Export Management and Labor Demand. Evidence from a Policy Experiment*

Francesco Manaresi† Alessandro Palma‡
Luca Salvatici§ Vincenzo Scrutinio¶

9th March 2021

PRELIMINARY AND INCOMPLETE

Abstract

We study the effect of a subsidy program for hiring a Temporary Export Manager (TEM) on firms’ outcomes and labor demand. Firms were invited to apply and subsidies were allocated on a first come, first served basis. We use a local differences-in-differences design based on time of arrival of firms application to compare the performances of subsidized firms who were eligible to receive the voucher to firms who were not eligible, in the neighbourhood of the time of exhaustion of the budget. Eligible firms experienced an increase in revenues, ROE, profits and value added per employee. These performances were accompanied by a significant growth in export in extra-EU markets in the fourth year after receiving the subsidy. Before starting to export, TEMs were also effective in stimulating ‘good’ labor demand, with an overall increase of the workforce of about 13%, mainly composed by full time and permanent employees.

J.E.L. codes: L2, L38, 040, F14, H2, F2

Keywords: SMEs, export subsidy, labor demand, natural experiment, click-day

*Acknowledgments: The realization of this project was possible thanks to the sponsorships and donations of the “VisitInps Scholars” program. We thank the staff of Direzione Centrale Studi e Ricerche at INPS for their support with the data and the institutional setting. The findings and conclusions expressed are solely those of the authors and do not represent the views of INPS. We also thank the staff of the Directorate General for Internationalization Policies (DG-PIPS) of the Ministry of Economic Development (MISE). Finally, we are grateful to Andrea Linarello (Bank of Italy), Marco De Andreis and Giulio Dal Savio (Italian Customs) for their precious help in obtaining custom data.

†OECD, DG for Science, Technology and Innovation; Bank of Italy, DG Economics, Statistics and Research; E-mail: francesco.manaresi@oecd.org

‡Corresponding Author, Gran Sasso Science Institute (GSSI); CEIS Tor Vergata University; E-mail: alessandro.palma@gssi.it

§Dept. of Economics, Roma Tre University; Centro Rossi Doria; E-mail: luca.salvatici@uniroma3.it

¶University of Bologna, IZA, London School of Economics; E-mail: vincenzo.scrutinio@unibo.it
1 Introduction

With the availability of microdata in recent years, the focus of the analysis in the trade literature has gradually shifted from trade patterns between countries or industries to the engagement of firms into international markets. Export activity has been positively associated to firm’s performance, increasing productivity through the mechanism of learning-by-exporting (Clerides et al., 1998; De Loecker, 2007; Harrison and Rodríguez-Clare, 2010) and new innovative capacity (Caldera, 2010; Rodríguez and Rodríguez, 2005; Ganotakis and Love, 2011; Woerter and Roper, 2010).

Production is more and more fragmented across country borders, with various parts of the production process—from design to distribution—segmented across different countries. Participating directly in Global Value Chains (GVCs) requires scale since production at each stage requires a suite of complementary services, including transport and logistics, finance, communication, and other business and professional services. In this setting, small firms are often not able to build the necessary internal capabilities to meet the strict product and quality standards demanded, or overcome external barriers such as regulations and customs procedures. Building such capabilities can require substantial investments in process and product innovations, managerial and workforce skills development as well as adoption of modern technologies.

These trends have important implications for productivity and policy, with potential gains through firms specializing in their most productive tasks and utilizing new varieties and higher quality foreign goods, services and intangible inputs. Policies that promote domestic market competitiveness, particularly in services, are key to benefiting from GVCs because they can facilitate the upscaling and development of the managerial capacity of SMEs. In the same vein, a large body of evidence on recent technological advances highlights that the performance effects of new technologies depend on complementary firm-level investments, such as organisation structures, management capability and skills development. GVCs, therefore, highlight policies that address credit market imperfections and support development of management capabilities (OECD, 2015).
In this paper, we estimate the causal effect of firms’ export subsidies by studying the “Vouchers for internationalization” policy, a unique program implemented recently in Italy. Such policy presents three key features. First, it aims at directly increasing export capacity by expanding the managerial skills of firms through a subsidized consultancy service consisting in a Temporary Export Manager (TEM). This allows focusing on the role that the availability of skilled labor plays in contributing to export and other firm’s performances. Second, firms have obtained the grant through a click day. The randomness of the vouchers’ assignment event generated as-good-as-random variation in TEMs’ allocation, ruling out selection into treatment and allowing to estimate the causal effect of the program on different outcomes of interest. Third, the policy involved a significant number of Small and Medium Enterprises (SMEs), warranting a large external validity.

Motivated by the international business literature which considers managerial resources as an essential aspect of firm-specific advantages that contribute to explain and predict firm success, the policy experiment we consider in this study allows us to establish a causal link between “managerial input” and the firms’ internationalization process. We do so by exploiting a policy discontinuity that directly affects the hiring process, but not the export opportunity as in the case of Caliendo et al. (2020). In this respect, the policy implementation allowed for a quasi-experimental design that avoids issues of selection, simultaneity and reverse causality. By employing granular custom and balance sheet data, we can estimate the policy effects on the firm’s export capacity by analyzing different trade margins and several outcomes of the firm’s performances. Moreover, we match firm data with administrative social security records to explore the effect of export activity on the labor demand, a primary outcome for policymakers that has been overlooked to date.

Overall, our findings highlight that the availability of export managers had positive effects on total trade (import + export), though we find significant effects only for export value three years after receiving the subsidy. Since we are able to distinguish export destinations, we also investigate whether the export manager had an impact non
only on the mere act of exporting but also the destination of exports that have been pointed as significant determinants of firm behavior (Brambilla et al., 2012). Our results show that TEMs were particularly effective in creating new market opportunities in extra-EU markets, that is markets characterized by the highest access barriers, where the gain from trade was about five times larger than the one obtained in more familiar EU markets.

The policy has been also an important driver of firm performance already after one year the assignment of the subsidized TEM voucher. In particular, we find a significant and positive growth in the revenues from sales, gross profits, ROE and value added per employee.

Our results also speak to the debate focusing on the labor market consequences of international trade (Dauth et al., 2017; Di Cintio et al., 2017). Immediately after receiving the TEM voucher, we observe an increase in the employment costs, a finding in line with the policy effects on the firm labor demand. Using social security data we show that export activity is associated with important margins of adjustments on the labor market. In particular, our estimates unveil that before starting to export, firms start to hire. Indeed, already after eight months from the subsidy assignment we find a significant growth in the total employment of about one employee/firm, which steadily increases in magnitude and significance during the four subsequent years. The analysis of the effects heterogeneity reveals that most of the new labor demand is driven by full time and permanent employees, that is ‘good’ jobs.

Our work conveys important implications for the design of policies to foster growth. First, relatively small incentives to firms generated a significant impact in stimulating export and overall firm’s growth. Since whether and under which mechanisms these subsidies actually work is a moot point, an interesting explanation of this leverage lies on the fact that firms receive in-kind contributions instead that generic financial incentives (Görg et al., 2008). Secondly, much of the literature pointed out the adjustment costs due to import competition rather the benefits stemming from exports increases. We do
believe that better understanding how and why trade may be beneficial, is a key item on
the research agenda for trade and labor economists. Finally, we assess the quantitative
impact of the managerial input, and firms benefit from a deeper participation to GVCs.
In this respect our results show that being part of international networks may significantly
improve firms’ performance and employment opportunities.

