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The determinants and employment effects of international outsourcing: the case of Italy

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The determinants and employment effects of international outsourcing: the case of Italy

by

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Abstract

Using a new firm-level database, we address micro determinants and employment consequences of international production outsourcing (INPOU).
Regarding the former, we confirm that INPOU in Italy mostly counters emerging economies' threats to traditional manufactured goods: INPOU disproportionately targets developing countries and intensifies in sectors with stiffest Chinese competition.
Concerning employment consequences, we concur with previous literature that INPOU firms' domestic employment performances are no worse than at matching no-INPOU firms. However, given Italy's industrial structure (small-sized networked enterprises), INPOU might negatively affect subcontracting firms. Our evidence that employment performances worsen in the productive segments with strongest INPOU supports our conjecture.

JEL Classification numbers: F23, D21
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1. INTRODUCTION

Though lagging with respect to other countries, Italian companies have recently accelerated their International outsourcing of production (INPOU) – sometimes denominated international production fragmentation. It is generally believed that Italian firms' INPOU is mostly aimed to respond against the increasing competition by emerging economies' manufacturing in the traditional goods segments typical of the *made in Italy* (e.g., textiles & clothing, leather & shoes, furnishing, etc.). Through this, unskilled labor intensive phases of production are outsourced to cheap labor countries (De Arcangelis *et al.*, 2002; Ferragina and Quintieri, 2002). Only in a limited number of cases, Italian firms' INPOU focuses on developed markets.

This paper tries to address two research questions employing a new firm-level database compiled at ISAE on the basis of two ad-hoc surveys run in May 2003 and April 2005. First, we study the micro determinants of INPOU. Next, we investigate the employment consequences of INPOU.

Studying the micro determinants of INPOU pertains to the domain of industrial economics. It is certainly not a novel question to ask which are the most important factors to induce companies to venture into this challenging action. Nevertheless, our contribution in this respect is twofold. On one hand, thanks to the flexibility of the ISAE surveys, we have access to fresher data than most other studies (e.g., Capitalia released its 2003 data just a few months ago). On the other hand, owing to the fact that the ISAE sample is highly representative, we can observe INPOU in a more comprehensive manner (e.g. even at small firms, often not covered by other FDI databases, such as that employed by Cominotti, et al.).

Also investigating the occupational consequences in Italy when companies venture into INPOU is not innovative (see, e.g., Barba Navaretti and Castellani, 2005). Yet, even in this case, we make two contributions. Firstly, for the reasons already sketched above, our results may be more general, thanks to the highly representative ISAE sample. Secondly, and most importantly, we make a contribution by addressing INPOU's overall employment effects, something which, to our knowledge has been neglected thus far. Specifically, we posit that the singularity of Italy's industrial structure requires particular care. Since Italy's productive sector consists primarily of a myriad of networked small and medium-sized enterprises (SMEs), considering only the employment performance at INPOU firms per se appears incomplete, if not potentially misleading. In other words, while for the large companies, typical of other developed countries, the occupational impact of INPOU may be generally limited within the individual company – possibly inducing labor mobility across different mother company's departments and/or group affiliates – this is unlikely the end of the story in Italy, where most of the brunt may fall on subcontracting firms. Indeed, in Italy, the bulk of unskilled labor intensive phases of production are already outsourced to subcontracting firms, which may be the heaviest bitten by INPOU (e.g., in the experience of Natuzzi's INPOU, not so many jobs were lost at Natuzzi itself, as much as at subcontracting firms in the area). For this reason, our analysis tries to uncover also the occupational consequences of INPOU for entire productive segments, where subcontracting firms are generally included together with INPOU companies per se. As

we will see, results differ substantially whether we limit INPOU's employment effect only to those experienced by the firms undertaking this reorganization or, instead, consider INPOU's more general employment impact.

In the rest of the paper, Section 2 sketches a brief survey of the relevant literature. Section 3 is devoted to illustrate our database, display some descriptive evidence, perform our econometric analyses and present the related results. Section 4 draws to a close by discussing policy implications and research avenues for the future.

2. RELEVANT LITERATURE

In the last decade, a boom in theoretical and empirical literature on the domestic effects of international outsourcing of production (INPOU) followed the political and social concerns that relocating (part of) business abroad depletes employment and worsen performance at home.

In this respect, theoretical works have detected the features, rationale and likely effects of INPOU, but the arguments are not conclusive. A very general (and popular) view states that whether firms opt for vertical or horizontal investment abroad, activities at home can be affected positively or negatively, depending on: *a)* the intensity of technological integration between the activities at home and those moved abroad (in case of vertical investments), and *b)* whether the foreign and domestic productions are complements or substitutes (in case of horizontal investments). Barba Navaretti and Venables (2004) provide a comprehensive discussion on this subject. Not surprisingly, then, economic debates are mostly on the empirical ground.

The effects of INPOU on the domestic activities and performance of the firm that invest abroad is one of the most addressed issues. In this respect, some works deal with the consequences on labour intensity of home country production, finding that the latter can be lower when the employment in affiliates in developing economies is large (see, e.g., Mariotti, Mutinelli and Piscitello 2003 for the Italian case).

Other studies focus, in turn, on the "jobs creation *vs.* depletion" issue. For example, Brainard and Riker (1997) find only a partial substitution between employment in firm's foreign affiliates and the parent at home (while substitution is larger between affiliates in different countries), suggesting that domestic employment performance of the multinationals need not worsen after INPOU. In other cases, it has been pointed out that employment in foreign affiliates in developing countries can be complementary to home employment, while a substitution relationship would emerge for employment in foreign affiliates in developed countries (see, among others, Konings and Murphy, 2001). Amiti and Wei (2004) find no evidence that INPOU led to job losses in the U.K. during the period 1995-2001, in either manufacturing to the services sectors; more in general, jobs depleted by service outsourcing are likely to be offset by new jobs created in the same sector. Finally, in a paper using Irish firm-level data, Gorg, Hanley and Strobl (2004) show that the effect of INPOU is positive particularly for large firms and for those based in broader international exports.

