

Using Administrative Data to Evaluate the Employment Impact of Incentives to Artisan Enterprises ⁽¹⁾

La Valutazione dell'Impatto Occupazionale degli Aiuti alle Imprese Artigiane con l'Utilizzo di Dati Amministrativi

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Riassunto: Questo lavoro propone un modello di analisi per stimare l'impatto occupazionale degli aiuti alle imprese artigiane utilizzando dati di fonte amministrativa. L'incrocio degli archivi INPS e Albo Imprese Artigiane consente di ricostruire, per ciascuna impresa, informazioni attendibili su una serie di variabili economiche e demografiche e sugli occupati totali rilevati con cadenza annuale. Queste informazioni permettono di stimare un modello parametrico di tipo differenza-nelle-differenze che offre stime d'impatto occupazionale al netto dell'effetto delle dinamiche economiche spontanee e delle diverse caratteristiche iniziali d'impresa. Le stime del modello, applicato agli aiuti alle imprese artigiane piemontesi nel biennio 2000-01, evidenziano un impatto medio di 4,78 occupati in più ogni 100.000 euro di contributi erogati.

Keywords: Employment effect, difference-in-differences, regression model

1. Introduction

The aim of this paper is to evaluate the employment effects of business incentives in support of artisan enterprises using employment administrative data from INPS (the National Social Security Agency of Italy) and economic and demographic firm-specific data from the Official Registry of Artisan Enterprises (maintained by the local Chambers of Commerce). We consider the case of the artisan enterprises located in the Piedmont region of Northern Italy and estimate the effect of their employment of a set of programs that supported their investment activities in 2000-01. We find that these programs had a small but significant effect on the total employment of these enterprises. Every €100,000 worth of total public support, employment increases on average by 4.78 units. Such average employment impact varies considerably by categories of assisted firms based on industrial sectors, firm sizes, locations (in terms of the province in which production takes place) and age of the leading entrepreneur. Impact estimates for each category of assisted firms range from a low of 0.7 to a high of 14.99 new jobs per every €100,000 worth of total public support.

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We obtain these results through a parametric difference in difference model (Heckman and Hotz 1989, Moffit 1991, Bartik and Bingham 1995, Bondonio and Engberg 2000) that yields impact estimates controlling for both area- and sector-specific economic trends and for firm initial characteristics. We find that the estimated impacts are robust across several specifications of the model.

2. Policy Information and Data

The focus of the analysis are the business incentives in support of artisan enterprises in effect in the Piedmont region during 2000-01. Such incentives can be grouped into four categories:

- a) Capital grants to support investment expenditures (up to 15-30% of the total investment) resulting in plant relocations into designated assisted areas or aimed at expanding production capacity and/or supporting technological upgrades of the production process;
- b) Loans at a below-market interest rate (for a maximum of 50% of the proposed investment) aimed at supporting capital expenditures to increase the production capacity and/or ameliorate the production process;
- c) The “Quality Certification Program” providing non-refundable capital contribution up to 30% of the investments aimed at the acquisition of Quality Certification for products or production processes;
- d) Contribution to cut interest rate costs related to capital expenditures for increasing the production capacity and/or ameliorating the production process.

The aggregate value of these incentives, in the 2000-01 period, is € 131.5 million. In order to evaluate the aggregate employment impact of the entire incentive package offered to the Piedmont enterprises we need to construct a “treatment-variable” using a metric that is common to all types of incentives. While for the incentives a), c) and d), the contribution paid to the assisted firms are equivalent to the amount of public expenditure devoted to support such policies, this is not the case for the loans b). For loans b), the public expenditure required to support the policy is equivalent only to the stream of interest payments that is foregone because of the interest rate being set at below market value. Accordingly, in the data set for the analysis, the monetary value of loans b) has been replaced by an estimate of the net present value of the stream of foregone interest rate payments.

The data used in the analysis is obtained by integrating four different data sources. We started from the Official Registry of Artisan Enterprises, maintained by the local Chambers of Commerce. The registry provides accurate information on existing enterprises and their characteristics, with the exception of current employment with the enterprise. This information has to be retrieved from two separate Social Security (INPS) databases, containing respectively data on self-employed individuals (the artisans themselves, in our case) and data on employees (the workers employed by the enterprise). The match between the three databases provided reliable information on the level of employment of *all* artisan enterprises in Piedmont at the end of 1999 and at the end of 2001.

Finally, the resulting data set was augmented with the information on the benefits received during the years 2000 and 2001. Of the 146867 enterprises existing in

Piedmont as of December 31, 1999, approximately 13840 received, in the 2000-01 period, some kind of support in the form of one or more of the incentives listed in Section 2. Table 1 shows the average number of persons employed among beneficiary and non-beneficiary enterprises at the beginning and at the end of the period considered for the analysis.