2 Export and firms’ performance

The traditional trade literature, building on Melitz (2003), stresses the selection of
exporters based upon productivity. The presence of a sunk cost plays a major role.
Drawing upon this, the current paper adds to strands of the literature. Since the
TEM vouchers can be considered an export subsidy, our paper is related to the large
body of the literature that focuses on the economic rationale for export subsidies
pointing out cross-markets terms-of-trade effects (see, for example, Feenstra (1986)) or
highlighting ‘the profit shifting’ role of export subsidies under international oligopolistic
conditions (Head and Spencer, 2017), while Bagwell and Staiger (1988) illustrate a
role for export subsidies when trade product quality is unknown. Recent advances in
the theory of international trade have shed new light on the reasons for and effects of
export subsidies. Using a model of firm-level heterogeneity and product differentiation
with monopolistic competition, Demidova and Rodríguez-Clare (2009) show that export
subsidies can increase aggregate productivity but this positive effect is dominated by
other determinants of the country’s welfare (terms of trade and variety).

Export subsidies could also represent a second best policy option in case of market
failures affecting specific markets as in the case of the financial markets. Financial
frictions pose a barrier to export entry by altering the firm’s long-term capital structure,
and thereby affecting the ability to finance sunk entry costs. Such constraints are
particularly important for intangible investments, which are subject to considerable
uncertainty and information asymmetry. Financial intermediaries may also prefer to fund
investment in physical assets—which can be offered as collateral—rather than intangible
investments, which offer only a future stream of profits Bloom et al. (2007).

In international markets, sunk costs typically represent the expenditure on establishing a commercial and distribution network abroad. Bergin et al. (2006) raise the question of how firms go about financing the payments of one-time sunk entry costs. They argue that financial frictions that affect long-term firm financing used to pay sunk entry costs, may be even more consequential than those affecting short-term working capital used to finance current production. Since a TEM can be considered a sunk cost as well, if exports are a long-run endeavor, firms need first do scale up production hiring more workers before increasing their export capacity.

We also focus on the interaction between labor adjustments and export decision: firms export performance create significant variations in firms’ employment structure. Much first-generation research on trade and wages worked under the canonical version of the Heckscher-Ohlin (HO) model (Lawrence et al., 1993; Borjas et al., 1997, among others). Recent work has wedded HO and modern trade theories that incorporate heterogeneous firms. Burstein and Vogel (2017) embed a Melitz-style model, in which firm differ according to their productivity, into an otherwise standard HO setting. Calibrating the model and allowing for more productive firms to be more intensive in the use of high-skill labor reveal that freer trade affects the wage premium for high-skill labor more through the Melitz mechanism of within-industry shifts in employment toward more productive firms than through the HO mechanism of between-industry shifts in labor demand (Autor et al., 2016). Coşar et al. (2016) allows for hiring and firing cost and studies the impact of trade policy in Columbia though selection into exporting is not a point of their analysis. Recently, Firooz (2019) studies the impact of trade on job turnover in a dynamic search model while Cooper et al. (2020) study the exporting decisions of Chinese manufacturing firms highlighting the economic significance of labor adjustment costs in shaping both employment and trade dynamics.

Finally, we relate to the international business literature which considers managerial resources as an essential aspect of firm-specific advantages, presenting an empirical
analysis which complements well established theoretical results with sound empirical
findings. Building on the previous argument, a key element to foster the firm’s capability
to participate in GVCs are good managerial practices. Entering new foreign markets
as an exporter is a highly complex process for firms, involving substantial fixed and
sunk costs, requiring strategic planning and guidance. The provision of these inputs
is an essential task of management. A growing body of works highlights the role of
management quality in shaping firms’ outcomes (Giorcelli, 2019; Bianchi and Giorcelli,
2019; Mion and Opromolla, 2014; Amador et al., 2018). Entering new foreign markets
as an exporter is a highly complex process for firms, involving substantial fixed and
sunk costs which vary across markets and industries, requiring strategic planning and
guidance. The provision of these inputs—from planning to implementation—is an essential
task of the management. While the importance of fixed entry costs and productivity has
been extensively analyzed within the international economics literature, the relevance
of the managerial contribution remains relatively unexplored, especially concerning
export performance. (Bloom and Van Reenen, 2007), for instance, focus on measurable
management practices and find a strong association between these practices and firm
productivity but little is known concerning export capacity. Nonetheless, there are good
reasons to believe that there is something special about managers and export.

The growing literature looking at the relationship between trade and tasks (Grossman
and Rossi-Hansberg, 2008) suggests that the complexity of the tasks involved in the
different stages of the production process (design, manufacturing of parts, assembly, R&D,
marketing, commercialization, etc.) is key to understand recent trends in international
trade. Export managers are indeed particularly important for trade activity because
they are likely to influence marketing and commercialization activities such as, for
instance, setting-up distribution channels, and finding and establishing relationships
with foreign buyers and suppliers. For instance, Arkolakis (2010) stresses the role of
marketing costs in international trade and provide evidence of the importance of the
continuous ‘search and learning about foreign demand’ problem that firms face when
selling abroad.
In this respect, the difficulty of introducing managerial inputs into the analysis is represented by the fact that we can seldom discern whether a firm is starting to export because it has managerial capabilities or rather it has hired new managers for the reason that it intended to export (Sala and Yalcin, 2013).

3 Research Design

3.1 Institutional Setting

With the aim of stimulating both growth and employment capacity of the Italian SMEs, the Government launched the “Vouchers for internationalization” policy in 2015.\(^1\) The policy was aimed to firms with revenues above 500,000 Euro in at least one of the three previous years or Start-Ups.

All firms could not receive any other government support for similar activities. It envisages a monetary subsidy for firms acquiring services from consultancy company providing expertise in trade activities. The Ministry of Economic Development (MISE) provides a validated list of providers satisfying requirements such as a consolidated experience in trade activities and knowledge of foreign languages. Eligible firms, specifically, receives consultancy from a “Temporary Export Manager” (TEM), who assists the firm in studying foreign target markets and in elaborating strategies to start or intensify export activities. The TEM is expected, therefore, to be part of the firm’s management staff for at least 6 months. This is a unique feature of this policy, since the role of managerial skills in the figure of TEM, which includes knowledge of foreign markets, team building, social network capacity and other professional skills, constitutes an important driver of foreign market penetration and potential firm’s growth (Opromolla et al. 2017).

The policy was assigned a total budget of 19 million of Euros in its first edition in 2016, which was raised to 38 million Euros in its second edition in 2018. Firms could benefit

\(^1\)They were first introduced with the Law n.133/2014 and later normative aspects were reported in the ministerial decree of the 15\(^{th}\) of May 2015.
of a total contribution of 10,000 Euros with a minimum of 3,000 Euros contribution provided by the firm itself.

In the first wave of the assignment of the vouchers, the amount of more than half of the contracts was exactly about 80% of the contracts had a value below 14,000 Euros, which shows how relevant the voucher was for this investment by firms. The duration of the contracts was between 6 and 12 months, with more than 50% of firms having contracts of exactly 6 months. Firms requested a variety of services from TEMs with most of them trying to get additional clients and contracts (46%) or requiring market research activities (34%). Remaining firms asked for other kinds of support ranging from legal consultancy on international markets (2.7%) to logistics and custom duties support (0.6%). In about 10% of the cases, the precise nature of the contract is not specified.

The policy mechanism involved four steps to be completed during the period September-December 2015. First, in early September firms were requested to send an expression of interest by filling a registration form in which they declared the main information required to be eligible for sending their applications.

The second step envisages a 11-day period during which firms could send their final applications, specifically from September 22nd starting from 10:00 a.m. to October 2nd. Since the Ministry adopted a first come first served eligibility criterion and firms were highly responsive in sending their applications, the allocation procedure resulted in a click day, with the total budget exhausted within the first two minutes. Figure 2 shows the density distribution of total applications over time.

Third, the Ministry checked the applications received to verify the information declared. Firms not complying with the requirements of the policy were excluded as well as those firms which renounced to the subsidy ex post. These firms were replaced with new firms based on their application time. Specifically, 73 applications were excluded because they contained inconsistent information, while 33 applications were withdrawn. This verification process led to a total of 4073 valid applications; of these, 1756 –
approximately 42% – received the vouchers.