The likely positive effects of INPOU on firm performance at home have been confirmed by an important strand of literature focusing on the construction of a proper

counterfactual for the firms venturing into INPOU, to which the performance after INPOU is compared. For instance, on the basis of a sample of Italian firms with more than 20 employees during the period 1993-98, Barba Navaretti and Castellani (2005, see also 2004a and 2004b), construct a counterfactual focusing on the firms that invest abroad for the first time and carry out a difference-in-difference estimate to assess the issue (see also Egger and Pfaffermayr, 2003, for a similar analysis on Austrian firms, and Barba Navaretti, Castellani and Disdier 2005 for the case of France). Thus, they show that the net effects of outward investments on the business in Italy are positive both in terms of size (turnover and employment) and in terms of efficiency. Moreover, the better performance of firms shifting from nationals to multinationals with respect to the "never shifting" ones does not deplete employment. Finally, there is no significant evidence that INPOU slows down the rate of employment growth.

It is worth noting that all of these studies deal with the INPOU effect on the performance of investing firms per se. However, as stated above, especially in Italy this cannot be the end of the story, because the "networked" feature of manufacturing sectors implies that performance of non-INPOU firms may well be affected by others' outward investment. This seems a novel insight in the literature.

To our knowledge, the only contribution on this side is the almost contemporaneous work by Federico and Minerva (2006). Focusing on the employment performance of the local area from which the outward investments originate, the authors estimate an employment growth regression which relates changes in employment levels, by local area and industry, to the local industrial structure and FDI. The analysis is carried out for the period 1996-2001 and a level of disaggregation involving provinces and 12 manufacturing industries. In doing so, they find that: *a)* local employment growth is positively associated with higher levels of FDI, (especially toward advanced economies); and *b)* the positive impact is concentrated in some capital-intensive industries, but no evidence of a negative relation is found for any other industry, also including traditional sectors. As opposed to our paper, however, Federico and Minerva do not analyze the change in the *overall* sector employment, but only the variation in the *province-sector* employment, on the basis of firm-level data and spatial and sector controls.

3. DATA, EMPIRICAL ANALYSES, AND MAIN RESULTS

This Section will firstly provide some details on our new database and display some descriptive evidence for preliminary discussion. Then, we will present the results of our econometric analyses.

3.1 The data and some descriptive evidence

3.1.1 Our database

ISAE carries out monthly surveys on a panel of over 4,000 Italian manufacturing and extractive firms with no less than 10 employees. The ISAE sample is proportional to the universe, layered by regions, sectors, and firm size. It covers about 4% of the

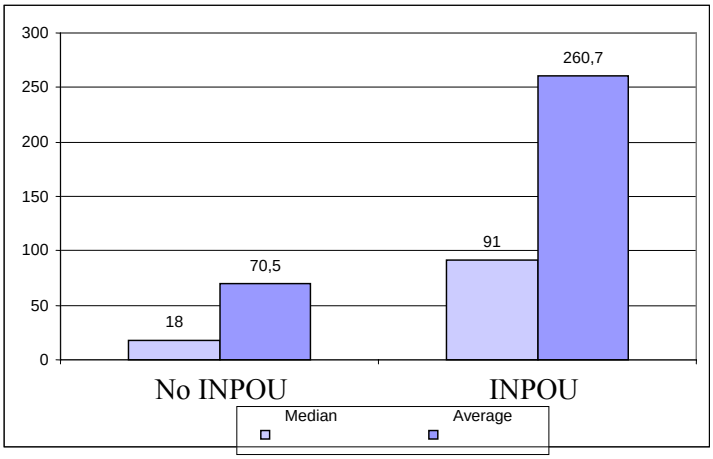
reference universe, that is the set of ISTAT ASIA archive. The ISAE surveys are in keeping with the European harmonized scheme.[1]

In this context, in May 2003 and March 2005 ISAE carried out two *ad hoc* surveys on the manufacturing firms propensity to venture into International outsourcing of production (INPOU). The INPOU section of the 2005 questionnaire is reported in Appendix 1. Therefore, using the sub-sample of 3,193 manufacturing firms responding to both surveys, we are able to provide a timely study about the current features and changes of INPOU in Italy. Moreover, in order to focus more specifically on manufacturing industries and to make our model more robust, we decided to drop, from the original sample, the observations relating to non-manufacturing or to "poorly represented" sectors such as coke, office facilities and TV-telecommunication**.**[2]

3.1.2 Some descriptive evidence

Referring to 2005, International production outsourcing (INPOU) regards 3.7% of our sample, in terms of number of firms, and 6.0% in terms of the employee (in Italy) share of the sample. The noticeable difference between the two figures depends on the fact that INPOU is more widespread among lager-sized companies (Figure 1).[3]

Figure 1 Average and median employees at INPOU vs. no-INPOU companies



Source: our calculations on the ISAE database.

Companies representing an additional 2.8% (in terms of employees in Italy) declared they intended to venture into INPOU within 12 months (Table 1). By

[1] In updating the panel, a specific attention is attached to continuity of the series (thus on "fidelity" of the firms). Accordingly, the "continuously-answering" firms are always present in the sample (this can occasionally lead to some oversized layers and a corresponding rise in sample numerosity) and only the under-represented layers are periodically integrated.
[2] It is worth mentioning that repeating the regression on the whole sample led to similar results.
[3] See also Costa (2005) and Costa and Ferri (2005) for more on this descriptive evidence.

geographical area, the phenomenon is most (least) intense in the North-East (in the South and Islands).