Table 1 - Average employment among artisan enterprises, by beneficiary status

	Beneficiary status in 2000-01		Difference beneficiaries - non-beneficiaries
	beneficiaries	non-beneficiaries	
Number of enterprises	13840	133027	
Average employment, Dec. 1999	4,14	1,72	2.42
Average employment, Dec. 2001	4,52	1,74	2.78
Employment difference 2001-1999	0,38	0,02	0,36

3. Regression Results

To estimate net employment impacts of the program interventions, we estimate several regression models, using as a dependent variable the absolute change in employment observed for each enterprise between Dec 31, 1999 and Dec 31, 2001.

The models we estimate have the following general forms:

$$\Delta Y_i = \alpha + \beta T_i + SECT\delta + LOC\phi + SIZE\lambda + AGE\omega + TEN\gamma + \varepsilon_i \quad (1)$$

$$\Delta Y_i = \alpha + \sum_p \beta_p T_{p_i} + SECT\delta + LOC\phi + SIZE\lambda + AGE\omega + TEN\gamma + \varepsilon_i \quad (2)$$

$$\Delta Y_i = \alpha + \sum_s \beta_s T_{s_i} + SECT\delta + LOC\phi + SIZE\lambda + AGE\omega + TEN\gamma + \varepsilon_i \quad (3)$$

$$\Delta Y_i = \alpha + \sum_l \beta_l T_{l_i} + SECT\delta + LOC\phi + SIZE\lambda + AGE\omega + TEN\gamma + \varepsilon_i \quad (4)$$

$$\Delta Y_i = \alpha + \sum_z \beta_z T_{z_i} + SECT\delta + LOC\phi + SIZE\lambda + AGE\omega + TEN\gamma + \varepsilon_i \quad (5)$$

Where:

$T = 0$ for non beneficiaries, = monetary value of the support from any program for beneficiaries expressed in units of € 100.000;

$\sum_p T_{p_i}$, $\sum_s T_{s_i}$, $\sum_l T_{l_i}$, $\sum_z T_{z_i}$ = sets of variables T for each type of policy incentive, industrial sector, area of firm location and size-class, respectively;

SECT is a set of 28 dummy variables representing the economic sectors in which the enterprise operates;

LOC is a set of 30 dummy variables representing the areas in which the enterprise is located;

SIZE is a set of 5 dummy variables representing the initial number of employees of the enterprise;

AGE is a set of 3 dummy variables representing the age of the artisan as of December 1999;

TEN is a set of 7 dummy variables representing the time elapsed since the start-up of the enterprise.

Table 2 contains the main results for the different specifications (1-5) of the model, omitting all the coefficient estimates for the control variables.

Table 2¹ - *Estimated employment impacts of each €100.000 worth of incentives*

Treatment variables (1=€100.000)	Coefficient	Standard dev.	P-values	Adj. R²
T (Avg. Treatment)	4,783	0,136	0,000	0,166
T_loans_at_below_market_value	29,025	0,804	0,000	0,166
T_quality_certification_program	1,859	0,209	0,000	
T_capital_grants_for_investment	2,362	0,248	0,000	
T_contr_to_cut_interest_rate_costs	10,107	0,302	0,000	
T_size_0_(new_firms)	12,450	0,569	0,000	0,167
T_size_1_employee	2,653	0,459	0,000	
T_size_2-3_employees	3,292	0,283	0,000	
T_size_4-6_employees	4,608	0,298	0,000	
T_size_7_or_more_employees	5,092	0,215	0,000	
T_loc_prov_AL	6,138	0,567	0,000	0,169
T_loc_prov_AT	3,892	0,589	0,000	
T_loc_prov_BI	27,456	1,942	0,000	
T_loc_prov_CN	2,846	0,209	0,000	
T_loc_prov_NO	25,501	1,479	0,000	
T_loc_prov_TO	5,886	0,217	0,000	
T_loc_prov_VB	5,402	0,562	0,000	
T_loc_prov_VC	12,624	1,330	0,000	
T_age_entrepreneur<30	14,270	1,011	0,000	0,167
T_age_entrepreneur_30-55	4,221	0,161	0,000	
T_age_entrepreneur>55	5,731	0,267	0,000	

Not surprisingly, given the large number of observations, all of the coefficients on the policy variables are estimated rather precisely. These estimates implies that, for every €100.000 of public spending in support of artisan enterprises, total employment over the two year period has increased on average by 4.78 units.

All of the impact estimates of Table 2 are quite robust as they survive an extensive sensitivity analysis performed by replicating the estimation of the models (1-5) with different functional forms of both treatment and control variables.

References

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¹ For space constraints, Table 2 does not contain regression results for the industrial sector specification, while we refer to lengthier version of the paper for the complete results of the analysis.