Lastly, eligible firms established contacts with TEMs by drawing from the list of consultancy companies provided by the Ministry. After arranging a formal consultancy contract, firms received the assigned grants within 60 days since their application.

3.2 Data

In this study we employ a unique employer-employee administrative dataset. We obtain this dataset by combining several administrative data sources in order to build a firm level panel form firms applying for the policy in neighborhood of the time of exhaustion of available funds. In addition, we focus on years close to the year of our policy implementation and, hence, throughout our analysis we mostly rely on data from 2012 up to 2018. We rely on four main data sources: first, we obtained data on the policy implementation, such as list of applicants and voucher assignment from the Ministry of Economic Development; second, we matched firms applying to the program with their workforce by using National Social Security Institute (INPS) data; then, we include information on firms’ balance sheets from CERVED data; finally, we add granular trade data at product-country-firm level provided by the Italian Customs.

We obtained detailed data on the administrative procedures related to the policy from the Ministry of Economic Development. The data include the list of firms applying for the subsidy together with their administrative identifiers, few characteristics, and time of arrival of the application, which is crucial for our identification strategy. The data also cover information concerning firm characteristics, such as previous experience in trade, participation to road shows,\(^2\) main sector of activity, and, if present, characteristics of the contract which benefited from the voucher, such as the type of service provided, the amount invested, and the identifier of the provider of the consultancy. The presence of a unique firm administrative identifier was used to match these information with other data sources.

\(^2\)Event supported by the Ministry to illustrate policies aimed at helping firms to enter or expand on international markets.
We, then, merged firms participating to the application process to worker level information on their workforce characteristics thanks to Italian Social Security data. We mostly relied on UNIEMENS archives which collect information on monthly mandatory firms’ communications for social security purposes. The dataset covers the universe of private sector, non-agricultural employees in Italy, and it provides rich information on their contracts, such as wage, part-time/full-time status, permanent or temporary contract, and a broad occupation classification. We included a few demographic characteristics such as age and gender. Data are available from 2005 up to 2018 but, as mentioned above, we restricted our attention to a time frame close to the policy implementation.

We build a firm level panel, containing information on the number of employees by categories and their characteristics, by collapsing our worker level data to a firm-month level.

We also match our set of firms with balance sheet data by relying on CERVED archives. This dataset is constructed based on the Firm Registry of the regional Chambers of Commerce and it covers all limited liability firms in the Italian economy. Balance sheet information are provided at annual frequency and contain information on revenues, values added, profits and other indicators of firm profitability.

Finally, we match our set of firms with granular data at country-product level thanks to information provided by the Italian Customs and Monopolies Agency. Custom data represent an ideal source of information to analyze the firm’s trade performance since we can observe each single firm’s transaction both within and outside the European Union. Data on trade transactions are at quarterly frequency and consist in both total value in Euro and quantities in kilograms. Moreover, for each transaction, we have information on the type of good traded based on the Combined Nomenclature (CN8) classification, origin country for import data and destination country for export data.

We collapse our dataset at firm-quarter level and build a panel for our firms of interest. We start by looking at an aggregate trade dimension (total trade within and outside the European Union), and then we move to a more detailed analysis of countries and

---

3 Data access was granted thanks to the VisitINPS initiative.
products involved in our firms’ international transactions.

4 Empirical Strategy

The major challenge to the identification of the effect of TEMs is selection: firms obtaining consultancy from TEMs might differ in many relevant and unobservable aspects from firms not employing them. Failing to control for these differences would lead to a bias in the estimates. To overcome this issue, we exploit the quasi-random assignment of the vouchers to firms willing to employ TEMs to identify a suitable treatment and control group.

The selection process for firms offers an ideal setting: indeed, funds allocated to the policy were substantially lower than the amount requested, and the assignment process took the form of a click-day, in which many applicants were not granted the subsidy due to a few seconds delay in sending the application. As described in Section 3.1, firms applied through an electronic process and applications were processed by time of application order up to the exhaustion of available funds.

Since not all firms can access the subsidy due to limited funding, and firms are not aware of the exact moment when resources will run out, eligibility for firms applying around the time cutoff will be as good as random, and we are able to identify the causal impact of the policy by comparing firms which nearly made the cutoff with firms which missed the cutoff by a few seconds, in the spirit of Pinotti (2017).4

In practice, we take firms around the time cutoff and run a local differences-in-differences model according to the following equation:

\[ Y_{jt} = \alpha + \beta_1 \mathbb{1}(\tilde{t}_f < 0) + \beta_2 Post_t + \beta_3 \mathbb{1}(\tilde{t}_f < 0)X Post_t + \theta_j + \eta_t + \epsilon_{jt} \]  (1)

Where \( Y_{jt} \) is the outcome of interest, \( \tilde{t}_f \) represents the time of arrival of the application

4Our diffs-in-diffs approach is motivated by the fact that we have little power at the cutoff to run a regression discontinuity.
in difference with the cutoff at which resources were exhausted (hence, the indicator variable taking value one if the firm applied before the time cutoff and zero otherwise, \(1(\tilde{t}_f < 0)\), identifies all firms technically eligible to receive the subsidy), \(Post_t\) is a dummy variable taking value one after 2015, \(\theta_j\) is a firm fixed effect, \(\eta_t\) is a time fixed effect, and \(\epsilon_{jt}\) is a random error. Our parameter of interest is \(\beta_3\), which identifies the differences in the dynamic of the dependent variable between the treatment and the control group in the periods before and after the policy. This specification allows us to uncover the treatment effect of the policy after netting out common time effects, and time invariant firm characteristics. As a few firms were excluded from receiving the subsidy even if they applied before the time cutoff and some later firms were deemed eligible even if they applied at a later time, our treatment variable \(1(\tilde{t}_f < 0)\) will allow us to identify an Intention-to-Treatment effect (ITT).\(^5\)

In most of the case, to provide visual evidence as well as a more precise description of both possible pre-trends and the dynamic of the effect, we estimate a classical variation of the difference-in-difference framework:

\[
Y_{jt} = \alpha + \beta_1 1(\tilde{t}_f < 0) + \sum_{d \in (-2,4)/(-1)} \beta_2 1(Year - 2016 = d) + \sum_{d \in (-2,4)/(-1)} \beta_3 1(\tilde{t}_f < 0)1(Year - 2016 = d) + \theta_j + \eta_t + \epsilon_{jt}
\]

(2)

We use the year of the voucher assignment (2015) as our reference period. As the application was opened only in the late part of 2015, firm outcomes are highly unlikely to be affected by the policy in the same period. On the one hand, the interactions between the dummy for being treated and years before the experiment allow us to investigate the presence of any pre-existing differential trend between treated and control firms in the years before the experiment. The interaction with later periods, on the other hand, describe the dynamic of the treatment effect over time. The model also include firm (\(\theta_j\)) and year fixed effects (\(\eta_t\)).