Table 1 INPOU and prospective INPOU companies by geographic area

(percentage, in terms of employees in Italy, on the total of each stratum)

Geographic area	INPOU companies	Companies to become INPOU within 12 months
North-West	5.4	2.6
North-East	8.7	3.3
Centre	5.3	2.5
South and Islands	1.4	2.3
Total Italy	*6.0*	*2.8*

Source: our calculations on the ISAE database.

Table 2 INPOU destination areas

(percentage, in terms of employees in Italy, on the total of each stratum)

Company size	INPOU % (of the stratum)	Destination (1)					
		Romania	China	India	EU	Other Central-Eastern European countries, Albania, Turkey	Other countries
Up to 99	*3.5*	*47.6*	*13.1*	*4.3*	*3.2*	*27.8*	*20.5*
100-249	*5.0*	*10.0*	*12.2*	*1.6*	*18.8*	*54.0*	*39.8*
250 & above	*14.2*	*11.5*	*40.1*	*21.0*	*13.7*	*34.5*	*23.3*
Total	*6.0*	*25.6*	*27.0*	*12.7*	*10.0*	*33.5*	*23.7*
Of which: (by sector)							
Food, drinks, tobacco	2.1	0.0	0.0	0.0	0.0	80.0	20.0
Textiles & clothing	14.7	34.2	4.8	3.0	0.0	51.4	29.0
Leather & shoes	15.1	74.3	20.9	10.3	0.0	21.8	10.0
Wood products	2.2	29.9	0.0	0.0	0.0	0.0	70.1
Paper & publishing	1.6	84.4	0.0	0.0	0.0	0.0	15.6
Petroleum	1.4	0.0	0.0	0.0	100.0	0.0	0.0
Chemicals	0.5	21.5	0.0	0.0	24.7	0.0	78.5
Rubber & plastic	5.6	6.5	53.0	0.0	40.6	6.5	66.4
Non metallic products	0.5	29.9	29.3	0.0	0.0	22.0	48.1
Metal products	3.4	10.3	37.7	0.0	6.6	24.2	22.3
Mechanical products	7.3	6.1	32.2	32.4	32.1	20.9	29.5
Electric machinery	13.8	19.8	61.9	30.7	7.5	36.8	0.0
Means of transport	4.3	26.3	11.9	11.9	6.6	75.0	0.0
Furnishing & other manufacturing	8.4	25.5	18.9	0.0	0.0	19.6	36.6

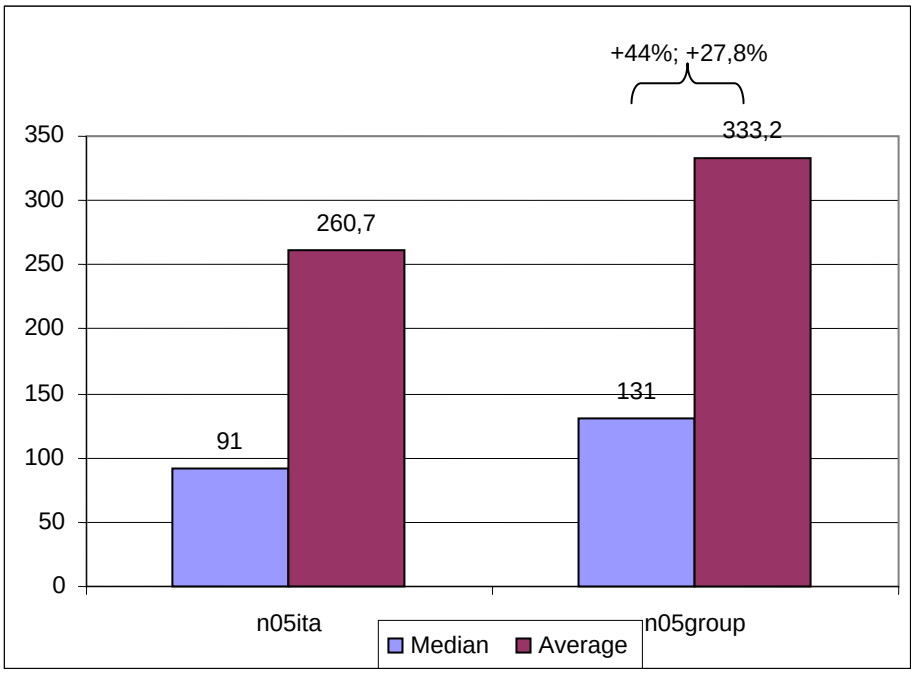
(1) The sum of each row may go beyond 100 since any interviewed company could declare up to 3 INPOU destinations. – Source: our calculations on the ISAE database.

As anticipated, inspecting destination areas suggests that INPOU is mostly triggered by cost-saving motives. Romania per se together with the group of Albania, Turkey and other Central-Eastern European countries show as most targeted

destinations (Table 2). Specifically, Romania is the most preferred by smaller-sized INPOU companies and in traditional production sectors.

Against the current situation in 2005, INPOU intentions seemed to decidedly privilege China, over Romania and other Central-Eastern European countries, as the favoured area of INPOU for the future (Costa, 2005). Furthermore, Costa and Ferri (2005) argue that INPOU may prove an effective way to increase firm size: the data show, in fact, that INPOU companies increase their group dimension significantly (Figure 2).

