sample, distinguishing domestic firms who domestically outsource from those that offshore and embark in FDI.

We start with two variables linked to dimensions, namely the Turnover Class and Size (derived from the number of employees). Both of them may assume three different values, i.e. 1, 2 and 3, which grow as the underlined value increases. The table shows distinctive features for firms that outsource nationally and for those internationalised. The former group shows a lower Turnover Class than the latter (2 vs 3) thus suggesting that firms with foreign suppliers or those who have opened production facilities abroad are more likely to generate a higher volume of sales.

We also notice that firms who choose to outsource only domestically are of a small size, i.e. with a number of employees below 49, whereas those who internationalise have a number of employees between 50 and 249 (class size 1 vs 2).

Another relevant result is the percentage of skilled employees on the total workforce of the firm. Such a percentage is slightly lower for firms that domestically outsource compared to those whose involvement in foreign markets is more pronounced. Nevertheless, there is no such a big difference, as in both cases the share is around 30%. Consistently with the results achieved by the scholarship on heterogeneous firms is the variable labelled as R&D, which identifies if the

²We constructed the groups clustering firms by their size and earnings class.

firm has a dedicated in-house research department. Although the values are not so robust as above, we get again an important result as the share of firms who create an *ad hoc* business function devoted to R&D are more likely to be internationalised. We found weak statistical evidence on the role of Trade marks, even though the share of firms who deposited them is largely bigger if they operate at an international scale. Such a result seems pretty obvious as there is probably a greater need of protection for intellectual products in a global context than in a national one.

Some attention has to be eventually devoted to variables regarding performance.

On one hand we define Turnover on Added Value and, on the other hand, Productivity, computed as the ratio of sales on added value. The first indicator takes a slightly higher value for district firms engaged in international activities, than those constrained within national boundaries. Such a difference may prove that there are significant linkages between district firms and their national partners (both upward and backward), but more complex forms of inter-firm relations feature district companies with manufacturing and commercial ties abroad. The values we obtained are computed on the basis on balance sheet data for both the years 2006 and 2007.

The second indicator is extremely significant for both the groups of firms we are dealing with, even though there is no clear-cut difference between the two. Productivity is computed as the ratio of sales on employees using values of the years 2007 and 2006, as we assume that higher productivity may turn into higher internationalisation some time later.

All the above results are again consistent with the foundations of international trade models based on firms' heterogeneity, but they do highlight the relevance of fragmentation of production process both domestically and abroad.

3.1 The Logit model

In order to deepen the analysis we provide the results of the well-known logit model. This kind of models estimate the probability that a firm belongs to a group given a specific characteristic. The response variable has been constructed considering firms relying on foreign supply and/or have FDI and those that do not.

The logit model gives the maximum likelihood estimates of the probability of a firm to belong to a specific group applying the following transformation:

$$\eta_i = \text{logit}(\pi_i) = \log \frac{\pi_i}{1 - \pi_i} \quad (1)$$

where π_i and $1 - \pi_i$ are respectively the probabilities that the response variable takes value one and zero. Specifying a matrix of covariates X data generating process become

$$\text{logit}(\pi_i) = X' \beta \quad (2)$$

with a simple inverse logit transformation we can obtain the predicted probabilities.

The independent variables considered by the model are the following (in brackets we provide the acronym used in the model):

1. Size of the firm (*SIZE*)
2. Human Capital (*HK*)
3. Trade marks (*TRADEMARKS*)
4. Existence of an R&D department within the firm (*R&D*)
5. Ratio of earnings on value added for the year 2006 (*SALESAVRATIO*)
6. Productivity recorded in the year 2007 (*PROD07*).

We focused our attention on those variables that seemed to better characterise the “Internationalisation process” from the results of the descriptive analysis. Has expected the results are also consistent with the logit model and their interpretation as well. The empirical evidence suggests some significant results for the sample.

The first explanatory variable is *HK*, a continuous variable defined as the percentage of skilled employees on the total workforce of the firm, which is meant to characterise the firm’s human capital endowment. Qualified human skills are in fact deemed essential for engaging in contracting abroad since this requires human capital intensive activities such as negotiating with partners in foreign languages and concluding contracts under different legal systems. This is consistent with the need to preside those phases with higher value-added, not only domestically, but also abroad, both within and outside the boundaries of the firm. It is just in the latter case, namely in arm’s length transactions that firms need to rely on skilled employees to control strategic functions through appropriate capabilities and abilities (in the broadest sense) meant to manage inter-company relations. The estimated coefficient associated with this variable is positive and significantly different from zero, a result consistent with the predictions of our theoretical framework.

Yet, the role of knowledge is not only expressed by qualified human endowment, but also through a series of additional variables. Indeed, firms operating in international markets are those capable to transform knowledge into registered trademarks. This is indeed the second explanatory variable, *TRADEMARKS*, which is a dummy taking value 1 if the firm registered trademarks in the last three years and 0 otherwise. The estimated coefficient associated with this variable is positive and significantly different from zero, in line with our expectations.

Closely connected to the previous two, is the third variable, a dummy labelled *R&D* which takes value 1 if the firm has an in-house R&D department, and 0 otherwise. Although its coefficient is positive and significantly different from zero, the impact on “internationalization” is not straightforward. Indeed, on one hand, the conventional view would argue that R&D-intensive industries tend to be vertically integrated in order to recover the high sunk costs generated by R&D investment. A complementary argument, based on the transaction cost approach, states that industries dealing with complex products face severe incentive and appropriability problems, which they tend to solve through firm’s vertical integration. On the other hand, if the company is considered an open entity, higher R&D intensity would be associated to extensive outsourcing and to the development of wide and complex networks both domestically, but mainly internationally, with the overall aim to have access to a broad range of capabilities, that are unavailable internally. From our standpoint, it is very important to look at offshoring as a tool to enter global knowledge networks, which may allow companies in pursuing patterns of industrial upgrading. This is not only true for big companies, but also for smaller ones, if they wish to focus mainly on strategic operations.

Nevertheless, the fourth explanatory variable is *Size*, as recent empirical evidence found that dimension is positively associated with the concept of internationalisation we supplied³. In particular, we use a dummy, called *SIZE*, which takes value 1 if the firm is of medium/big size (i.e. if it has more than 49 employees), and 0 otherwise (i.e. if it is a small one, with less than 50 employees). The coefficient is positive and significantly different from zero, thus suggesting that a bigger firm has a higher probability of being internationalised.

Once established this set of structural variables, we decided to introduce two additional features of the firm, related to performance.

Initially, we specify *PROD07*, a measure of productivity, computed as the ratio of sales on employees, which is intended to test whether firms operating at an international level (in commercial, productive or both ways) are more productive than those serving only the domestic

³This is the result achieved by applied heterogeneous firm models which emphasise that only the biggest firms are normally the most productive and able to engage in international activities. The literature on core competencies suggests that the small firms are the most likely to outsource, but not to offshore, thus our choice to concentrate on the internationalisation of bigger firms might be fruitful.

market. The values we used to build this variable are for the year 2007, as we assume that the effects of a higher productivity may turn into higher internationalization in the year after. Notwithstanding, there is no clear-cut evidence on the causal relationship between productivity and internationalisation, namely which factor drives the other, although there seems to be some form of circularity that leads to a cumulative increase of both dimensions. Since the estimated coefficient for this variable is positive and significantly different from zero, we got confirmation of our expectations, which are again consistent with the theoretical scheme we are applying. Still focusing on performance, we add a second variable, which takes into account the propensity of the firm to outsource, computed as the ratio of sales on added value. We label this variable as *SALESAVRATIO*. This variable, which is positive and significant not only tells if the firm outsources domestically, but also if it offshores. The latter option is more likely to occur as we are dealing with medium and large corporations, that are most inclined to establish arm's length transactions at an international scale.

In Tab. 2 we provide the results of this estimation.

	Est	Odds ratio	Std Err	Z value	$Pr(> z)$	Sign code
Intercept	-4.9	-	0.92	-5.35	< 0.01	***
<i>SIZE</i>	0.79	2.19	0.34	2.28	0.02	*
<i>HK</i>	2.93	18.65	1.01	2.89	< 0.01	**
<i>TRADEMARKS</i>	0.88	2.40	0.32	2.78	< 0.01	**
<i>R&D</i>	0.82	2.26	0.32	2.58	< 0.01	**
<i>SALESAVRATIO06</i>	0.14	1.15	0.06	2.42	0.02	*
<i>PROD07</i>	0.02	1.02	0.01	1.84	0.07	.

Table 2: Model estimation

4 Conclusions and further research

We tried to provide some preliminary evidence on the characteristics of district firms that operates internationally, either through foreign suppliers or FDI.

To the best of our knowledge this is the first contribution to apply the heterogeneous firm framework to firms tied within a local production system. Such companies are indeed smaller than their non district peers, thus the theoretical framework we applied might seem not to be appropriate in explaining the internationalisation process. Instead, the empirical analysis supports the idea that district firms are able to interact with foreign suppliers and, in some cases, establish FDI, thanks to the size they are able to achieve not only individually (as leaders) but through the network they rely on.

If we go back to statistics, there are some results worth recalling here.

In the first place, the most important variable we isolated is Human Capital. If focusing only on the heterogeneous firm model this outcome is not at odds with its main assumptions, which predict that internationalization is more likely to occur if firms are endowed with high skilled labour force. However, this might seem relatively at odds if we consider that the sample is made up of district firms, which do not typically rely on particularly strong qualified employees (although we need to stress again that we are dealing with companies that are leader within their district).

In the second place, we stressed the size of the firm as another tool to differentiate companies belonging to the same industry and, in this case, to the same sample of district actors. Size, together with productivity, is the main element justifying the presence of heterogeneous firms within an industry, as it is no longer sustainable the idea of a representative company. In our sample we noticed that size matters for internationalisation, and it does matter amongst district firms. This result supports the view that bigger firms are more inclined to internationalise as they have human, economic and other in-house resources which allow to preside foreign markets

easier than smaller firms.

In the third place, we highlight the role of R&D as an additional significant feature of firms. As already stated, we expect just a minority of firms to have an in-house R&D department, but this is likely to occur not only for bigger companies, but also for smaller ones if their strategic orientation is towards the empowerment of high added-value functions. Strictly connected to the previous dimension, is the ability of firms to deposit Trademarks, which is certainly higher for bigger firms, but it may also stem from a certain organisational choice adopted by smaller but more dynamic companies.

Further research should apply our empirical specification to non-district firms in order to stress possible differences with the sample used in this paper. This seems particularly helpful if one is willing to carefully check for firms' heterogeneity in different industrial contexts.

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