\(^5\)As the level of compliance with the time rule is very high, this will be very similar to the ATT, as we will show with a IV strategy.
As a first step, we identify the time cutoff. We do it graphically by plotting the share of firms which were allocated the subsidy with respect to the time of arrival of the application. We group firms in one second bins and Figure 1 plots the share of successful application by time of arrival. The distribution of the acceptance rate clearly shows a discontinuity after 46 seconds from the opening of the application, which corresponds to the application of 2002 firms. As the total amount of funds available was about 20,000,000 Euros and each firm received 10,000 Euros, our cutoff closely corresponds to the theoretical time of resource exhaustion.\footnote{We further test for the possible presence of other discontinuities by running Regression discontinuity regressions with dependent variable a dummy for receiving the subsidy and with time as running variable. We use local polynomial, a triangular kernel, a bandwidth selected through minimum squared error criterion. The estimation performed by using the \texttt{rdrobust} command developed by Calonico et al. (2017). We then use 10 second intervals and run a set of regressions at fake discontinuity points and at our cutoff. Finally, we plot the discontinuity coefficients together with the \textit{z-statistic} for their significance in Figure A1 in the Appendix. The discontinuity at our cutoff (0) is clearly the largest and the only one significant at the 5\% level. This provides comforting evidence concerning our choice.}

Then, we move to assess whether firms were able to sort around the cutoff by examining the distribution of applications around the time of fund exhaustion. We report the full distribution (Panel (a)) and the neighborhood of the cutoff (Panel (b)) which we will use in our estimation in Figure 2. Throughout the analysis we will use a 30 seconds radius neighborhood of the cutoff to focus on firms which received the subsidy at the margin. Results are consistent with larger intervals. Resources are exhausted within one minute since the opening of the application process and a bulk of firm file their request around 30 seconds after the opening. The distribution does not show any clear discontinuity at the cutoff, as the McCrary test, reported below Panel (b) shows. This is consistent with the fact that firms could not keep track of applications of other firms and hence time their application accordingly.

Finally, we check whether firms in our treatment and control group are comparable in terms of observable characteristics. We consider several firm dimensions in the four years before the policy was implemented (2012-2015) and in the year immediately prior the application (2015) and compare firms on the two sides of the time cutoff. Summary statistics for the treated and the control group are reported in Table 1. Overall, results
are encouraging: in most of the cases, although some of the differences are relatively large (up to 20% with respect to the average in the control), only in a few cases differences are significant and many important dimensions firms are extremely similar, such as value added per employee or gross profits. Differences are smaller and less statistically significant in the year immediately before the policy assignment. This evidence suggests that the firms which applied slightly later might provide an appropriate counterfactual for our treatment group.

The soundness of our empirical strategy relies, however, on the assumption that firms in the two groups would have moved on parallel trend in absence of the policy. Although we cannot explicitly test this assumption we can provide evidence in favour of our identifying assumption by considering the trends in the periods before the policy introduction. We will analyze them explicitly in the following sections.

5 Results

5.1 Trade outcomes

We start by looking at firm internationalisation which should have been the primary outcome of the policy. Among the firms in our 30-seconds radius with respect to the cutoff, many firms already export at baseline with about 70% of them having positive exports within or outside the European Union. Export managers can help firms from various perspectives, by pointing out new locations for the firms products or suggesting the managers alternative customers within a country to which the firm was already exporting. The additional knowledge about foreign markets might, however, not only lead to higher exports but also to changes in the inputs the firms choose for their production with a greater integration in the GVC. In addition, the additional knowledge provided by external consultants might be more useful to investigate more distant markets with different regulations with respect to more familiar markets (e.g. those belong to the European Union).
To explore in a synthetic way these margins, we focus on aggregate measures of export at firm and year level. We compute total exports and imports for both countries belonging to the European Union and for other countries. Then we compare the dynamic of both these quantities over time with respect to the year of application for the voucher (2015). The voucher was then collected by awarded firms in the following year and we expect the effect to materialize over time as firms adjust to the new opportunities for both inputs and outputs.

Results, obtained by estimating Equation 2, are reported in Figure 3. We start by considering export to countries outside the EU in Panel (a) and to the EU in Panel (b). Export generally seem to be relatively stable in the period before the policy, with only tiny deviations from the baseline period in both 2013 and 2014 (periods -2 and -1). This pattern remains stable in most of the periods afterwards but for the 2019 where we start to observe a much larger and significant difference between the two groups. This dynamic is confined to the extra European markers, where TEMs are likely to have a larger information advantage and capacity to favour the firm with respect to countries in the EU. Exports to the EU are instead extremely stable. This effect appears with some lag which might be considered reasonable given the necessity to adjust production and create market opportunities in more remote location: as the consultancy service was mostly performed in 2016 and it lasted from 3 to 12 months in the overwhelming majority of cases, this corresponds to a 3 year lag for the effects to be fully detectable.

Panel (b) and Panel (c) investigate the dynamic for imports where we do not see large changes in either group of countries. Some small increase in imports can be detected but in no case they are statistically different from zero.

Finally, we consider two more aggregate outcome that is the total value of trade and the net balance of the firm, that is whether the extra trades contributes positively or negatively to the profits of the firm. Results for these two variables are reported in Panel (e) and in Panel (f). The subsidy does seem to increase the international exposure of the firm, and, towards the end of the sample, to positively contribute to the firm
profitability. However, results are greatly imprecise and it is difficult to derive definitive answers from the available evidence.

Results from a classical difference-in-difference model, reported in A1, confirm previous findings but also in this case most of the coefficients are too imprecisely estimated. The average export gain with respect to countries outside the EU is about 5 times the one for EU countries while the average effect on the firm trade balance appears to be negative. The effects are generally small with respect to the level of our main variables but this magnitude could be easily related to the small size of the voucher (10,000 Euro and most of the projects had a cost of approximately 13,000 Euro). In this perspective the magnitude of the gain might appear more sizeable, especially if we consider that by the fourth year, firms which were assigned the voucher exported outside the Euro Area 100,000 Euro more with respect to the difference in the year of the voucher assignment. The firm might, however, be gaining from access to better or cheaper suppliers and this would in turn generate positive outcomes on the firm profitability which we analyze below.

5.2 Firm outcomes

Then, we assess the impact of the subsidy on firm level outcomes. We consider several dimensions of the firm activity and we look at costs, revenues, and profitability. We start with our most parsimonious model and then move its dynamic counterpart.

Table 2 reports results for our main variables of interest. Effects are generally positive and for three variables (Revenue from Sales, VA per Employee, and Return on Equity) highly statistically significant (1%). The effects are relatively small in terms of magnitude, being about 5% of the average for the dependent variable for the control group. The Return on Equity is the only exception with a coefficient representing an increase of about 17% with respect to the baseline. Notice that the increase in productivity (proxied by value added per employee) is not a strict target of the policy and might be coming from two different dynamics: first, firms, might be adjusting their production in order
to be able to enter foreign market along the lines suggested by the consulting managers, or the managers themselves might be providing counselling beyond the strict scope of their role, thus leading to better performance of the firm overall.

Then, we move to explore the dynamic of the treatment effect and estimate our model in Equation 2 and plot results in Figure 4. In all cases, we detect only small differences in trends in the periods preceding the policy intervention which lends support for our identification assumption. The positive effects of the policy builds over time and becomes particularly clear in the last period of analysis (2019). The improvements of the performance of the treated firms in the year of the treatment and in the following two years is often modest, while the jump in the last period is substantially larger. For example, the increase in profits in the first and second year after the policy implementation is about one third of the difference observed in 2019. Consistently with previous results, also in this case, the policy appears to take time to fully show its positive effects. Some earlier, albeit smaller, effects are however also detectable in the short term.

All balanced, these results show that the policy had a positive impact on the firm dynamics, with gains both in terms of size and profitability which built up over time and became particularly salient after 4 years.

We perform several robustness checks to assess the robustness of our results. In particular, we compare the ITT with ATT by exploiting an instrumental variable strategy and we restrict the sample only to firms with positive employment throughout the observation period. In the instrumental strategy, we instrument the fact that the firm actually used the voucher for the TEM with the fact that the firm applied before the time cutoff corresponding to the exhaustion of available funds. We report results in Table A2. Results for the IV strategy are largely in line with main results while the restriction to the balanced panel leads to smaller and often non-significant coefficients. The time pattern and the more evident positive effects in the last period of observation remain unchanged also in this smaller sample (about 4000 observations less, close to 25% of the original sample). Results for this exercise are reported in Figure A2.
Firms appear to benefit both in the short and, in a more pronounced way, in the long term from the presence of the TEM and this is reflected in several outcomes in terms of size, efficiency, and profitability. We finally move to assess to what extent this higher performance is translated in higher labour demand.