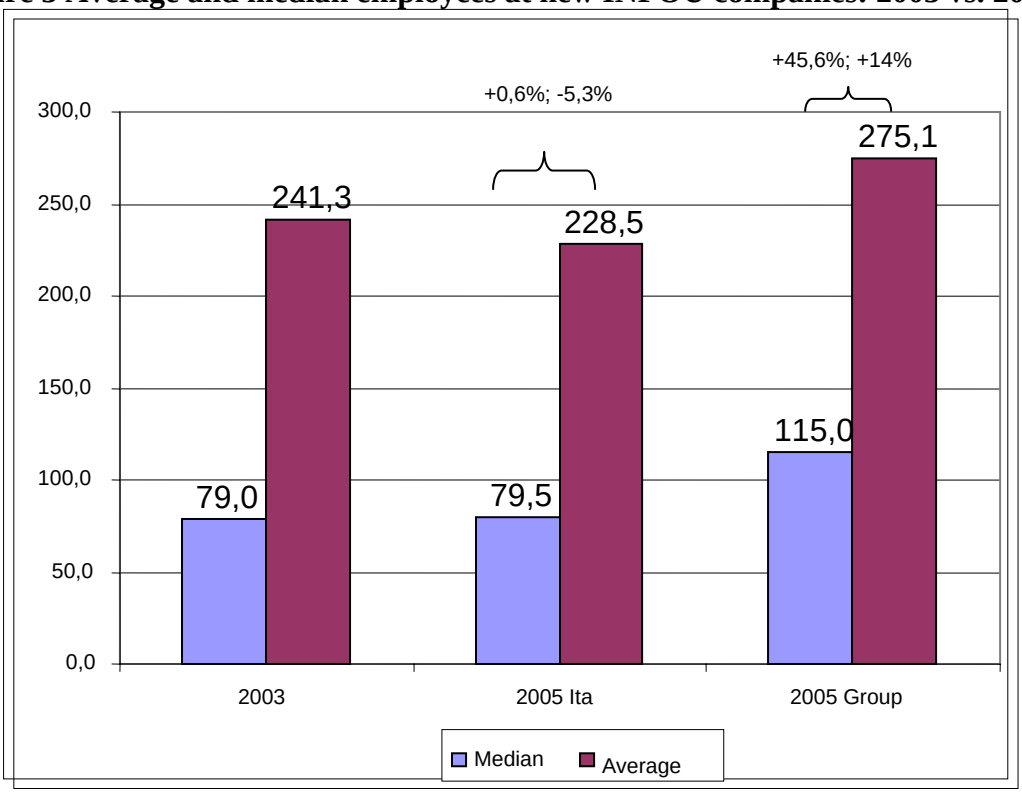
Figure 2 Average and median employees at INPOU companies: Italy vs. total



Naturally, the question one is most interested to answer is whether INPOU firms – while creating jobs abroad – sheds jobs in Italy. We can observe this from two different angles: *a)* a "short-term angle" on the impact of INPOU, by looking at firms outsourcing between 2003 and 2005; *b)* a "medium-term angle", by focusing on the companies which were already INPOU in 2003 (and confirmed to be INPOU in 2005).

As to the short-term impact, we notice that employees in Italy of the companies which have become INPOU between 2003 and 2005 decrease by 5.3% (Figure 3), against the 8.5% drop in employment at the no-INPOU firms in the ISAE database.

Figure 3 Average and median employees at new INPOU companies: 2003 vs. 2005



Regarding the medium-term impact, we detect that employees in Italy of the companies which were already INPOU in 2003 (and were still so in 2005) decrease by 6.2%, still less than the 8.5% drop in employment at the no-INPOU firms in the ISAE database.

Thus, in line with the previous findings of Barba Navaretti and Castellani (2005) and Barba Navaretti *et al.* (2005), the descriptive evidence derived from the ISAE database seems to reject the hypothesis that INPOU has detrimental consequences for employment in Italy. Nevertheless, before drawing a conclusion on this, we will need to look at the econometric analysis. In addition, as mentioned, we will not stop at evaluating the employment performance of INPOU firms but will also investigate the eventuality that INPOU companies trigger negative externalities at sub-contracting firms. This indirect effect should not be overlooked in a productive structure like Italy's one, consisting of myriads of networked enterprises.

3.2 The econometric regressions

On the basis of the new sample of 3,047 firm-level observations (after discarding those poorly represented sectors) we run a three-step quantitative study. Firstly, in 3.2.1, we analyze some determinants of the INPOU choice by individual firms, so linking our work to an ever increasing literature on the subject (see, e.g., Barba Navaretti and

Venables 2004, cap. 9, for a comprehensive review). Then we propose a twofold analysis of the effects of INPOU on employment in the Italian manufacturing industry. The first one, in 3.2.2, focuses on a *direct* effect, by including the "INPOU choice" in a linear regression that analyses the percentage change in employment for individual firms; the second one, in 3.2.3, deals with the *indirect* effects of INPOU. The latter is a relatively new comer in the literature on the issue, and a relatively neglected one among the studies on the Italian industry. However, as we pointed out above, in industry contexts like the Italian one, where firm size is quite small, and wide and strict productive relationships prevail (e.g. the numerous cases of subcontracting), INPOU is likely to have effects not only on firm employment, but also on *sector* employment. More importantly, these latter effects may have a different sign from the direct ones and partially offset them.

3.2.1 The determinants of INPOU

To verify the first model of the determinants of INPOU, we run a simple probit regression as a function of a set of firm-specific characteristics:

(1) $\text{Prob}(\text{INPOU03}_i=1 \mid \text{RELPRO03}_p, \text{RELPRO032}_p, \text{RELSECT03}_j, \text{LOGEMP03}_i, \text{S\_EXP03}_i, \text{S\_EXP032}_i, \text{SPECPRO03}_{j,p}, \text{TRAD}_i, \text{SCAL}_i, \text{SPEC}_i, \text{NW}_i, \text{NE}_i, \text{CE}_i)$

where: $RELPRO03_p$ is an index of the "intensity of INPOU in the province *p*", and expresses the share of firms that venture into INPOU on the whole of the firms in the province in 2003; the sign of its coefficient is expected to be positive; $RELPRO032_i$ is the square of $RELPRO03_i$ (we assume that the "province-impulse" effect increases more than proportionally as the INPOU in the province do); $RELSECT03_j$ is an index of the "intensity of INPOU in the sector *j*" (expressed by the classification ateco-2 digit) in 2003, and the expected sign is positive; $LOGEMP03_i$ is the logarithm of the number of employees in the 2003 (the logarithmic form is expected to capture a nonlinear relationship), and the sign is likely to be positive; S_EXP03_i is the share of export on firm turnover in 2003, imputed by the regressors to fill in the missing values, and its expected sign is positive (to the extent that a larger share reveals that the firm in question is somewhat more "open" to the international market and business); S_EXP032_i is the square of S_EXP03_i; $SPECPRO03_{j,p}$ is a control variable expressing the "intensity of specialization" of the province in terms of employees, that is the share of employees of the province *p* employed in industry *j*; $TRAD_i$, $SCAL_i$ and $SPEC_i$ are three dummy variables following the well-known classification by Pavitt (1984);[4] and

[4] We remind that the Pavitt classification shares manufacturing industries out, on the basis of technological patterns, on 4 categories: *a) traditional industries* (e.g. foodstuffs, textiles, wood, clothing, leather) where products are similar within the sector, the plant scale is not significant, technology is incorporated in plants, and competition is based on prices; *b) scale intensive industries* (e.g. petrochemicals, cars, metallurgy, household appliances), where output is quite similar, the (large) plant size is crucial in reducing unit costs, the (process) technology is fundamental for having a competitive production cost and competition is based on prices; *c) specialized industries* (e.g. mechanicals, optics and

NW_i, NE_i, CE_i are three dummies expressing the Italian macro-areas the firm operates in (North-West, North-East and Centre, respectively).

The (robust) estimates of the probit model for the probability of investing abroad are reported in the first two (the "2003") columns of Table 3 below. Single, double and triple asterisks indicate significance at the 0.1, 0.05 and 0.01 level, respectively.

Table 3 Probit for the probability of INPOU in 2003 and 2005

2003		**2005**	
Variable	Coefficient	Variable	Coefficient
relpro03	14.328047***	relpro05	18.125932***
relpro032	-33.914477***	relpro052	-56.887413***
relsect03	9.4251032***	relsect05	11.785961***
Logemp03	0.16087053***	logemp05	0.23061181***
s_exp03	3.1708948***	s_exp05	3.1727241***
s_exp032	-2.72826***	s_exp052	-2.9204902***
Specpro03	0.17382399	specpro05	-0.24596439
Trad	0.46813536**	Trad	0.4464885*
Scal	0.38987878*	Scal	0.38696708
Spec	0.06029944	Spec	0.00184087
Nw	-0.2737446	Nw	-0.27719905
ne	-0.19991325	Ne	-0.144182
ce	-0.13643082	Ce	-0.19987646
_cons	-4.1968242***	_cons	-4.5346928***
N. obs.	3047	N. obs.	3040
Wald chi2(13)	189.6500	Wald chi2(13)	167.3200
Prob > chi2	0.0000	Prob > chi2	0.0000
Pseudo R2	0.2280	Pseudo R2	0.2834

Legend: * p<0.1; ** p<0.05; *** p<0.01.

The signs of the coefficients are as expected. In other words, our model suggests that in 2003: a more "intense" INPOU in the province and industry of the firm (the linear effect prevails throughout the sample), a larger firm size, and a higher share of exports on turnover (our "openness" proxy) all tend to increase the probability that a manufacturing firm would choose to investing abroad. There is also some industry effect: operating in traditional and scale intensive industries (i.e. the typical "made in Italy" industries) increases the probability of INPOU. Finally, somewhat surprisingly, our data fail to capture any significant territorial effect (but these are partially embodied in the variable of intensity of INPOU in the provinces), neither is the intensity of specialization of the province significant.

It is also worth noting that these results are confirmed (actually reinforced) by an analogous regression relating to 2005.[5] Thus, a larger size, belonging to a province

photography), where products are differentiated, specific skills are relevant in production, technology is standardized and competition focus mainly on product characteristics; *d) high tech industries* (e.g. pharmaceuticals, office machines, medical and precision instruments), where output and prices are very differentiated and firms compete against each other mainly on innovation and technological knowledge.

[5] The fewer observations in this latter estimate is due to missing values in the dependent variable.

and/or to a sector heavily affected by the INPOU phenomenon, are at present relevant factors inducing Italian manufacturing firms to invest abroad.

However, we are most interested in industry effects, chiefly in light of the recent discussions on the competitive threats posed by "newcomers" such as China or India to developed economies (like Italy) heavily based on traditional productions. Thus, we introduce China's market share on the global economy, by sector (ateco-2 digit), as a proxy for the "perceived international competitive threats" for the firm, and assess it by running the following probit regression (where some of the other sector variables were dropped to avoid correlation problems):

(2) Prob($DELOC03_i$=1 | $RELPRO03_p$, $RELPRO032_p$, $LOGEMP03_i$, S_EXP03_i, S_EXP032_i, $SPECPRO03_{jp}$, $TRAD_i$, $SCAL_i$, NW_i, NE_i, CE_i, $DCHINA9903_j$),

where variables are defined as before and the new regressor $DCHINA9903_j$ indicates the absolute change in the Chinese international market share in industry *J* between 1999 and 2003.[6] Once again, we conduct the analysis also for 2005 (Table 4).

Table 4 Probit for the probability of INPOU, the "China effect"

2003		2005	
Variable	Coefficient	Variable	Coefficient
Relpro03	14.338372***	relpro05	19.107241***
Relpro032	-34.499836***	relpro052	-63.502491***
Logemp03	0.14695446***	logemp05	0.21065816***
s_exp03	3.294506***	s_exp05	3.3049505***
s_exp032	-2.7544874***	s_exp052	-2.8842992***
specpro03	0.22916507	specpro05	-0.15696522
trad	0.14262278	trad	0.04933712
scal	0.19591884	scal	0.05375234
spec	-0.08778856	spec	-0.11331907
nw	-0.29859594*	nw	-0.31936283
ne	-0.24096649	ne	-0.19497096
ce	-0.11018326	ce	-0.18037876
dchina9903	6.0074894**	dchina0105	5.6883495***
_cons	-3.5192734***	_cons	-3.8376859***
N. obs.	3047	N. obs.	3040
Wald chi2(13)	192.91	Wald chi2(13)	177.54
Prob > chi2	0.0000	Prob > chi2	0.0000
Pseudo R2	0.2066	Pseudo R2	0.2548

Legend: * p<0.1; ** p<0.05; *** p<0.01.

While the "old" regressors are as in the previous estimates, our data suggests that the "Chinese threat" fosters firm level INPOU. In terms of the marginal effects (not

[6] Of course, in the 2005 specification, $DCHINA0105_j$ indicates the analogous change between 2001 and 2005. In both cases we opted for the absolute (as opposed to percentage) change, which should be the one to affect entrepreneur perceptions of China's competition. In other words, an increase of 1% in such a share is perceived as an increasing threat, apart from the fact that the original share was either 2% or 20%.

reported in the table), in the 2003 analysis a unit increase in the difference between 1999 and 2003 Chinese market shares raises the average probability of investing abroad, for a firm in the same Ateco2 sector, by nearly 32% (19% in the 2005 analysis).[7]

3.2.2 The direct employment impact of INPOU

However, the angle from which the INPOU issue is to be really assessed, both for economic and policy issues, is the employment one: what about the INPOU effects on manufacturing employment? This is by now a hot subject in the industrial economics literature, in general and in Italy as well (see, among others, Brouwer, Mariotti and van Ommeren 2001, Barba Navaretti and Venables 2004, Barba Navaretti and Castellani 2005, Federico and Minerva 2006).

As stated before, consistently with the referred literature, our first step in this direction consists in estimating a simple linear model of change in firm employment:

$$(3)\quad DPEMP_i = c + \beta_1 INPOU03_i + \beta_2 RELPRO03_{ip} + \beta_3 ITAEMPSEC01_j + \beta_4 SPECPRO03_{jp} + \beta_5 S\_EXP03_i + \beta_6 S\_EXP032_i + \beta_7 TRAD_i + \beta_8 SCAL_i + \beta_9 HITECH_i + \beta_{10} NW_i + \beta_{11} NE_i + \beta_{12} CE_i + \beta_{13} CHINAWORLD2003_j + \varepsilon_i,$$

where the other variables are defined as before, and $DPEMP_i$ is the percentage change in employment at firm *i* between 2003 and 2005. The results are reported in Table 5.

Table 5 INPOU employment effects

Variable	Coefficient
inpou03	-0.02679109
relpro03	0.04237061
itaempsec01	0.00118701
Specpro03	0.02972725
s_exp03	0.06603417
s_exp032	-0.06854732
trad	-0.00471844
scal	-0.04723174**
hitech	-0.04183956
nw	0.03436425*
ne	0.05565376***
ce	0.03956775***
chinaworld2003	-0.39723785***
_cons	-0.00749233
Number of obs	3047
F(13, 3033)	3.16
Prob > F	0.0001
R-squared	0.0147

Legend: * p<0.1; ** p<0.05; *** p<0.01.

[7] If, instead of considering the *variations* in China's market share, we use the *absolute levels*, results do not change: only the marginal effect drops to around 10%.

The lack of other relevant explicative variables negatively affects the fitness of our model. However, our focus is on the role of international production outsourcing in affecting employment performance of the firm. In this particular case, results are consistent with previous findings (e.g., Barba Navaretti and Castellani, 2005). Namely, INPOU03 is not significant, corroborating our descriptive evidence, and suggesting that the domestic employment performance of INPOU firms is no worse than at other firms.

In spite of all the attention devoted to the employment consequences of INPOU, what the literature may have (so far) neglected is that the issue at stake has not one but two dimensions: the direct impact (just addressed) but also an indirect impact. In other words, as stated above, in a highly networked manufacturing industry such as the Italian one, the possibility is concrete that, from an occupational point of view, INPOU could heavily affect also the productive segment at large where the firm belongs. What's more, in theory, INPOU could deliver a positive (or "not-so-negative") direct impact at the *firm per se*, helping it limit job losses or enhance its market share, and a negative indirect impact on its *productive segment*, because of the termination of close trade relationships linking firms' businesses, such as subcontracting and so on.

3.2.3 The indirect employment impact of INPOU

To capture the INPOU *indirect* effect on (industry) employment, we estimated a new model for the growth rate of employment in the *sector*, by considering a new dataset broken down by 21 sectors (ATECO-2 digit) and 19 region level data,[8] consisting of 352 observations. Here too, we excluded the non-manufacturing and the 3 "poorly represented" sectors (i.e. with only one observation in the cell), obtaining a new sample of 278 observations. This exercise could be replicated also by sector and province level data, using a consistent dataset of 1,035 observations (dropping to 584 after replicating the exclusion as stated above).

Therefore, we run the following two symmetric pairs of region-by-sector and province-by-sector regressions:

$$(4)\ DPEMPSEC_j = c + \beta_1 AVGINPOU03_{jr} + \beta_2 AVGINPOU032_{j,r} + \beta_3 ITAVGEMP01_{j,r} + \beta_4 SPECREG03_{j,r} + \beta_5 S\_AVGEXP03_{j,r} + \beta_6 NW_j + \beta_7 NE_j + \beta_8 CE_j + \varepsilon_j,$$

and

$$(5)\ DPEMPSEC_j = c + \beta_1 AVGINPOU03_{jp} + \beta_2 AVGINPOU032_{jp} + \beta_3 ITAVGEMP01_{j,p} + \beta_4 SPECPRO03_{j,p} + \beta_5 S\_AVGEXP03_{j,p} + \beta_6 NW_j + \beta_7 NE_j + \beta_8 CE_j + \varepsilon_j.$$

where: $DPEMPSEC_j$ is the percentage change (between 2003 and 2005) in the average number of employees in sector *j*; $AVGINPOU03_{jr}$ is the share of the number of firms in

[8] The regions are 19 because the ISAE sample groups Piemonte and Val d'Aosta together.

sector *j* and region *r* (province *p*) that relocated their production abroad in 2003;[9] $AVGINPOU032_{jr}$ is the square of $AVGINPOU03_{jr}$; $ITAVGEMP01_{jr}$ is the average number (at the national level) of employees in sector *i* and region *r* (province *p*) in 2001 (this is a control variable to avoid endogeneity problems);[10] $SPECREG03_{j,r}$ is the "degree of specialization" of the region *r* in sector *j* (analogously for province *p* in $SPECPRO03_{j,p}$); $S\_AVGEXP03_{jr}$ is the average of the turnover share of exports in sector *i* and region *r* (province *p*) in 2003, imputed by the regressors to fill in the missing values);[11] NW_j, NE_j and CE_j are the aforementioned territorial dummy variables.

The results are all listed in Table 6 below.

Table 6 The effect of INPOU on industry employment in 2003

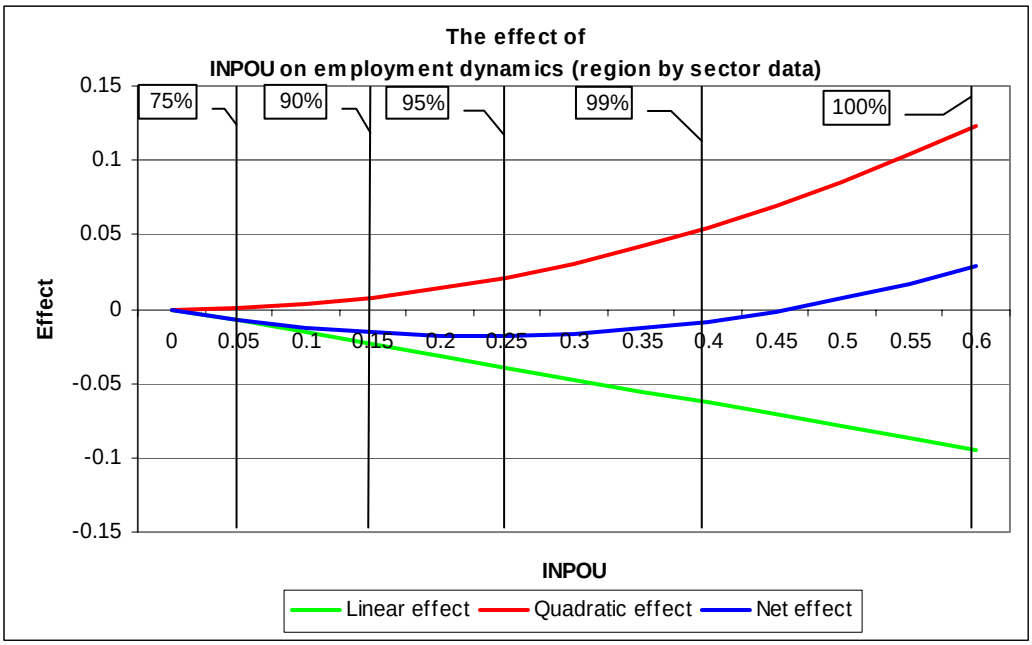
Region by sector data			Province by sector data		
Variable	Original dataset	"Modified" dataset	Variable	Original dataset	"Modified" dataset
avginpou03	-0.143317***	-0.157828**	avginpou03	-0.086038***	-0.098173***
avginpou032	0.243606***	0.342934*	avginpou032	0.082222***	0.121547***
specreg03	0.035323	0.085262***	specpro03	0.010271	0.021694*
s_avgexp03	-0.033358	0.015976	s_avgexp03	-0.011535	-0.000310
Nw	-0.000704	0.002526	nw	-0.005577	-0.001378
Ne	-0.001779	0.000401	ne	-0.008494**	-0.005022
Ce	-0.002190	-0.000071	ce	-0.006112	-0.008776*
itavgemp01	0.000642***	0.000542***	itavgemp01	0.000405***	0.000163
_cons	-0.012606**	-0.026638***	_cons	-0.012268***	-0.015019***
N	352	278	N	1035	584
F(8, 343)	4.52		F(8, 1026)	4.88	
F(8, 269)		3.48	F(8, 575)		3.2
Prob > F	0.0000	0.0008	Prob > F	0.0000	0.0015
R-squared	0.1223	0.1240	R-squared	0.0497	0.0395

Legend: * p<0.1; ** p<0.05; *** p<0.01.

Among the significant variables, let us focus on those relating to INPOU. It appears that considering either regional or provincial area, employment dynamics tends to be poorer the more intense the INPOU phenomenon in the area and in the industry is. This seems to confirm that, INPOU may actually shed jobs in Italy when correctly accounting for its spill-over effects throughout the production chain.

This result is partly qualified observing that the relation between INPOU and the change in industry employment features also a quadratic effect. This means that the ultimate effect is not the same throughout all the "degree of INPOU range", but it depends on the net impact of the linear and quadratic terms. For example, as far as the region-by-sector specification is concerned, the trends of these components and the net one are all reported in the Figure 4 below.

[9] Here each firm counts as one unit irrespective of its employees. In the near future we will check whether results are robust when we compute this share as an employment share.
[10] Controlling for specialization in terms of firms (as opposed to employees), does not change the results.
[11] In the 278-observations dataset imputing does not matter: there are no missing values.



Therefore, for INPOU to have a positive effect on (sector) employment, we need to observe a substantive occurrence of the phenomenon in a given industry and a given region: indeed, the effect is constantly negative unless INPOU is undertaken by over 50% of the firms operating in that industry and region, but this happens in less than 1% of the sample.

4. CONCLUSIONS

This paper aimed to investigate the micro determinants as well as the employment consequences of international production outsourcing (INPOU) by Italian manufacturing companies. To accomplish this task, we availed ourselves of a new firm-level database developed at ISAE building on two ad-hoc surveys run in May 2003 and March 2005. Even though lacking some of the commonly used firm-level control variables, our database bestows two pluses: (i) thanks to the flexibility of the ISAE surveys, we have access to INPOU data more up to date than most other databases; (ii) owing to the fact that the ISAE sample is highly representative, we can observe INPOU in a more comprehensive manner than in some other studies.

It seems that, albeit lagging with respect to other countries, Italian companies recently accelerated their INPOU. Our evidence on the determinants confirms that INPOU in Italy mostly counters emerging economies' threats to traditional manufactured goods: INPOU disproportionately targets developing countries and intensifies in sectors with stiffest Chinese competition.

Concerning the employment consequences of INPOU, beside corroborating the previous literature on the *direct* occupational impact at INPOU firms per se, we extend the analysis to the possible *indirect* employment effects. As to the former, we concur with previous papers that INPOU firms' domestic employment performances are no worse than at matching no-INPOU firms. However, this evidence might be partial and potentially misleading. Given Italy's industrial structure (small-sized networked enterprises), in fact, INPOU might favor employment performance at the very firms undertaking it while imparting negative spill-over effects on suppliers. This worry would be less justified in other countries, where INPOU is dominated by large-sized companies. In such a case, the occupational impact of INPOU might be generally limited within the individual company – possibly inducing labor mobility across different mother company's departments and/or group affiliates. However, this is unlikely the end of the story in Italy, where most of the brunt may fall on subcontracting firms. Then, INPOU could induce in Italy negative indirect employment effects. Our evidence that employment performances worsen in the productive segments with strongest INPOU supports this conjecture.

Experts in the field might wish to make a further effort to study the indirect employment effects of INPOU we just uncovered. More analyses – perhaps using more appropriate and detailed information – may be needed to confirm its existence and to establish its economic significance.

In this background, however, the latter results of ours may start feeding the policy debate in Italy. Clearly, the issue is not whether to limit INPOU, which is one of the key options to preserve competitiveness (Rossi, 2006), but how to deal with its negative effects on Italy's job market. Considering that the spill-over effects of INPOU provide a negative externality on the firms in business relation with the company venturing into INPOU, there seems to be scope for some type of public sector intervention through measures able to amortize these effects. For instance, in view of the fact that INPOU generally induces a shift from unskilled to skilled labor demand, public programs could be needed to support job retraining and favor mobility in the areas with intense INPOU.

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Appendix A

"SECTION ON INTERNATIONAL PRODUCTION OUTSOURCING"

Q1. Did your company outsource any production abroad?

- Yes_____1 Go to Q2
- No_____2 Go to Q3
- No answer_____3 Go to Q3

Q2. Can you please tell us to which foreign countries your company outsourced production?
(maximum 3 countries)

- China_____1
- India _____2
- Romania _____3
- Turkey _____4
- Albania or Ex-Yugoslavia (*Albania, Bosnia, Croatia, Macedonia, Serbia, Slovenia*) _____5
- Ex-USSR (*Azerbaijan, Belarus, Estonia, Latvia, Lithuania, Russia, Ukraine*) _____6
- Other Center-Eastern European countries (*Bulgaria, Czech Republic, Hungary, Poland, Slovak Republic*) _____ 7
- Japan and other Asian countries (*Indonesia, Japan, Korea, Pakistan, Thailand, Taiwan*) ____ 8
- North America _____9
- Central e Southern America _____10
- (15-member) European Union _____11
- Other (*Africa, Oceania*) _____12
- No answer _____13

Q3. Does your company intend to outsource production abroad over the next 12 months?

- Yes_____1 Go to Q4
- No_____2 Stop if answer to Q1 was 2 or 3, otherwise go to Q5
- No answer_____3 Stop if answer to Q1 was 2 or 3, otherwise go to Q5

Q4. Can you please tell us to which foreign countries your company intends to outsource production over the next 12 months?
(maximum 3 countries)

- China_____1
- India _____2
- Romania _____3
- Turkey _____4
- Albania or Ex-Yugoslavia (*Albania, Bosnia, Croatia, Macedonia, Serbia, Slovenia*) _____5
- Ex-USSR (*Azerbaijan, Belarus, Estonia, Latvia, Lithuania, Russia, Ukraine*) _____6
- Other Center-Eastern European countries (*Bulgaria, Czech Republic, Hungary, Poland, Slovak Republic*) _____ 7
- Japan and other Asian countries (*Indonesia, Japan, Korea, Pakistan, Thailand, Taiwan*) ____ 8
- North America _____9
- Central e Southern America _____10
- (15-member) European Union _____11
- Other (*Africa, Oceania*) _____12
- No answer _____13

Q5. Can you please tell us how many employees are working at your foreign affiliates?

- 1-20 employees_____1
- 21-50 employees_____2
- 51-250 employees_____3
- Beyond 250 employees_____4
- No answer_____5

Q6. Production outsourcing by your company was CHIEFLY financed thorough:
(1 answer only)

- Own capital_____1
- Bank credit_____2
- Other forms of financing_____3
- No answer_____4

Q7. The intended Production outsourcing by your company was CHIEFLY financed thorough:
(1 answer only)

- Own capital_____1
- Bank credit_____2
- Other forms of financing_____3
- No answer_____4

End of the interview