5.3 Employment and workforce composition

We present now the results of the effects of TEM subsidy assignment on the firms’ labor demand. As in previous sections, we begin from our baseline local differences-in-differences model that considers treatment effects by comparing the two groups of firms before and after the TEM assignment in late 2015. Table 3 presents these results for different outcomes of labor demand. Specifically, we first estimate the effect on the total number of employees (column 1) and then we explore if the TEM subsidy produces differentiated effects for permanent, full time and part-time employees, blue and white collars, managers and apprentices (columns 2-7). We also estimate heterogeneous effects for women, men and workers of different ages (columns 8-12).

Out of 2.9 total additional employees, we find that the TEM subsidy has produced the most significant effect for permanent employees, with 1.2 additional workers, corresponding to 40% of the total effect. Yet, less significant workforce increases are found for full time employees (2.19 additional workers, corresponding to 75% of the total effect), white collars (1.13 additional workers, or 38%), men (1.62 additional workers, or 56%) and senior employees (1.14 additional workers, or 39%). As in the case of total employment, the coefficients for blue collars, managers, apprentices, women, junior and mid-level employees are not significantly associated with the subsidy assignment.

Overall these figures show that the TEM subsidy has increased the workforce, while the heterogeneity analysis unveils that some specific employment categories are driving the effects on labor demand. Nevertheless, it is not clear yet what is the underlying dynamics driving these and other TEM effects on trade and firm performances previously discussed. An important issue is, for instance, whether the export performance is obtained as a
consequence of human capital development, i.e. by hiring new workers or, conversely, starting or expanding export activities pulls labor demand. To shed further light on this point, we exploit more granular INPS data available also at monthly frequency, which we aggregate on quarters. These data, combined with the trade results obtained using high frequency custom data, and the quasi-experimental setting of the policy, allow to temporally decompose the TEM effects on different outcomes, ruling out possible endogeneity due to simultaneity of export-labor demand dynamics.

We thus run a more demanding specification of model 2 in which the time index \( t \) represents now calendar year-quarters. Following the same structure as Table 3, these results are graphically presented in Figures 5–8.\(^7\) Panel (a) in Figure 5 shows the main results for total employees, where we find a strongly significant increase in the workforce starting only eight months after the TEM assignment. Moreover, the impact on total employment is increasing both in magnitude and significance in later months, up to nearly three additional employees/firm on average. This result is economically meaningful and lends to hypothesize that the TEM has produced long-lasting effects on the labor market. Panel B and Panel C show, respectively, effects heterogeneity on permanent employees (panel (b)) and full time employees (panel (c)). In both categories we find a significant growth, with a sharper effect for full time employees.

The decomposition of the effects by worker’s qualification is showed in Figure 6. In this case, the evidences are less compelling than those obtained for total workforce. The estimates are indeed less precise (likely because of a loss of statistical power when slitting the main sample by these categories) and show a non-zero pre-trend effect, which however is never significant. Yet, we observe a steady workforce increase of white collar employees, which reaches a significant magnitude of one worker increase on average after two years after the TEM assignment. We also observe a steady but more modest growth in the number of apprentices, reaching a significant value of 0.25 additional workers only after four years. The trend pattern for blue collar employees is increasing as well, but

\(^7\)To keep the length of the paper parsimonious, we show these results only graphically. All the estimation tables are available upon request from the authors.
although very close, the coefficients never reach statistical significance. We do not find significant effects for managers.

Since women are characterized by less opportunities on the labour market and less stable career perspectives (for example, due to childbirth as shown by Kleven et al. (2019)), it is worth disentangling the labor demand effects separately for male and female employees. Figure 7 present these results. By comparing the effects for female (panel (a)) and males (panel (b)), we observe that female employees have been penalized: while after 24 months the increase in the workforce appears balanced on an average of 1.5 employees, in the longer run the effect becomes stronger and more significant only for men, which reaches a magnitude of 2 employees/firm in the last months. Therefore, the hiring opportunities of the TEM policy seem to be unequally distributed across men and women.

Finally, in Table 8 we explore the effects of age as a proxy of work experience. The new working opportunity generated by the TEM policy appear concentrated on young workers (panel (a)) and, to a greater extent, on older employees (panel (c)), with no significant effect for mid-level employees (panel (b)). At the end of our period of analysis, corresponding to late 2019, firms have hired on average 1.8 senior employees and less than one junior employee. This might be explained by the fact that to explore export opportunities, firms have a relatively larger need of experienced workers.

6 Conclusions

Looking at the impediments to firm growth, especially for small and medium-sized enterprises, the usual suspects have been the financial constraints as a central obstacle. However, capital alone cannot explain the entirety of firm growth; ‘managerial capital’ is needed to know how to employ the capital best.

We test if alleviating the constraints on managerial capital has a first-order effect on the performance of SMEs in Italy and which dimensions of firms behavior are particularly important. For that purpose, we exploit a policy experiment in which firms were exposed
to quasi-random variation in the assignment of a voucher for hiring a TEM for at least six months. Therefore, the policy allows to evaluate the role of managerial skills in expanding market opportunities and firms’ growth.

We have three primary sets of results. First, we show that the TEM has a positive impact on the trade choices of the enterprises in the treatment group, with a growth in extra EU export, that is towards more complex and remote markets that require specific competences. Second, we analyze the impact on the firms’ performance. Results show that the policy had a positive impact on the firm dynamics, with gains both in terms of size and profitability which built up over time and became particularly salient after 4 years. Third, and finally, we find remarkable impacts on employment. Results show that the TEM subsidy has stimulated new labor demand, while the heterogeneity analysis unveils that some ‘good jobs’ (full time permanent employees) are driving the effects on labor demand. Moreover, these effects seem to be long-lasting as they remain stable after four years.

Given the positive impact on firms performance, and eventual growth in employees, one may wonder why more firms do not use consulting services. Although we do not attempt to translate the employment growth to firm profits, given the relative magnitude, we note that the annual return on labor to the firm need not be very high to justify the one-time consulting expenditure. Several issues may hinder the market for consulting services (Bruhn et al., 2018). First, there may be no failure at all: those who hire a TEM may be the ones who can benefit, and those who do not hire the TEM would not benefit. It is important to emphasize that all enterprises in our study had initially expressed interest in the subsidized consulting program. Then the firms that did not get the subsidy decided that the TEM was unlikely to yield profitable results for them at the unsubsidized rate, and thus the failure to take up remains a rational and correct decision. Naturally, we do not observe what the impact of the TEM would have been on those who did not use it, but given the large increase in returns and long-term employment on the treated firms, there seems to remain a failure for those who do not use the TEM.
Second, there may be a credit market failure. Access to finance is essential for SMEs to finance investment needs. However, at all stages of development, small businesses struggle more than large enterprises to get finance. This can be for many reasons: such as not having a proven financial track record, lacking collateral or investors lacking information to assess their credit-risk or value their intangible assets. However, this does not fully satisfy the question: why do we not observe consulting firms accepting delayed payment or working with financial services firms to provide credit to cover their services? Either way, it suggests that a credit market failure is the source of the problem for some enterprises. This may be particularly relevant given the timing of the impacts. It is not until the long run that we see evidence of likely increased firm size that could be useful for generating liquidity to pay for consulting services.

Third, entrepreneurs may be risk or ambiguity averse with respect to the potential returns from hiring a consultant. This aversion could be perpetuated by a lack of information in the market on the returns to consulting advice (of which consulting firms have difficulty credibly signalling). Overall, our findings indicate that management consulting services can have high returns for small, and medium-sized enterprises, and we consider funding constraints and uncertainty about the benefits to be the most likely explanations for the lack of market transactions in consulting services.

Overall, our results confirm that international exposure has a large and important impact on firm performance and hiring decisions. However, there is still much to learn about the way managerial inputs affects firm performance. Besides, while there might be large heterogeneity in the effects, our sample is not large enough to allow us to look at all the firm and geographical-level interactions that might be of interest, such as the competitive nature of the industry, or territorial skill levels. We believe that this is a critical area for further research.

Finally, it is important to notice that this intervention, like all skill-building experiments, is a joint test of two closely related hypotheses: on the one hand, we aim to establish if export exposure is a limiting factor to the growth of enterprises. At the same time, we can
find a positive answer only if this exposure can be conveyed via a consulting intervention in the first place. It could be that exports are instrumental to growth, but it might not be possible to get them by simply providing consulting services. However, this exercise provides a lower bound on the potential impact of improvements in managerial capital, given the limitation of the efficacy of this particular intervention. More importantly, in a period when many welcome the occurrence of ‘deglobalization’ it is important to point out that the degree of internationalization has positive impacts on SMEs performance and labour demand.
References


Bianchi, N. and Giorcelli, M. (2019). Not all management training is created equal: Evidence from the training within industry program.


Figures

Figure 1: Share of firms who were assigned the subsidy by application time

Note: Share of firms receiving the temporary export manager voucher by time of application.

Figure 2: Density Discontinuity

(a) Full distribution
(b) 30 Seconds radius from cutoff

Note: Density of application for the temporary export manager by time of arrival of the completed application within the first four minutes and within 30 seconds with respect to the 2002nd application, which roughly corresponds to the theoretical exhaustion of resources.
Figure 3: Effect of Subsidy Assignment on Firm Internationalization Over Time

Notes: The figure reports results of a difference in difference model estimated between 2012 and 2019. All variables are winsorized at 5%. Treated firms are the firms which applied for the voucher before the 2002nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Effects are reported in thousand of Euro. Standard errors are clustered at firm level.
Figure 4: Effect of TEM Voucher Assignment on Firm Outcomes Over Time

Notes: The figure reports results of a difference in difference model estimated between 2012 and 2019. Capital/Labour ratio computed as the ratio between total assets (material+immature) and number of employees. Base year is 2015. All variables are winsorized at 5%. Treated firms are the firms which applied for the voucher before the 2002nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Standard errors are clustered at firm level.
Figure 5: Effect of TEM Voucher Assignment on Firm Labour Demand Over Time

Notes: The figure reports results of a difference in difference model based on monthly data between 2012 and 2019. Base month is September 2015. Treated firms are the firms which applied for the voucher before the 2002nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Standard errors are clustered at firm level.
Figure 6: Effect of TEM Voucher Assignment on Firm Labour Demand Over Time: Worker Qualification

Notes: The figure reports results of a difference in difference model based on monthly data between 2012 and 2019. Base month is September 2015. Treated firms are the firms which applied for the voucher before the 2802nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Standard errors are clustered at firm level.
Figure 7: Effect of TEM Voucher Assignment on Firm Labour Demand Over Time: Gender

Notes: The figure reports results of a difference in difference model based on monthly data between 2012 and 2019. Base month is September 2015. Treated firms are the firms which applied for the voucher before the 2002nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Standard errors are clustered at firm level.
Figure 8: Effect of TEM Voucher Assignment on Firm Labour Demand Over Time: Age Group

(a) Junior Employees (age 19-29)

(b) Mid-Level Employees (age 30-45)

(c) Senior Employees (age >45)

Notes: The figure reports results of a difference in difference model based on monthly data between 2012 and 2019. Base month is September 2015. Treated firms are the firms which applied for the voucher before the 2002nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Standard errors are clustered at firm level.
## Tables

### Table 1: Comparison of Treated and Control Firms Before the Policy Implementation

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Average Controls</th>
<th>Average Treated</th>
<th>Difference (2)-(1)</th>
<th>Relative Difference (3)/(1)</th>
<th>T-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel (a): Over three years before the policy (2012-2015)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export Extra EU</td>
<td>1033.95</td>
<td>1277.77</td>
<td>243.82</td>
<td>0.24</td>
<td><strong>2.19</strong></td>
</tr>
<tr>
<td>Export Intra EU</td>
<td>1157.00</td>
<td>1360.39</td>
<td>203.39</td>
<td>0.18</td>
<td>1.69</td>
</tr>
<tr>
<td>Import Intra EU</td>
<td>244.43</td>
<td>272.36</td>
<td>27.93</td>
<td>0.11</td>
<td>0.89</td>
</tr>
<tr>
<td>Import Intra EU</td>
<td>440.95</td>
<td>404.85</td>
<td>63.91</td>
<td>0.19</td>
<td>1.65</td>
</tr>
<tr>
<td>Total Trade</td>
<td>3415.82</td>
<td>4125.04</td>
<td>709.22</td>
<td>0.21</td>
<td><strong>2.21</strong></td>
</tr>
<tr>
<td>Balance</td>
<td>1703.23</td>
<td>2044.51</td>
<td>341.28</td>
<td>0.20</td>
<td>1.67</td>
</tr>
<tr>
<td>Total Employment Cost</td>
<td>780.02</td>
<td>867.90</td>
<td>87.88</td>
<td>0.11</td>
<td><strong>2.16</strong></td>
</tr>
<tr>
<td>Capital Employment Ratio</td>
<td>59.03</td>
<td>68.01</td>
<td>8.98</td>
<td>0.15</td>
<td><strong>2.50</strong></td>
</tr>
<tr>
<td>Revenue from Sales</td>
<td>4817.49</td>
<td>5104.24</td>
<td>286.75</td>
<td>0.06</td>
<td>1.05</td>
</tr>
<tr>
<td>Value Added per Employee</td>
<td>53280.32</td>
<td>53180.13</td>
<td>-100.19</td>
<td>0.00</td>
<td>-0.09</td>
</tr>
<tr>
<td>Gross Profits</td>
<td>2468.52</td>
<td>2614.32</td>
<td>145.80</td>
<td>0.06</td>
<td>1.13</td>
</tr>
<tr>
<td>ROE</td>
<td>8.69</td>
<td>7.34</td>
<td>-1.35</td>
<td>0.16</td>
<td><strong>2.11</strong></td>
</tr>
<tr>
<td>Tot. Employees</td>
<td>23.36</td>
<td>26.90</td>
<td>3.54</td>
<td>0.15</td>
<td>1.90</td>
</tr>
<tr>
<td>Permanent Employees</td>
<td>21.64</td>
<td>23.74</td>
<td>2.10</td>
<td>0.10</td>
<td>1.43</td>
</tr>
<tr>
<td>Full Time Employees</td>
<td>21.17</td>
<td>23.92</td>
<td>2.75</td>
<td>0.13</td>
<td>1.66</td>
</tr>
<tr>
<td>Blue Collars</td>
<td>12.90</td>
<td>15.07</td>
<td>2.17</td>
<td>0.17</td>
<td>1.81</td>
</tr>
<tr>
<td>White Collars</td>
<td>8.44</td>
<td>9.66</td>
<td>1.22</td>
<td>0.14</td>
<td>1.46</td>
</tr>
<tr>
<td>Managers</td>
<td>0.59</td>
<td>0.47</td>
<td>-0.12</td>
<td>-0.20</td>
<td>-0.65</td>
</tr>
<tr>
<td>Apprentices</td>
<td>1.15</td>
<td>1.34</td>
<td>0.19</td>
<td>0.17</td>
<td>1.43</td>
</tr>
<tr>
<td>Women</td>
<td>7.13</td>
<td>8.93</td>
<td>1.80</td>
<td>0.25</td>
<td>2.24</td>
</tr>
<tr>
<td>Men</td>
<td>16.23</td>
<td>17.97</td>
<td>1.74</td>
<td>0.11</td>
<td>1.40</td>
</tr>
<tr>
<td>Junior (age 16-29)</td>
<td>3.11</td>
<td>3.99</td>
<td>0.89</td>
<td>0.29</td>
<td>2.34</td>
</tr>
<tr>
<td>Mid-level (age 30-45)</td>
<td>11.27</td>
<td>12.88</td>
<td>1.61</td>
<td>0.14</td>
<td>1.64</td>
</tr>
<tr>
<td>Senior (age &gt;45)</td>
<td>8.99</td>
<td>10.03</td>
<td>1.04</td>
<td>0.12</td>
<td>1.42</td>
</tr>
</tbody>
</table>

| **Panel (b): Year of the policy assignment (2015)** |
| Export Extra EU | 907.88 | 1090.52 | 182.64 | 0.20 | 1.89 |
| Export Intra EU | 1232.95 | 1461.57 | 227.62 | 0.18 | 1.80 |
| Import Intra EU | 278.62 | 303.73 | 25.11 | 0.09 | 0.69 |
| Import Intra EU | 365.14 | 405.92 | 69.95 | 0.19 | 1.69 |
| Total Trade | 3378.34 | 4014.02 | 635.68 | 0.19 | **2.02** |
| Balance | 1609.93 | 1862.76 | 252.83 | 0.16 | 1.29 |
| Total Employment Cost | 818.68 | 899.19 | 80.51 | 0.10 | 1.88 |
| Capital Employment Ratio | 58.81 | 68.47 | 9.66 | 0.16 | **2.60** |
| Revenue from Sales | 5035.09 | 5237.43 | 202.34 | 0.04 | 0.70 |
| Value Added per Employee | 53927.16 | 53081.32 | -845.84 | -0.02 | -0.68 |
| Gross Profits | 2571.43 | 2669.43 | 98.00 | 0.04 | 0.73 |
| ROE | 10.20 | 8.74 | -1.46 | -0.14 | -1.75 |
| Tot. Employees | 23.66 | 28.26 | 4.60 | 0.19 | 1.80 |
| Permanent Employees | 21.64 | 24.11 | 2.47 | 0.11 | 1.75 |
| Full Time Employees | 21.15 | 24.63 | 3.48 | 0.16 | 1.70 |
| Blue Collars | 12.79 | 15.48 | 2.69 | 0.21 | 1.75 |
| White Collars | 8.85 | 10.60 | 1.74 | 0.20 | 1.55 |
| Managers | 0.59 | 0.52 | -0.07 | -0.12 | -0.43 |
| Apprentices | 1.17 | 1.33 | 0.16 | 0.13 | 1.09 |
| Women | 7.23 | 9.57 | 2.34 | 0.32 | 1.81 |
| Men | 16.42 | 18.69 | 2.26 | 0.14 | 1.57 |
| Junior (age 16-29) | 2.88 | 3.97 | 1.09 | 0.38 | 1.59 |
| Mid-level (age 30-45) | 10.70 | 13.02 | 2.32 | 0.22 | 1.89 |
| Senior (age >45) | 10.08 | 11.27 | 1.19 | 0.12 | 1.39 |

Note: Summary statistics for treatment and control group. All variables for firm and trade outcomes are winsorized at 5% and reported in thousand of Euros.
### Table 2: Effect of TEM Voucher Assignment on Firm Outcomes

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) Employment Cost</th>
<th>(2) C/E Ratio</th>
<th>(3) Revenue from Sales</th>
<th>(4) VA per Employee</th>
<th>(5) Gross Profits</th>
<th>(6) Roe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Cutoff X Post</td>
<td>24.636</td>
<td>-0.790</td>
<td>268.600**</td>
<td>2,763.534***</td>
<td>92.442</td>
<td>1.541***</td>
</tr>
<tr>
<td></td>
<td>(19.620)</td>
<td>(1.920)</td>
<td>(116.414)</td>
<td>(1,069.947)</td>
<td>(65.777)</td>
<td>(0.593)</td>
</tr>
<tr>
<td>Observations</td>
<td>17,331</td>
<td>16,795</td>
<td>17,331</td>
<td>17,025</td>
<td>17,143</td>
<td>17,098</td>
</tr>
<tr>
<td>Mean Control</td>
<td>844.63</td>
<td>51.71</td>
<td>4859.36</td>
<td>47748.82</td>
<td>2533.03</td>
<td>8.79</td>
</tr>
<tr>
<td>Firm FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Notes: Difference in difference regression for the effect of being assigned the TEM voucher on firm balance sheet outcomes. Post is the period after 2015, year of the voucher assignment, while before cutoff is a dummy indicating firms which applied before the 2002nd firm, which corresponds to the theoretical exhaustion of available funds. Firms included in the sample if they applied within a radius of 30 seconds with respect to the theoretical exhaustion time of funds. C/E Ratio is computed as the total value of material and immaterial assets over the number of employees. Effects are reported in thousand of Euro. Standard errors are clustered at firm level. Level of Significance: *** 0.01, ** 0.05, * 0.1.
Table 3: Effect of TEM Voucher Assignment on Firm Labor Demand

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tot. Employees</td>
<td>Permanent</td>
<td>Full Time</td>
<td>Blue Collars</td>
<td>White Collars</td>
<td>Managers</td>
<td>Apprentices</td>
<td>Women</td>
<td>Men</td>
<td>Junior (age 16-29)</td>
<td>Mid-level (age 30-45)</td>
<td>Senior (age &gt;45)</td>
</tr>
<tr>
<td>Treated × Post</td>
<td>2.900</td>
<td>1.191***</td>
<td>2.192*</td>
<td>1.685</td>
<td>1.127*</td>
<td>-0.0268</td>
<td>0.0867</td>
<td>1.276</td>
<td>1.624*</td>
<td>0.780</td>
<td>0.977</td>
<td>1.142*</td>
</tr>
<tr>
<td></td>
<td>(1.774)</td>
<td>(0.580)</td>
<td>(1.182)</td>
<td>(1.213)</td>
<td>(0.581)</td>
<td>(0.0718)</td>
<td>(0.113)</td>
<td>(0.919)</td>
<td>(0.898)</td>
<td>(0.547)</td>
<td>(0.699)</td>
<td>(0.641)</td>
</tr>
<tr>
<td>Constant</td>
<td>27.34***</td>
<td>24.07***</td>
<td>24.04***</td>
<td>14.89***</td>
<td>10.16***</td>
<td>0.576***</td>
<td>1.391***</td>
<td>8.865***</td>
<td>18.47***</td>
<td>3.843***</td>
<td>12.27***</td>
<td>11.22***</td>
</tr>
<tr>
<td></td>
<td>(0.674)</td>
<td>(0.220)</td>
<td>(0.449)</td>
<td>(0.461)</td>
<td>(0.221)</td>
<td>(0.0273)</td>
<td>(0.0427)</td>
<td>(0.349)</td>
<td>(0.341)</td>
<td>(0.206)</td>
<td>(0.266)</td>
<td>(0.233)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.849</td>
<td>0.921</td>
<td>0.882</td>
<td>0.828</td>
<td>0.879</td>
<td>0.896</td>
<td>0.717</td>
<td>0.842</td>
<td>0.865</td>
<td>0.825</td>
<td>0.879</td>
<td>0.829</td>
</tr>
</tbody>
</table>

Notes: Sample size is 195,574 observations. All regressions include firm and year fixed effects.
Appendix

Figures

Figure A1: Test for Discontinuity in the Treatment Probability

(a) Coefficient

(b) Z-Statistic

Note:
Figure A2: Effect of TEM Voucher Assignment on Firm Outcomes Over Time: Balanced Panel

(a) Total Employment Costs

(b) Capital/Labour Ratio

(c) Revenue from Sales

(d) Value Added per Employee

(e) Gross profits

(f) Return on Equity

Notes: Results of a difference in difference model estimated between 2012 and 2019. Capital/Labour ratio computed as the ratio between total assets (material+immaterial) and number of employees. Base year is 2015. All variables are winorized at 5%. Treated firms are the firms which applied for the voucher before the 2002nd application. Firms were included in the analysis if they applied within a radius of 30 seconds from the threshold. Sample restricted to firms having positive employment over the whole period of analysis (2012-2019). Regression includes firm and year fixed effects. Coefficient of the difference with respect to the base year reported together with their 95% confidence interval. Standard errors are clustered at firm level.
## Tables

### Table A1: Effect of TEM Voucher Assignment on Firm Internationalisation: Trade

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) Export extra EU</th>
<th>(2) Export Intra EU</th>
<th>(3) Import extra EU</th>
<th>(4) Import Intra EU</th>
<th>(5) Total trade</th>
<th>(6) Trade Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Cutoff X Post</td>
<td>33.645</td>
<td>2.782</td>
<td>13.461</td>
<td>28.685</td>
<td>118.530</td>
<td>-14.539</td>
</tr>
<tr>
<td>(34.379)</td>
<td>(46.433)</td>
<td>(14.446)</td>
<td>(17.095)</td>
<td>(103.170)</td>
<td>(61.329)</td>
<td></td>
</tr>
<tr>
<td>Mean Control</td>
<td>126.726</td>
<td>216.74</td>
<td>512.35</td>
<td>1038.76</td>
<td>5001.61</td>
<td>1899.4</td>
</tr>
<tr>
<td>Firm FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Quarter FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Note: Difference in difference regression for firm internationalisation. Post is the period after 2015, year of the voucher programme, which corresponds to the theoretical estimation of available funds. Firms included in the sample of those applied within a radius of 30 miles with respect to the theoretical estimation time of funds. Total Trade is computed as the sum of all imports and exports from countries within and outside the European Union, while Trade Balance is the sum of all exports minus all imports. All variables are measured in 2015 Euro. Effects are reported in thousand of Euros. Standard errors are clustered at firm level. Level of Significance: *** 0.01, ** 0.05, * 0.1.

### Table A2: Effect of TEM Voucher Assignment on Firm Outcomes: Robustness

#### Panel (a): Baseline

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) Employment Cost</th>
<th>(2) C/E Ratio</th>
<th>(3) Revenue from Sales</th>
<th>(4) VA per Employee</th>
<th>(5) Gross Profits</th>
<th>(6) Roe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Cutoff X Post</td>
<td>24.636</td>
<td>-0.790</td>
<td>268.600**</td>
<td>2,763.534***</td>
<td>92.442</td>
<td>1.541**</td>
</tr>
<tr>
<td>(19.620)</td>
<td>(1.920)</td>
<td>(116.414)</td>
<td>(1,069.947)</td>
<td>(65.777)</td>
<td>(0.593)</td>
<td></td>
</tr>
</tbody>
</table>

#### Panel (b): Instrumental Variable

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) Employment Cost</th>
<th>(2) C/E Ratio</th>
<th>(3) Revenue from Sales</th>
<th>(4) VA per Employee</th>
<th>(5) Gross Profits</th>
<th>(6) Roe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Cutoff X Post</td>
<td>28.747</td>
<td>-0.916</td>
<td>313.422**</td>
<td>3,203.552***</td>
<td>107.923</td>
<td>1.791**</td>
</tr>
<tr>
<td>(22.871)</td>
<td>(2.226)</td>
<td>(135.828)</td>
<td>(1,241.958)</td>
<td>(76.802)</td>
<td>(0.690)</td>
<td></td>
</tr>
<tr>
<td>F-Stat for Instrument</td>
<td>6842.02</td>
<td>6681.23</td>
<td>6842.02</td>
<td>6940.37</td>
<td>6776.74</td>
<td>7029.15</td>
</tr>
</tbody>
</table>

#### Panel (c): Balanced Panel

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) Employment Cost</th>
<th>(2) C/E Ratio</th>
<th>(3) Revenue from Sales</th>
<th>(4) VA per Employee</th>
<th>(5) Gross Profits</th>
<th>(6) Roe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Cutoff X Post</td>
<td>15.404</td>
<td>-0.933</td>
<td>244.492**</td>
<td>1,211.279</td>
<td>71.197</td>
<td>1.074</td>
</tr>
<tr>
<td>(18.708)</td>
<td>(2.013)</td>
<td>(107.913)</td>
<td>(1,021.017)</td>
<td>(63.015)</td>
<td>(0.659)</td>
<td></td>
</tr>
<tr>
<td>Firm FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Note: Difference in difference regression for the effect of being assigned the TEM voucher on firm balance sheet outcomes. Post is the period after 2015, year of the voucher programme, which corresponds to the theoretical estimation of available funds. Firms included in the sample of those applied within a radius of 30 miles with respect to the theoretical estimation time of funds. Panel (a) reports baseline results from (2) for the sake of comparison. Panel (b) reports the results of an instrumental variable estimation of the effect of being assigned the TEM voucher on firm outcomes. Panel (c) uses a balanced panel approach. Effects are reported in thousand of Euros. Standard errors are clustered at firm level. Level of Significance: *** 0.01, ** 0.05, * 0.1.
Table A3: Effect of TEM Voucher Assignment on Firms Labor Demand (Time Interval of 180 Seconds)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tot. Employees</td>
<td>Permanent</td>
<td>Full Time</td>
<td>Blue Collars</td>
<td>White Collars</td>
<td>Managers</td>
<td>Apprentices</td>
<td>Women</td>
<td>men</td>
<td>Junior (age 16-29)</td>
<td>Mid-level (age 30-45)</td>
<td>Senior (age &gt;45)</td>
</tr>
<tr>
<td>Treat×Post</td>
<td>2.437</td>
<td>0.874*</td>
<td>1.822*</td>
<td>1.471</td>
<td>0.847</td>
<td>-0.0180</td>
<td>0.104</td>
<td>0.998</td>
<td>1.439*</td>
<td>0.677</td>
<td>0.754</td>
<td>1.005*</td>
</tr>
<tr>
<td></td>
<td>(1.690)</td>
<td>(0.457)</td>
<td>(1.099)</td>
<td>(1.158)</td>
<td>(0.558)</td>
<td>(0.0456)</td>
<td>(0.0902)</td>
<td>(0.890)</td>
<td>(0.829)</td>
<td>(0.529)</td>
<td>(0.653)</td>
<td>(0.564)</td>
</tr>
<tr>
<td>Constant</td>
<td>26.96***</td>
<td>23.87***</td>
<td>23.65***</td>
<td>14.67***</td>
<td>10.10***</td>
<td>0.572***</td>
<td>1.317***</td>
<td>8.759***</td>
<td>18.20***</td>
<td>3.718***</td>
<td>12.09***</td>
<td>11.15***</td>
</tr>
<tr>
<td></td>
<td>(0.526)</td>
<td>(0.142)</td>
<td>(0.342)</td>
<td>(0.360)</td>
<td>(0.174)</td>
<td>(0.0412)</td>
<td>(0.0281)</td>
<td>(0.277)</td>
<td>(0.258)</td>
<td>(0.165)</td>
<td>(0.203)</td>
<td>(0.175)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.852</td>
<td>0.925</td>
<td>0.884</td>
<td>0.831</td>
<td>0.880</td>
<td>0.895</td>
<td>0.722</td>
<td>0.843</td>
<td>0.870</td>
<td>0.825</td>
<td>0.880</td>
<td>0.836</td>
</tr>
</tbody>
</table>

Note: