Are Export Promotion Programs Effective in Promoting the Internalization of SMEs?

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Abstract

This paper investigates the impact of Export Promotion Programs (EPPs) in Lombardy – one of the richest region in Italy and one of the four Motors of Europe – on the export performance of beneficiary firms. To assess the impact of the EPPs, we *applied a fixed-effect differences-in-differences estimator with ex-ante matching. W*e *shed light on why and how EPPs work by exploring in details what dimensions of export performance respond better to these programs, which support services are more related to export success and which firms benefit more. Our estimates suggest that assisted firms show higher export propensity and export intensity than non-assisted firms, with micro- and small-sized firms and already exporting firms benefiting the most. Last but not least, the effect of EPPs remains positive and significant even when the potential impact of other subsidies is accounted for. These results are useful for improving the design of EPPs.*

Key words: SMEs; export promotion; impact evaluation; export performance;

JEL codes: L25, F14, F13, L15.

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Are Export Promotion Programs Effective in Promoting the Internalization of SMEs?

1. Introduction

There is a strong awareness in the current theoretical and policy debate of how crucial Small and Medium-sized Enterprises (SMEs) are to a nation's economic development. In every country, regardless of the level of development, they represent over 95 per cent of the entire universe of private firms and account for a significant proportion of total employment and job creation (WTO, 2016; Criscuolo et al., 2014; de Kok et al., 2013). Given their small size, however, SMEs are more vulnerable to barriers that may prevent their growth prospects, mainly on international markets where SMEs face several liabilities due to smallness and inexperience, as compared to their larger counterparts. In particular, they face stronger financial constraints to invest in activities related to internationalization, are more affected by the uncertainty surrounding foreign markets and have weaker competences to carry out international activities successfully (Wright et al., 2007; Esteve-Perez and Rodriguez, 2013; Paul et al., 2017). Despite that, it has been demonstrated that although small firms are less likely to become and survive as exporters, if they do survive they grow faster than large firms since they have the capacity to enter and exit markets more rapidly than large firms (Wagner, 2007, 2012; Verwaal and Donkers, 2002).

These considerations explain why facilitating the participation of SMEs in international trade has been and still is an important policy objective. Indeed, several governments at local, national and international level pursue active policies aimed at developing mechanisms that build and provide SMEs with the necessary resources to compete successfully in international markets (Esteve-Perez and Rodriguez, 2013). These policies, often referred to as Export Promotion Policies (EPPs), include a wide range of activities, like training on export procedures, the provision of information on market opportunities and counselling services, the organization of trade missions, international fairs, and meetings with potential customers (Ledermann et al., 2010; OECD, 2009).

While Government intervention may be widely justified – as it will be explained in details below – it is important to ascertain whether these programs provide support effectively. This paper aims at disentangling this issue. In particular, we assess the potential impact of the EPPs implemented by the public authorities of Lombardy – one of the richest Region in Italy and one of the four

motors of Europe – on the export performance of firms using those export promotion services. Then, we shed light on how EPPs work by exploring in details what dimensions of export performance respond better to these programs, which support services are more strongly related to export success, and, lastly, which firms benefit the most.

Following the recent and growing literature on EPPs evaluation at firm level (Van Biesebroeck et al., 2015 and 2016; Cadot et al., 2015; Volpe Martincus and Carballo, 2008, 2010a, 2010b, 2010c, 2012; Volpe and Martincus et al., 2012; Broocks and Van Biesebroeck, 2017; Munch and Schaur, 2018; Cruz, 2014),[1] we apply an ex-ante matching fixed-effect differences-in-differences estimator to identify the causal impact of EPPs on firms' export performance. In this context, credible identification is a challenge, since one is forced to address self-selection of firms into EPPs. Compared to the existing literature, we have some advantages in dealing with this issue.

First, we have detailed longitudinal administrative data on the EPPs implemented in Lombardy and on beneficiary firms during the period from 2010 to 2014. Program data include the enrolment status, as well as information on the type, the number and the value of the services received each year by every firm. The peculiar structure of this administrative archive allows us to identify assisted and not assisted firms. The latter constitute a proper control group because they likely follow the same unobserved self-selection process into the program as the supported firms. Secondly, since we observe variation in EPPs across firms and over time, we can implement a regression-based identification strategy with a rigorous set of fixed-effects, and thus properly correct for time-invariant unobserved heterogeneity. These two advantages combined together, ensure that the estimates can be interpreted as causal effects of EPPs on firms' export performance. In addition, we have information on whether SMEs participated in other public programmes, not necessarily implemented at regional level and focused on export promotion, which may have a direct or an indirect impact on firms' export performance.[2] Therefore, we can study whether receiving alternative public subsidies magnifies or dumps the effect of EPPs

We contribute to the existing literature in several ways. First, we strengthen the existing evidence regarding the effectiveness of EPPs in a developed and open economy like Italy, which is today

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[1] There also exists a small literature exploring the effectiveness of EPPs at aggregate level, complementing firm-level studies. On average, this literature demonstrates that the benefits, in terms of increased exports, accruing to assisted firms overcome the loss potentially faced by non-assisted firms. See Rose (2007), Lederman et al. (2010) and Olarreaga et al. (2015).

[2] Export promotion services may also be obtained from national or other regional agencies. Moreover, firms may have access to other policy instruments aiming at supporting firms' R&D and technology adoption strategies. To the extent to which these programs allow firms to become more productive, export performance may improve consequently (Máñez et al., 2015; Esteve-Perez and Rodriguez, 2013; Cassiman et al., 2010).

still scant.[3] We find a positive and significant effect of EPPs, since assisted firms have higher export propensity and export intensity relative to their non-assisted counterparts. Second, we examine the varying effects of different kinds of EPPs and find that the estimated effects are larger for services classified as "promotional", like participation in international trade fairs and exhibitions, than for "technical assistance and counselling" activities or "Information and knowledge specific provision" services, like participation in economic mission abroad. Third, and more importantly, we explore the contingencies that mitigate or magnify the effects of EPPs and demonstrate that the joint use of all the above-mentioned services is more effective in promoting exports than individual ones, and that firms with export experience show the highest increase in export activities. Estimated effects are also larger for micro and small-sized firms rather than for medium-sized ones. Lastly, we estimate the effects of EPPs on two dimensions of export performance and find that while promotional support activities are able to increase both the export propensity and the export intensity of assisted firms, other EPPs only affect the export propensity, encouraging new firms to become exporters. These findings are relevant from an economic policy perspective too, since they represent a valuable input in improving the design of the existing policies and in driving the allocation of resources to different EPPs.

The remainder of the paper is organized as follows. Section 2 provides an overview of the related literature. Section 3 describes the research setting and the EPPs implemented in Lombardy. Section 4 presents the measuring framework and the identifying assumptions, as well as some descriptive statistics on assisted and control firms, and EPPs whose potential effects are discussed in light of the theoretical literature. Section 5 is devoted to estimation results, while Section 6 discusses the effectiveness of EPPs at aggregated level. Section 7 concludes and indicates potential caveats and future lines of research.

2. Literature review

2.1 Theoretical background

The theoretical framework of our analysis is related to two different streams of literature that, although developed independently one from each other, are strictly related: *i)* the microeconomic

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[3] According to our knowledge, only Broocks and Van Biesenbroeck (2017), Van Biesenbroeck et al. (2015 and 2016) and Munch and Schaur (2018) provide evidence on the effectiveness of EPPs in developed countries, while all the others focus on developing countries, and mainly Latin America, as Section 2 discusses in details. The effectiveness of EPPs implemented in Italy at national or regional level has never been assessed with quantitative and counterfactual methods, with two exceptions, i.e. a study commissioned by another regional administration, Tuscany (Bocci et al., 2015) and Comi et al. (2019).

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literature that analyses the determinants of patterns of internationalization of SMEs; *ii)* the macroeconomic literature that provides a rational for a public intervention in supporting the internationalization processes of SMEs.

As for the former, it acknowledges that exporting is a complex activity and small firms face more constraints and higher foreign market entry costs than their larger counterparts (Bernard and Jensen, 1999 and 2004; Greenaway and Kneller, 2007). Firms pursuing cross-border activities must engage in a costly process of understanding export procedures, gathering information on the conditions to enter markets abroad, not to mention the process of searching for reliable and qualified trading partners in geographical and "psychic" distant markets.[4] SMEs are more sensitive to these obstacles than their large counterparts for at least two reasons. First, information barriers and foreign market entry costs are fixed and/or sunk in nature, i.e. do not depend on the level of trade and cannot be recovered should the attempt to break into the foreign market unsuccessful; secondly, SMEs usually lack the internal financial, human and technological resources and knowledge necessary to deal with such obstacles and carry out export activities successfully (WTO, 2016; Bernard and Jensen, 1999 and 2004; Wagner, 2007 and 2012). This literature also recognizes that the information requirements associated with exporting are so important that they may hinder exports and prevent some firms from successfully engaging in it (Melizt, 2003; Bernard and Jensen, 1999 and 2004; Portes and Rey, 2005; Rauch, 1999; Greenaway and Kneller, 2007).

The existence of such an anti-export bias claims for a policy intervention, as suggested by the second strand of literature related to this paper. Since many of the costs associated with export activities relate to information, two potential sources of market failures may arise, i.e. information spillovers and asymmetries of information (Copeland, 2008). Indeed, firms may be reluctant to make considerable efforts in the attempt to open new foreign markets, establish distribution channels, and cultivate contacts with potential foreign clients, since these costly activities may indirectly benefit their potential competitors (Lederman et al., 2010). Difficulties may also arise because domestic firms cannot observe the quality of potential foreign partners and the attention they pay in performing the tasks they have contracted. This literature also inform about the form government support should take in order to overcome information barriers. The prediction is strongly in favour of in-kind rather than cash support (Blackorby and Donaldson, 1988) since the latter not only would violate WTO rules, but would also create incentive compatibility problems

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[4] Psychic distance refers to the set of "factors preventing or disturbing the flows of information between firms and markets" (Johanson and Wiedersheim-Paul, 1975, p. 308), like "differences in languages, education systems, managerial practices, culture, and industry development" (Dominguez and Mayrhofer, 2017, p. 1052).

since firms not eligible for the subsidy would have incentives to change their behaviour to collect it (Copeland, 2008).

The above considerations explain why today most governments, rather than providing a cash subsidy, furnish an indirect subsidy by delivering trade assistance to domestic firms, at costs lower than the market ones (Copeland, 2008). It includes the provision of both general information on trade, finance, logistics, customs and regulatory compliance, and firm-specific services. The latter take the form of export training and export capacity building, technical counselling on specific aspects of the export process, promotional assistance aimed at encouraging firms to participate in international trade fairs, and other types of assistance that would allow more firms engage in export activities (Lederman et al., 2010). Notice that with the provision of these services, Governments aim at addressing the spillovers-related externalities issue, so that exports may reach the level they would have got in the absence of any frictions to trade.[5]

2.2 Empirical literature

While the literature acknowledges the rationale for public-sponsored export promotion services, there is less consensus on the effectiveness of these activities in fostering both aggregate and firm-level exports. The heterogeneity characterizing policy interventions, assisted firms, the study context and the potential impact indicators, makes it difficult to provide conclusive evidence on the critical factors at the basis of successful support for SMEs' internationalization strategies.

Most of these studies benefit from a greater availability of data and use econometric techniques recently developed in impact evaluation literature to deal with self-selection issues in non-experimental settings (Angrist and Pischke, 2009). The results point to a positive and significant effect of EPPs on firms' export performance. The effect, however, is mainly concentrated on the extensive margin – the development of new product and/or destination markets and when firms enter foreign markets for the first time – rather than on the intensive margin, e.g. the increase of already existing export flows. These results implicitly suggest, on the one hand, that EPPs have to target new exporters or firms trying to develop new exportable products or new destinations for existing products; on the other hand, that experience on international market substitute for EPPs, given to a process of learning-by-exporting.[6] The majority of these works, however, refer to the experience of developing countries, mainly located in Latin America (Volpe Martincus and

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[5] Whether EPPs are the best response to this type of market failures, as well as a thorough discussion of their pros and cons are out of the scope of this paper. Readers interesting in deepening these theoretical issues may refer to Copeland (2008).
[6] See Silva et al. (2012) for a thorough review of the learning-by-exporting literature.

Carballo, 2008, 2010a, 2010b, 2010c, 2012; Volpe Martincus et al., 2012; Cruz, 2014), with the exception of Cadot et al. (2015) who refers to Tunisia.[7] Only three very recent papers (Van Biesebroeck et al., 2015; Broocks and Van Biesebroeck, 2017; Munch and Schaur, 2018) focused on EPPs provided by developed countries, i.e. Canada, Belgium and Denmark, respectively. These studies find a positive effect of EPPs on firm export performance, but the supremacy of the extensive margin does not emerge clearly as in the case of developing countries. In particular, Van Biesebroeck et al. (2015) found that, in contrast with the existing evidence on Latin America, EPPs are more effective in increasing exports to existing markets rather than to encourage Canadian firms to extend foreign activities in other markets. Munch and Schaur (2018), instead, found the opposite, i.e. the effect of EPPs provided by the Danish government on firms' export sales is limited compared to that on the export status, while Broocks and Van Biesebroeck (2017) concentrate on the export status only, finding positive results. This weak empirical evidence indicates that further investigation is needed to better understand the working mechanism underlying EPPs in developed countries.

Another issue that needs further analysis is the relative effectiveness of different types of policy instruments. Public agencies usually offer a wide array of services to assisted firms not always directly comparable because of different categorizations. Nevertheless, the existing evidence shows that a combination of different types of services is associated with better export performance, indicating that there are complementarities among services (Volpe Martincus and Carballo, 2010a; Broocks and Van Biesebroeck, 2017, Van Biesenbroeck et al., 2015; Cadot et al., 2015). The extant literature also points to the fact that EPPs exhaust their effectiveness in the short run, implicitly suggesting the need for repeated support (Cadot et al., 2015; Van Biesebroeck et al., 2015). This may be due, on the one hand, to the fact that whenever firms break into a new market, they suffer from information incompleteness problems, given that most services are country- or market-specific; on the other hand, EPPs are designed to support firms in overcoming obstacles to foreign trade rather than stimulating mechanisms of learning by exporting.

As for contingencies that may magnify or hamper the impact of EPPs, the existing evidence is scant and does not show any systematic patterns. Firm size, age and export experience affect the impact of EPPs in both developed and developing countries, though in different direction. In particular, Volpe Martincus and Carballo (2010a), Volpe Martincus et al. (2012), Munch and Schaur (2018) and Broocks and Van Biesebroeck (2017) find that smaller firms benefit the most, while Cadot et al. (2015) point to medium-sized firms as the most important beneficiaries of EPPs. Moreover, Van Biesebroeck et al. (2015) find that older firms and firms with more export experience benefit

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[7] The cited works focus on Peru, Colombia, Chile, Uruguay, Costa Rica, Argentina and Brazil, respectively.

the most, while Cadot et al. (2015) find that the strongest treatment effects appear on firms with no prior export experience. However, these results are barely comparable since they use different categories for firm size and export experience. Hence, we can conclude that accumulating further knowledge on the effects of EPPs in different contexts is crucial to understand how and under which circumstances they work better.

3. The Research setting

3.1 Export patterns

To provide some context for the policy environment, we first present a short overview of export patterns in Italy and in Lombardy. Italy is among the top 15 leading exporting economies of the world and between 2010 and 2014 Italy's exports grew from €337 to €398 billion, with an average annual growth rate of about 4.2%. Italy's share of world exports slightly reduced from 2.95% to 2.85%, while the share of total EU exports remained stable over the period (around 5%). The number of exporting firms also increased over time from 205,708 in 2010 to 212,023 in 2014, with average firm export growing from €1.64 million to €1.87 million. Given the objectives of this paper, it is worth highlighting first, that more than 62% of these operators were micro-firms, while large exporters represented only 0.5% of the sample;[8] the contribution of these two classes of operators to national exports was about 0.5% and 50%, respectively. Moreover, the share of micro-exporters on national exports decreased in the considered period, suggesting a tightening of the constraints these firms may face while exporting. Secondly and more importantly, export operators, regardless of their size, represented less than 5% of active firms (ISTAT-ICE, 2015).

Lombardy mirrors most of national trends. It leads the rank of the Italian exporting regions, hosting about one third of national export operators who, all together, contribute to almost one third of the national exports. In absolute value, exports from Lombardy increased from €94 to €110 billion in the considered period (ISTAT-ICE, 2015), while the number of exporters increased from 58,177 in 2010 to 61,674 in 2014. Average firm export, despite a slight increase (from €1.6 to €1.7 million) was below the national average. Small exporters represented about 60% of total exporters but only 0.6% of total exports, while large exporters were 0.6% of total exporters and provided up to 40% of total export value. Last but not least, the latest available data (Unioncamere Lombardia, 2018) show that the share of exporting firms on total active firms, although above the

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[8] Micro-exporters are those with an export turnover below €75,000, while large exporters have an export turnover above €50 million (ISTAT-ICE, 2015).

national average, remained stable over the considered period (7.8% in 2014 with respect to 7.6% in 2012).[9]

These trends and mainly the relevant contribution that Lombardy offers to national exports, the greater importance of exports by micro-operators, and the extremely low share of active firms engaged in export activities, provide a strong rationale for EPPs.

3.2 Export promotion

Export promotion support in Italy has been restructured with a reform of Title V of the Italian Constitution that gave sub-national governments (at NUTS II level) power to act in certain areas like international trade. Within this framework, the government of Lombardy has implemented several policy measures aimed at expanding the presence of regional firms in foreign markets with high potential, increasing the number of regularly exporting firms, and enhancing the regional economic system's ability to attract investments from abroad.

The organizational strengthening of SMEs, whose structure is often not adequate to the challenges posed by internationalization, has been addressed by means of the so-called vouchers for internationalization, i.e. grants for firms to support their exporting processes. The purpose of vouchers for internationalization is to help SMEs satisfy various needs. In particular, the vouchers allow firms to improve their capacity to manage export processes by:

- *Providing technical assistance and counselling* on several aspects related to the export process, like market analyses, search for possible clients and suppliers, as well as how to manage administrative, documentation and payment problems related to across-the-border operations (Voucher A).

- *Organising outgoing economic missions abroad*, to help participating firms gaining "experiential knowledge" (Spence 2003) with foreign countries' economy, politics and culture through direct contacts with local officials and businessmen, so that to improve their perceptions of market potential and increase their knowledge of local commercial practices (Voucher B).

- *Encouraging participation in international fairs and exhibitions* held abroad, to help firms expanding their international activities. During those events firms can promote and sell

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[9] Low awareness of EPPs' existence and effectiveness, or unwillingness to rely on external sources of exporting knowledge may be crucial factors in explaining these percentages.

their products and services, meet suppliers and clients, and establish contacts with new partners (Voucher C).[10]

All non-agricultural SMEs operating in Lombardy are eligible for EPPs provided that they are active and not in bankruptcy, have not received other grants for the same initiative, and respect the provisions of the Regulation (EC) 1998/2006 on the application of Articles 87 and 88 of the Treaty to *de minimis* (low level) state aids.[11]

Firms respecting these criteria are admitted to the grant without any selection procedure in a chronological order until resources are exhausted.[12] The grant, however, is paid upon completion of the activities covered by the vouchers and on a reimbursement basis, since firms must present receipts upon implementing the activities envisaged by the vouchers.

The amount of the grant assigned to each eligible firm is small and fixed across firms, though it varies according to the type of support requested and the destination market.[13] Firms admitted to the grants have to co-finance the provision of the selected services with a fixed minimum amount that differs across vouchers and the destination market. Furthermore, firms are allowed to apply for multiple vouchers per year, but the total amount of the grant received should not exceed €15,000.

Overall, these characteristics – matching-grant program, payment after presentation of regular invoices, – ensure that grants are not misallocated, but used for their intended purpose by firms committed to exporting activities. Therefore, vouchers for internationalization are particularly attractive for an evaluation exercise.

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[10] The provision of the above-mentioned services has been outsourced by Lombardy region to third parties, like the Chambers of Commerce and their specialized agencies for internationalization, territorial associations and consortia. The latter and other private service providers should comprise at least 10 SMEs, have a non-profit purpose, and be devoted to supporting the internationalization processes of member firms. Participating firms select autonomously the provider. Quality differences across providers may reduce the estimated effects.

[11] This Regulation sets the *de minimis* ceiling at €200,000 per undertaking granted over any period of three fiscal years. This considerably simplifies the granting of small amounts of support.

[12] It may happen that firms withdraw autonomously from the programme, or that the grant is not assigned because the application was not filled in correctly or because the exhaustion of the funds allocated to EPPs. These cases – unfortunately not distinguishable one from the other – represent, on average, from 5 to 10 percent of the total number of applications, according to the type of voucher considered.

[13] In particular, Voucher A furnishes a public contribution of €2,500, while Voucher B and C offer different grants according to the destination markets and the type of participation in international fairs. For example, a firm interested in the German market will receive €800 to participate in an economic mission, €1,000 to participate in an international fair individually, and €1,200 for an in-group participation in the same trade fair. Firms interested in the Japanese market, instead, would receive €2,300, €2,000 and €2,500 respectively. These figures refer to vouchers for internationalization granted in 2012. See the Official Journal of the Lombardy Region (BURL), n. 6, February 2nd 2012.They may change over time.

4. The research setting

4.1 Empirical strategy

The aim of the empirical analysis is to assess the impact of EPPs on different measures of firms' export performance in the short-run. We use a differences-in-differences fixed-effect model to estimate the following econometric model:

$$Y_{it} = \alpha + \beta Treated_i \times Post_{it} + \gamma Treated_i + \theta X_{it} + \tau_t + \mu_i + \varepsilon_{it} \tag{1}$$

where *it* denotes the *i-th* firm at time *t*. Y_{it} is a measure of the firm's export performance, *Treated$_i$* is a dummy equal to 1 if the firm has been treated, $Post_{it}$ is a dummy variable equal to one for the period after the firm *i* has been treated, X_{it} is a vector of time-varying firms' characteristics, τ_t and μ_i are, respectively, time and firm fixed effects, and ε_{it} is the residual error term. β is the parameter of interest, as it captures the effect of the Treatment On the Treated (TOT) in this framework.[14]

The estimation of equation (1) yields biased estimates if the error component is correlated with the treatment variable. Indeed, when firms are not randomly assigned to the treatment, endogeneity may emerge, because of self-selection and omitted variables. When applying for the treatment, each firm takes a decision based on its observable and unobservable characteristics – like the presence of a skilled and ambitious manager in our context – that may be correlated with both the treatment variable and the outcome.

We address these potential sources of endogeneity in three different ways. First, we estimate the model using a within-firm estimator (fixed effects), which enables us to control fully for the time invariant unobserved heterogeneity of firms, greatly reducing both sources of endogeneity and thus the potential bias. Furthermore, the within estimator allows us to overcome the problem of the few covariates available in our datasets, as it can control for all firm's time invariant characteristics without observing them. We are assuming that conditional on individual fixed effect μ_i and covariates X_{it} the assignment of firms to the treatment is strictly exogenous in year *t*, i.e. it is not correlated with the past, present or future error term component ε_{it}, which contains time-variant unobserved characteristics.

Secondly, we pay attention to another critical task in causal effect identification strategies, i.e. the choice of a suitable control group. The latter should be as similar as possible to the treatment group in terms of observables in order to be able to assume a similar distribution and evolution over time also of the unobservable characteristics. We provide evidence based on two different

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[14] Of course, applying a fixed-effects estimation to Eq. (1) prevents us to identify the parameter γ since the variable $Treated_i$, constant over time for each treated firm, is differentiated away.

types of control groups. The first type consists of firms that applied at least once for the treatment but have not received it yet (*internal control groups*), while the second includes firms that have never applied for the EPPs (*external control group*). Under the assumption that control firms share the same observed and unobserved drivers of the selection process into the treatment as the treated firms, the former can be considered a good pool among which controls can be picked up. The latter, instead, provides a robustness excise to document how selection bias works. We selected our control groups using Abadie et al.'s (2004) semiparametric matching approach. More specifically, for each treated firm observed in the pre-treatment year, we identified the closest five firms in the non-treated groups based on the values of observable characteristics, allowing for replacement. Combining (*ex-ante*) matching with the differences-in-differences estimator has the extra benefit of reducing the so-called Ashenfelter's Dip, e.g. a temporary fall in the outcome just before the treatment (Blundell and Costa Dias, 2009). This drop may result in an over-estimated TOT. *Ex-ante* matching can prevent this from happening, mainly when it includes pre-treatment outcomes among the variables used to match treated and controls (Angrist and Pischke, 2009; Blundell and Costa Dias, 2009).

Thirdly, differences-in-differences estimates are valid only if there exists a parallel trend in the outcome variables for treated and control firms before the treatment. Indeed, the existence of a parallel trend can be interpreted as a further confirmation of similar distribution of unobserved time variant characteristics between treated and controls, once individual fixed-effects are controlled for. We exploit retrospective data on firms and test for the presence of such parallel pre-treatment trends using the following equation (Muralidharan and Prakash, 2017):

$$Y_{it} = \alpha + \gamma_1 Treated_i \times Trend_t + \gamma_2 Trend_t + \theta X_{it} + \varepsilon_{it} \qquad (2)$$

where the variable $Trend_t$ is a linear trend that takes the value of one from 2007 until 2009, i.e. one year before the voucher was tendered, while the other variables are defined as in Eq. (1). A not statistically significant estimation of the coefficient of the interacted term, γ_1, would confirm the existence of the parallel trend and validate the estimation of the effect of the voucher. Otherwise, differences-in-differences estimates would not be valid. Finally, we clustered standard errors at firm level not only to control for dependence of observations across years, but also because we do not have a stratified sample design (Abadie et al., 2017).

4.2 Data and variables

In our empirical analysis, we use a unique firm-level dataset that resulted from merging three different sources of information: 1) the register of Lombard firms that applied for EPPs, at least

once from 2010 to 2014; 2) the AIDA database, containing comprehensive balance sheet information on companies in Italy, with up to ten years of history; 3) the Italian Business Register of active firms (ASIA), that records several structural characteristics of Italian firms. The data were merged using a unique identifier at firm level, i.e. the Tax ID number.

The administrative database kindly provided by Lombardy's local authorities represents our main operative sample. When presenting their applications, firms were asked to provide most of the pieces of information we used in our analysis for at least the last three years of activity. Besides detailed information on the services provided – type, number and monetary value of vouchers received – each record includes information on employment, location (NUTS III level), industry code (NACE Rev. 2, 2 digits), year of incorporation, total and export sales. The other two databases have been used to fill missing information concerning mainly employment and total turnover (AIDA) and to create the external control group (ASIA), i.e. to select firms that have never applied for regional EPPs, as said in Section 4.1. Only the regional administrative archive contains information about export sales, while ASIA includes a categorical variable identifying exporting firms, but only for two years (2011 and 2012). No other dataset contains information about the export activity of Italian firms, at least to our knowledge.

Given the objectives of the paper, we consider as outcome variables two different indicators: the export propensity and the export intensity. The former is a dummy variable equal to one when the firm exports and zero otherwise, while the latter is export over total turnover. Export propensity helps us to investigate whether and to what extent EPPs are able to expand the number of potential exporters, while export intensity allows us to explore whether EPPs help expanding foreign activities.[15]

We start considering as treatment variable the usage of any kind of EPPs. We then look at the impact of the different types of EPPs separately. In doing so, we adjusted the treated group accordingly, i.e. we considered only those firms that had received exclusively that specific type of voucher. Given the fact that firms may have benefited from the grant in different years, the estimated coefficient β should be interpreted as the "gross" effect of the treatment taken from 2010 to 2014.

As covariates, the theoretical framework explains patterns of internationalization as a self-selection of more efficient firms into the export market (Melitz, 2003; Bernard and Jensen, 1999 and 2004); thus, we include as explanatory variable the (log) labour productivity, computed as

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[15] Unfortunately, we observe only total export sales, without any distinction on products and destination markets. Thus, differently from previous similar studies, we cannot say whether EPPs affect more the extensive or the intensive margin.

total turnover over the number of employees. The idea is that firms with greater productivity has a higher propensity to export and export more than less efficient firms. Besides the traditional productivity-export relationship, other factors may affect firms' internationalisation strategy. In particular, it has been argued that "the lack of size can be considered a handicap in exporting for small firms" (Serra et al., 2012, p. 211). To test this hypothesis, we include the (log) number of employees, and expect that large-sized SMEs have a higher propensity to export and larger export sales (Majocchi et al., 2005).[16] Another crucial driver for internationalization is the age of the firms, though its expected impact on export performance is rather ambiguous (Majocchi et al., 2005; Love et al., 2016; Crespi et al., 2008; D'Angelo et al., 2013; Di Maria and Ganau, 2014). If age is an indirect proxy for firms' internationalization experience, we expect it exerts a significant and positive impact on both export propensity and export intensity. If, instead, age is an indicator of "sclerotic thinking, and inertia" (Love et al., 2016, p. 808), we expect it affects negatively firms' export performance since older firms may have more difficulties in learning from international experience. We also add age squared to capture potential non-linearities in the process of learning.[17] Furthermore, for each firm we know whether it has received other grants in the years before applying for the vouchers. Therefore, we define a dummy variable equal to one if firms benefitted from other public supports, and zero otherwise. We use this variable to investigate the magnitude and significance of potential interactions between regional EPPs and other grants.[18]

Our operative sample includes 1,260 treated firms, i.e. firms that applied for the voucher at least twice, so as to have valid information on all the relevant variables described above at least one year before the treatment period and at least one year after the treatment. Non-treated firms, instead, have been selected among the 1,425 not-assisted firms included in the administrative archive. The latter include firms that either applied for the voucher in 2014 for the first time or received at most one voucher in any other years from 2010 to 2013. This pool of firms has never been observed after receiving the voucher and has never been treated when included as control, as exemplified in Figure 1.

Insert Figure 1 about here

Despite showing the same selection process into the treatment, assisted and control firms are quite different in the pre-treatment period, as Table A1 in the Statistical Appendix shows.

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[16] In this paper, the traditional threshold level of 250 employees has been used to define SMEs (Eurostat).
[17] Age and age squared were dropped from Eq. (2) because in a fixed effect framework they are perfectly collinear with the trend.
[18] Firms' time invariant observed characteristics, such as the sector of activity and the location of firms, do not appear as covariates in our specifications because in estimating a model with firm fixed effects they are already controlled for. These variables have been used for descriptive purposes only.

Therefore, we matched each treated firm with the five more similar non treated firms in 2009[19] – i.e. the first common pre-treatment year – allowing for replacement, and using a semiparametric matching procedure based on: (log of) turnover, (log of) number of employees, age, export intensity, sector of activity, and the dummy signalling whether firms have received grants different from EPPs and with an exact matching by export probability and firm size. Eventually, we ended up with two very similar groups. Our final sample thus includes, besides 1,260 treated firms, 6,295 control firms, for a total number of about 30,000 firm/year observations.

4.3 Descriptive statistics

In Table 1 we report some pooled descriptive statistics concerning treated and control firms in 2009, i.e. in the first potential year before of the treatment. On average, 13% of treated firms was micro-firms, 57% small-sized firms, and the remaining 30% medium-sized firms.[20] The majority of assisted firms (85% of the sample) had some international experience, having already exported before applying for EPPs, while about 67% of the assisted firms benefited from public grants other than EPPs.

Insert Tables 1 about here

Among the different types of EPPs firms can choose (see Table 2), participation in international trade fairs (voucher C) is the most popular, having been selected by almost half of the firms included in the sample. Outgoing missions (voucher B) and technical assistance and counselling (voucher A) follow with smaller and quite similar percentages, i.e. 12 and 11 percent, respectively.[21] More importantly, statistics show that the groups of participants in the different programs are quite heterogeneous. In particular, firms participating in trade fairs (voucher C) are more engaged in export activities than firms assisted through the other two types of voucher, as indicated by the average export intensity. Second, the share of micro-sized firms on total users of

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[19]The inclusion of pre-treatment outcome as a matching variable prevents us to use one of the years in which the voucher was tendered to run the matching procedure.

[20] We adopt the definition of micro, small- and medium-sized enterprises established by the EU recommendation 2003/361.Two factors determine whether an enterprise is a SMEs, i.e. staff headcount and either turnover or balance sheet total. In particular, micro firms are those with fewer than 10 employees and an annual turnover (or balance sheet total) not exceeding €2 million; small-sized firms, instead, have up to 50 employees and an annual turnover not exceeding €10 million, while medium-sized enterprises have up to 250 employees and an annual turnover not exceeding €20 million. Firms with more than 250 employees were not included in the sample. Firm categorization refers to the first year in which each firm is observed, and it is assumed to remain constant over time.

[21] The number of firms reported in the last row of table 2 refers to firms that have used only that specific type of voucher. In other words, only 137 firms out of 1,260 have used at least one voucher A in the considered period (2010-2014), while 147 firms have used at least one voucher B and 622 at least one voucher C. Only 353 firms out of 1,260 have used more than one type of voucher in the selected period.

voucher A (20% of assisted firms) is twice as large as the share of those registered for voucher C (11% of total assisted firms). Medium-sized firms, instead, show the opposite pattern, representing 21% of total firms assisted with voucher A and 32% of firms assisted with voucher C. Small-sized firms represent about two thirds of total assisted firms, regardless of the type of EPPs.

Insert Tables 2 about here

These figures indicate that technical assistance (voucher A) and, though to a lesser extent, outgoing missions (voucher B) seem to be more appropriate to overcome smallness liabilities, since they provide micro- and small-sized firms with the resources and competencies they lack internally to successfully engage in export activities. In contrast, international trade fairs (voucher C) seem more appropriate to overcome foreignness liabilities, and to consolidate export performance of already exporting firms. Overall, these differences implicitly suggest that the impact of the vouchers may change not only among firms with different sizes, but also in relation to the export status. The next sections will seek to disentangle these issues, as well as the relative impact of the aforementioned programs.

5. Results

In this section, we first report treatment effects on the treated (TOTs), accounting for heterogeneity across firms of different sizes and with different export experience. In separate sub-sections, we then investigate the absolute and relative impact of different types of EPPs on the outlined measures of firms' performance and examine the robustness of our results to alternative identification strategies.

5.1 Main results

The first set of estimates is reported in Table 3. It allows us to understand whether and to what extent EPPs, broadly considered, impact on firms' export status (Columns 1 and 2) and/or firms' export intensity (Columns 3 to 5). The results are based on different samples that include firms with no export experience before receiving the grant in the first case, and all firms assisted through EPPs in the second case. In the extent to which EPPs reduce information costs and improve firms' knowledge and ability to do business across borders, we would expect to find a positive and significant impact on both outcome variables.

Column 1 shows that, as expected, EPPs increase the probability of becoming an exporter by 14% relative to the control firms. The estimated coefficient is significantly different from zero at the

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conventional levels, thus suggesting that EPPs effectively encourage SMEs to engage in export activities.

To investigate where EPPs have their large impact, we interacted the treatment indicator with dummies for firm size (Table 3, second column). Although the impact remains positive for all firm size categories, it is significant for micro- and small-sized firms only. Moreover, it is increasing with size, with the effect on small-sized firms estimated as being five times larger than the effect on micro firms. These results are not surprising since micro-firms, lacking the necessary internal resources and competences, are less inclined to export than larger-sized firms; therefore, only few of them will be encouraged by EPPs to start exporting. These findings are therefore consistent with the resource-based theory on firms' internationalization strategies (Serra et al., 2012; Majocchi et al. 2005).

Insert table 3 about here

In constructing columns 3 to 5 of Table 3 we used a larger sample which included all firms, regardless of their previous experience on foreign markets, and estimated the average impact of EPPs on firms' export intensity. The intention was to determine whether and to what extent export support is able to help firms to consolidate their foreign activities (column 3) and which group of firms benefit the most (columns 4 and 5). As indicated by the estimated coefficient reported in column 3, EPPs increase the share of export turnover on total turnover of assisted firms by 1.8% relative to non-assisted firms. More interestingly, we found that this average effect is heterogeneous with firms' size and export experience. Although all categories of firms benefit from EPPs, their impact is decreasing with firms' size, with an estimated impact on micro-firms twice as big as that of the other two categories of firms. Also, stronger treatment effects appear on firms with prior export experience, suggesting that the contribution of EPPs provide additional benefits to firms that are already equipped to export (column 5 of Table 3).

Consistently with the theoretical predictions and previous empirical literature, the above patterns indicate that EPPs are an effective instrument in fostering SMEs' export performance. However, when conditioning on different firms' characteristics, we found a heterogeneous picture. In particular, when the outcome variable is the export intensity, our results suggest that export experience is complementary with EPPs, a result not consolidated in the literature (Van Biesebroeck et al., 2015), while firm size substitute for it (Van Biesebroeck et al., 2015; Volpe Martincus and Carballo, 2010b; Munch and Schaur, 2018). As for the export propensity, instead, we found positive effect for micro- and small-sized firms only, with the strongest treatment effect on the latter (firms with up to 20 employees), a result similar to those previously found in the literature focused on developed countries (Broocks and Van Biesebroeck, 2017; Munch and

Schaur, 2018). However, it is worth mentioning that all the cited studies are not directly comparable one with each other. They, in fact, use not only different categorizations of firms by size but also different evaluation settings and strategies. This issue, therefore, requires further investigation.

Although we are aware that, in a model such as the one we estimated, all the covariates are endogenous (Angrist and Pischke, 2009) and thus their coefficients may be biased, their signs and significance may warrant to be shortly commented. In particular they indicate that, *ceteris paribus*, larger, older and more efficient firms tend to export more; a result consistent with the literature on firms' internationalization (Bernard and Jensen, 1999, 2004). In contrast, productivity is the only crucial determinant of the export status. Indeed, only more efficient firms self-select into the export markets, a result well acknowledged by the literature on firm heterogeneity (Melitz, 2003; Greenaway and Kneller, 2007, Wagner, 2007, 2012)[22].

In order to be sure that our estimates are valid, we investigated the existence of parallel pre-treatment trends between treated and control firms in both outcome variables.[23] Table 4 shows the results, according to which no systematic differences exist between treated and untreated firms. Therefore, we can conclude that, across all firms and different sub-samples, EPPs positively affect SMEs' export performance.

Insert table 4 about here

5.2 Differentiating by type of EPPs

In the previous section, we collapsed all EPPs in one treatment indicator to investigate their effect on firm export performance. Thus, we cannot say whether there is a program that outperforms the others in achieving the objectives of the whole program, or whether firms using a specific program perform better than if they had used a different one.

In order to test these hypotheses, we estimated separately the impact of each type of export support on the outcome variables previously identified. Table 5 shows the results. Interestingly, voucher A and B increase approximately by 11% and 14% the probability of a non-exporting firm to become an exporter (column 1 and 3 in Table 5), while they do not exert any significant effect

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[22] In principle, the productivity variable, always significant in Table 3, may be considered as a "bad control" (Angrist and Pischke, 2009), biasing our estimates of the treatment effects. To check whether this is the case, we run specifications from (3) to (5) in Table 3 without labour productivity among the covariates. The coefficients of the treatment variable remain all significant and positive, with negligible changes in the magnitude (at the fourth decimal digit).

[23] The estimate of a pre-treatment parallel trend in export propensity has been carried out on the entire sample of firms, regardless of the export experience accumulated before the treatment.

on firms' export intensity. In contrast, participating in trade fairs (voucher C) not only increases of about 24% the chance of exporting, but also enhances export intensity of about 1.9% with respect to non-assisted firms.[24] Therefore, there is a strong evidence that participating in trade fairs lead to better results than acquiring specific or general information and knowledge. This result may depend on the peculiarities of each type of export supports. Technical assistance and outgoing missions, in fact, tend to improve firms' awareness of the business opportunities offered by foreign markets, while trade fairs allow firms to identify such prospects, and sell products, with immediate and faster effects on firms' export sales and export status.

Insert table 5 about here

Up to now, we assessed the effectiveness of each programme relative to the non-participation status, but not relative to each other. Therefore, we were ignoring the fact that firms may participate in more than one programs in the same year, as discussed in Section 3.2. In order to evaluate whether there are complementarities among services, i.e. whether combined services are more effective in promoting exports than individual one, we included in the regression equation the three treatment indicators simultaneously with the corresponding interacted effects, so that to consider all possible combinations of EPPs.

Table 6 shows the results. Not surprisingly, the estimated impact of each type of voucher on the outcome variables is qualitatively and quantitatively similar to that previously discussed. To be noted, however, is that the program comparison clearly indicates that a combination of the three basic services, i.e. counselling, outgoing missions and trade fairs, has the strongest impact of any other combinations on export intensity (column 2) but not on export propensity (column 1).

Overall, these results suggest that there exists complementary among different types of export support. In particular, participation in preparatory activities significantly improves gains from trade fairs. Indeed, firms may obtain general information on how to deal with export process through technical assistance and counselling activities included in voucher A. This objective knowledge may facilitate the acquisition of experiential knowledge – i.e. information on country's economy, culture, market regulations and so on – when managers visit foreign countries by participating in economic missions. This greater awareness on how to behave in the target markets helps presenting the right products or services during trade fairs, thus increasing the return associated with these commercial events (Spence, 2003; Volpe Martincus and Carballo, 2008).

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[24] The existence of a pre-treatment parallel trend on outcome variables ensures the validity of such estimates. See Table A2 in the Appendix.

Insert table 6 about here

5.3 Robustness checks

Previous results indicate a strong positive impact of EPPs on both export performance and export propensity. However, the estimated treatment effect may be biased, at least for two reasons. First, treated firms might have received other public subsidies that may directly or indirectly encourage export activities. Examples of such relevant support programs may include subsidies for R&D and training as well as similar EPPs offered at national or supra-national level.[25] Despite the potential influence of these types of government support on export status and performance of SMEs, to date there has been no study, at least to our knowledge, that has specifically investigated the potential distortion generated by these indirect channels of public support on the impact of EPPs. Secondly, we clearly cannot definitively rule out that there may be other unobserved time-varying factors influencing both the selection into the treatment and the export performance of firms. This section is devoted to demonstrate that these issues are not relevant in our setting.

5.3.1 The role of other public subsidies

To investigate whether and to what extent our findings are driven by the existence of other potential public grants that are more effective than regional EPPs in improving export performance, we augmented Eq. (1) by including a dummy variable identifying those firms that had benefited from other public grants.[26] As shown by Table 7, the impact of the EPPs, *ceteris paribus*, remains positive and significant. In addition, it is magnified when assisted firms could access other grants, but this consideration applies to export intensity only, indicating that vouchers for internationalization remain solely responsible for the increase in the potential number of exporting firms. This further strengthens the role of EPPs on the extensive margin.

Insert table 7 about here

Lastly, we re-estimated Eq. (1) by restricting the sample to those firms that had never received any grants apart from EPPs. This additional restriction clearly implies that fewer firms enter the treatment and control groups. The conclusions do not change qualitatively. However, as expected, the effects on export intensity tend to be somewhat smaller, since they no longer include the potential magnifying effects of other subsidies.

5.3.2 Self-selection

So far we have worked under the assumption that after matching control and treated firms, and conditioning on the covariates *X* and individual and year fixed-effects, the assignment to the treatment could be considered as good as random. Despite that, unobserved time-varying factors may be at work, biasing our estimates.

As examples, consider a firm that hires a young, more educated and more proficient in foreign language manager, or a firm that, facing a reduction in domestic demand, decides to explore foreign markets without having any specific competence on it. Should these examples occur, the TOTs would be over- and under-estimated, respectively. While the latter is acceptable and could be considered as a lower bound of the true effect, provided that it is positive and significant, the former might lead to bad interpretation. Therefore, we need to control for its potential relevance in our setting.

In order to achieve this objective, we consider a different control group, made of firms that never applied for EPPs, drawn from the Italian Business Register of active firms (*ASIA*). As explained in Section 4.1 the latter includes the information about the export status only for the years 2011 and 2012; therefore, we had to rearrange the empirical setting accordingly. More specifically, we replicate our estimates using only a two-year period, with 2012 as the year of the treatment, and estimate the impact of EPPs in the same year the firm has received the assistance.[27]

Operatively, we considered as treated the 634 firms assisted in 2012 and selected the internal control group among the 1,700 not assisted firms observed in the Lombardy archive, using the same semiparametric procedure as before based on the following firm characteristics: (log) employment, age, size, the location of the firm (province), and the industry code. An exact matching was imposed on the export status. Although the treated and the internal control groups were already quite similar, the matching removed any residual difference, as it can been see in Tables A3 and A4 in the Statistical Appendix.

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[27] This may not be a problem since previous studies demonstrated that EPPs are effective in the short run only (Cadot et al., 2015; Van Biesebroeck et al., 2015).

Then, we repeated the matching procedure for the external control group, and matched the 634 treated firms with more than 700,000 local firms that never applied for EPPs.[28] Differently from the previous case, the treated and external control groups were quite dissimilar before the matching (Table A3), but well balanced after it (Table A4).

As outcome, we considered the export propensity, while the treatment dummy is equal to one if firms applied for EPPs in 2012 and zero otherwise. Furthermore, we estimated the same specification separately for those firms that did not export in 2011, and for those already engaged in export activities in 2011. Results are reported in Table 8.

As expected, the estimated effects of EPPs vary substantially across the control groups, being three times larger in the case of the external control group. This indicates that the effect of EPPs is not overestimated by using an internal control group as we did in the paper. Moreover, the estimates obtained with the internal control group are positive and statistically significant when we use all the firms, though this result seems to be driven by the sub-sample of firms already exporting before receiving the treatment.[29] This exercise suggests that administrative data ensure that assisted and control firms are more similar than assisted firms and controls drawn from external samples.

Insert table 8 about here

These results are also useful to shed light onto another minor concern related to our definition of treated and not-treated firms. In the baseline estimates in Table 3 and 5, in fact, treated firms had to have applied for EEPs at least twice in order to be observed after the treatment, while the firms in the control sample have applied only once. As long as this different behaviour is related to unobservable time varying factors, it could once again violate the assumption that selection into treatment is orthogonal to export performance. However, we believe that the occurrence of unobserved time varying factors and the potential distortion they are likely to generate increase with the length of the considered period. Therefore, using just two years, as we did in Table 8, represents the best solution to minimize this source of bias. Having found a still positive and significant coefficient, we can definitively conclude that our results are robust to time-varying unobserved heterogeneity and that EPPs are an effective instrument to support SMEs' export performance.

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[28] In this case, given the large amount of control firms, an exact matching procedure was used for all the matching variables.

[29] The small size of this sub-sample of firms suggest that the impact of EPPs on export status is not precisely estimated.

6. Aggregate effects

The estimates presented so far in this paper can be extended to perform a simple back-of-the-envelope analysis of costs and benefits of EPPs in Lombardy. This exercise is based on the hypotheses that marginal changes in the policy parameters do not affect firms' choices and decisions, and that marginal benefits consist exclusively of additional export turnover. Under these assumptions, we can compare direct costs (public and private) related to the provision of EPPs with the estimated benefits in terms of export turnover. We are aware that this is a quite simplistic exercise, and that the objective of EPPs is not to promote export *per se*, but rather to overcome market failures so that export activity moves to the level that would have been achieved if markets were efficient (Copeland, 2008). Since this objective is quite difficult to achieve in practice, we try more modestly to understand whether this public program is able to generate "private returns" in the short-run that may in turn have positive effects on the local socio-economic environment in the medium- and long-run.[30]

Table 9 presents the results of this exercise. The average yearly increase associated with EPPs amounts to €65,000 per each treated firm, an increase of about 4% of the amount exported on average by each Lombard firm active on international market, as described in Section 3.1. By considering that about 2,800 firms have received the vouchers for internationalization, EPPs provided by Lombardy region generated each year €182 million of additional export sales. Given that Lombardy authorities allocated to EPPs about €9.52 million per year, any euro invested in the program generated €20 of extra exports. This figure remains positive (about €9) when one also considers the amount paid by assisted firms (about €10.5 million per year).

These raw figures are in the same range of those provided by similar exercises. More specifically Broocks and Van Biesebroeck (2017) found that a euro invested by Flander's local authorities in similar programs generated between €16 and €29 of additional export, according to the characteristics of the assisted firms. Ollareaga et al. (2015), instead, by estimating an aggregate effect over a sample of 94 countries, found that on average one dollar spent on EPPs generates between $11 and $19 of additional exports.

Insert table 9 about here

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[30] Indeed, the spillovers argument suggests that firms' involvement in international markets may reduce the costs of internationalisation for other firms. Non-exporting firms may learn to export from other firms' export experience. This may occur through several channels, such as labour mobility – hiring a person that has previously worked for a firm exporting to a specific market – imitation, and client/supplier relationships, which ensure a faster diffusion of information and best practices. On the existence and nature of export spillovers see among many others Aitken et al. (1997), and Choquette and Meinen (2015).

7. Conclusions

Although most governments at national and sub-national level invest resources to help firms enter foreign markets and consolidate their export activities, there is scant evidence on whether these resources are misused, mainly in contexts characterized by the presence of a deep integration with the global economy. In this paper, we have examined the effects of EPPs implemented in Lombardy on firms' export propensity and export intensity. In short, we found that EPPs are effective in promoting export activities. Our estimates are qualitatively and quantitatively consistent across different estimation settings and proved to be robust to self-selection bias, and other potential sources of endogeneity, like the concurrent use of different policy instruments able to affect firms' export performance. A rough cost-benefit analysis confirms that the benefits are 9 times larger than the overall costs.

Besides demonstrating the effectiveness of EPPs, we also shed light on the heterogeneity characterizing the effects. EPPs boost both the export propensity and the export intensity of assisted firms. Moreover, the magnitude of estimated impact suggests that firm size substitute for export support, while export experience is complement to it.

Lastly, we found that EPPs have a differential impact on export status and export intensity. While non-exporting firms may be encouraged to engage in export activities by any type of EPPs, participation in trade fairs is the only one able to expand SMEs' export sales, relative to the total ones. It is worth noticing that the impact of trade fairs on export intensity is magnified when it is accompanied by technical assistance and specialized counselling, i.e. those services able to improve the knowledge of SMEs about the functioning of specific foreign markets.

We believe that our analysis has yielded some new policy implications. A more precise targeting among firms according to their export experience should be implemented. In particular, trade fairs are a powerful policy instrument to stimulate SMEs to break into foreign markets, but the return on these events is larger for firms with international experience or provided that assisted firms have already learnt from other preparatory programs, like technical assistance and specialised counselling and outgoing economic missions.

Despite our estimates are robust to corrections for several econometric issues, some caveats still apply. First, identification of the treatment effect implies that there are no spillovers from assisted to non-assisted firms, at least in the short run. For example, non-exporting firms may learn from neighbouring exporting firms about business opportunities, as well as labour turnover from exporting to non-exporting firms may foster the transmission of knowledge on how to deal with export processes. The presence of such spillovers may downward bias the direct positive effects of EPPs, while reinforcing the rationale for the policy intervention. Lastly, and in contrast with

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previous existing studies, given the information we have, we cannot say anything concerning the impact on firms' trade margins. We learnt that EPPs encourage non-exporting firms to exporting, but we do not know whether the positive effect on export intensity is driven by firms expanding their activities in new product/market destination, or by firms that export more in the same product/market. Therefore, additional investigation is needed to disentangle this issue, and further improve the design of EPPs, at least in developed countries.

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Figure 1: Treated and un-treated firms

	Pre-treatment period			Treatment period				
	2007	2008	2009	2010	2011	2012	2013	2014
Firm 1	P.O.	O.	O.	O.	A. N.O.	O.	A. N.O.	N.O.
Firm 2	P.O.	O.	O.	O.	A. N.O.	N.O.	N.O.	N.O.
Firm 3	P.O.	P.O.	P.O.	P.O.	O.	O.	O.	A. N.O.

A=Applied for a voucher; O=observed; N.O.=not observed; P.O.=potentially observed, depending on whether firms provided voluntary the requested information. Firm 1 is a treated firm. It applied for the EEPs for the first time in 2011. Firms 2 and 3 are non-treated firms. They are never observed after the year they applied for the voucher.

Table 1. Summary statistics and differences between treated and control firms after the matching procedure in 2009. Any voucher.

	Any voucher		
	Treated Firms (A)	Control Firms (B)	Difference (A)- (B) (S.E.)
Export intensity	0.351	0.333	0.018** (0.088)
(Log) labour productivity	12.14	12.12	0.014 (0.03)
(Log) Employees	2.77	2.83	-0.062* (0.035)
(Log) total revenue	14.91	14.96	-0.048 (0.039)
Exporters (%)	0.85	0.85	0.0007 (0.010)
Size (%):			
Micro firms	0.13	0.13	0.0001 (.010)
Small-sized firms	0.57	0.57	-0.0003 (0.015)
Medium-sized firms	0.29	0.29	0.0002 (0.014)
Other grants (%)	0.67	0.67	-0.009 (0.014)
Number of vouchers (%)			
One	0.37		
two	0.26		
three	0.21		
Four	0.16		
Number of firms	*1260*	*6295*	

Notes: SMEs are defined according to the EU Recommendation 2003/361. See footnote 6 for the definition of the parameters identifying each category. Exporters: firms that exported at least once in the pre-treatment period. (Log) labour productivity is defined as total revenue over employment. Other grants is a dummy variable equal to one whether the firm received other grants in the relevant period (2006-2013).
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2. Summary statistic and differences between treated and control firms after the matching procedure in 2009. By different type of EPPs.

	Voucher A			Voucher B			Voucher C		
	Control firms	Treated firms	Diff. (S.E.)	Control Firms	Treated firms	Diff. (S.E.)	Control firms	Treated firms	Diff. (S.E.)
Export intensity	0.214	0.219	-0.004 (.025)	0.18	0.17	0.003 (0.021)	0.396	0.421	-0.024* (0.013)
(Log) lab. productivity	12.01	12.04	-0.031 (0.07)	12.03	12.02	0.008 (0.076)	12.17	12.19	-0.016 (0.036)
(Log) Employees	2.68	2.67	0.013 (0.10)	2.64	2.608	0.030 (0.099)	2.90	2.83	0.071 (0.051)
(Log) total revenue	14.70	14.71	-0.02 (0.12)	14.69	14.63	0.06 (0.12)	15.08	15.02	0.056 (0.054)
Exporters (%)	0.71	0.71	0.005 (0.04)	0.64	0.64	0 (0.04)	0.93	0.93	0 (0.01)
Size (%):									
Micro firms	0.19	0.20	-0.008 (0.037)	0.177	0.177	0 (0.04)	0.106	0.106	0 (0.02)
Small-sized firms	0.62	0.59	0.032 (0.045)	0.578	0.578	0 (0.04)	0.569	0.569	0 (0.02)
Medium-sized firms	0.19	0.21	-0.023 (0.037)	0.244	0.244	0 (0.04)	0.324	0.324	0 (0.02)
Other grants (%)	0.75	0.74	0.0005 (0.04)	0.526	0.530	-0.004 (0.045)	0.632	0.645	-0.012 (0.02)
Number of firms	*680*	*137*		*735*	*147*		*3110*	*622*	

Notes: Voucher A includes Technical assistance and counselling activities; Voucher B aims at providing first-hand experience on foreign countries' economy, politics and business culture through the organization of mission abroad, while Voucher C sponsors participation in international trade fairs and exhibitions. SMEs are defined according to the EU Recommendation 2003/361. See footnote 6 for the definition of the parameters identifying each category. Exporters: firms that exported at least once in the pre-treatment period. (Log) labour productivity is defined as the (log of) the total revenue over employment. Other grants is a dummy variable equal to one whether the firm received other grants in the relevant period (2006-2013). *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3. The effect of EPPs on export propensity and intensity. FE DID estimates (2007-2013).

VARIABLES	(1) Export Propensity	(2) Export Propensity	(3) Export intensity	(4) Export intensity	(5) Export intensity
Treated x Post	0.142***		0.0177***		
	(0.0268)		(0.00373)		
Treated x Post x Micro firms		0.0432**		0.0301***	
		(0.0205)		(0.00916)	
Treated x Post x Small-sized firms		0.232***		0.0162***	
		(0.0491)		(0.00511)	
Treated x Post x medium-sized firms		0.0928		0.0155***	
		(0.0572)		(0.00547)	
Treated x Post x Non exporters					0.00368
					(0.00646)
Treated x Post x Exporters					0.0194***
					(0.0040)
Employment (log)	0.00972	0.0107	0.0318***	0.0317***	0.0318***
	(0.0121)	(0.0117)	(0.00576)	(0.00576)	(0.00576)
Age	0.0158	0.0187	-0.00557	-0.00568	0.00431***
	(0.0244)	(0.0249)	(0.00396)	(0.00396)	(0.00161)
Age^2	0.000131	5.57e-05	6.01e-05	6.57e-05	5.75e-05
	(0.000312)	(0.000306)	(6.32e-05)	(6.35e-05)	(6.32e-05)
Labour productivity (log)	0.0153*	0.0162*	0.0276***	0.0275***	0.0277***
	(0.00887)	(0.00899)	(0.00565)	(0.00565)	(0.00566)
Constant	-0.392	-0.428	-0.000932	0.000141	-0.143
	(0.277)	(0.280)	(0.101)	(0.101)	(0.0837)
Observations	3,105	3,105	29,086	29,086	29,086
R-squared	0.142	0.183	0.031	0.031	0.031
Number of firms	866	866	7,555	7,555	7,555
Firm FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: Each estimate (column) is obtained from a separate regression. The export propensity regressions, column (1) and (2), are estimated on a sub-sample including only non exporting firms with a linear probability FE DID model. The effects on export intensity (columns 3-5) are estimated on the full sample (7,555 firms) with a FE DID model. All the specifications include firm and year fixed effects. Robust standard errors are in parentheses. They are clustered at the firm level. SMEs are defined according to the EU Recommendation 2003/361. See footnote 6 for the definition of the parameters defining each category. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4. Pre-treatment parallel trend estimates. 2007-2009.

VARIABLES	(1) Export propensity	(2) Export intensity
Trend	0.0118***	0.00679***
	(0.00217)	(0.00112)
Trend x Treated	0.000338	0.00113
	(0.00449)	(0.00260)
Constant	0.823***	-0.0535
	(0.00270)	(0.0740)
Observations	16,150	16,150
R-squared	0.018	0.012
Number of firms	7,555	7,555
Firm FE	YES	YES
Year FE	YES	YES

Notes: Each estimate (column) is obtained from a separate regression. All the specifications include firm and year fixed effects. Each specification also includes time variant covariates, i.e. (log) employment and (log) labour productivity. Trend is a linear trend that takes value one in 2006, two in 2007, three in 2008 and four in 2009. Robust standard errors are in parentheses. They are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. The effect of the voucher A, B and C on export propensity and export intensity. 2007-2013.

VARIABLES	(1) Export propensity	(2) Export intensity	(3) Export propensity	(4) Export intensity	(5) Export propensity	(6) Export intensity
Voucher A x $Post^A$	0.110**	0.0621				
	(0.0475)	(0.144)				
Voucher B x $Post^B$			0.141***	-0.0024		
			(0.0517)	(0.0120)		
Voucher C x $Post^C$					0.241***	0.0190**
					(0.0710)	(0.00852)
Constant	0.0621	-0.203	-0.466	-0.277	-0.276	-0.197
	(0.144)	(0.198)	(0.305)	(0.184)	(0.301)	(0.179)
Observations	564	2,694	914	3,191	713	14,320
R-squared	0.114	0.055	0.201	0.046	0.249	0.038
Number of firms	178	817	190	664	146	1,513

Notes: Each estimate (column) is obtained from a separate regression. Columns (1), (3) and (5) are estimated on a sub-sample of firms including only non-exporting firms with a linear probability FE DID model. Column (2), (4) and (6), are estimated on the full sample with a FE DID model. All the specifications include (log) labour productivity, age, age squared, (log) employment and firm and year fixed effects. Voucher A is a dummy equal to one if the firm applied for Technical assistance and counselling activities; Voucher B is a dummy equal to one if the firm applied to the grant sponsoring participation in outgoing missions, while Voucher C is a dummy equal to one for those firms who applied for trade fairs and exhibitions. $Post^A$, $Post^B$, $Post^C$ are dummy variables for the period after the firms received for the first time a Voucher A, B or C Robust standard errors are in parentheses. They are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Interaction among vouchers. 2007-2013

VARIABLES	(1) Export Propensity	(2) Export Intensity
Voucher A x $Post^A$	0.112**	0.0118*
	(0.0457)	(0.00669)
Voucher B x $Post^B$	0.146***	0.00702
	(0.0540)	(0.00953)
Voucher C x $Post^C$	0.239***	0.0186***
	(0.0705)	(0.00498)
(Voucher A x $Post^A$) x (Voucher B x $Post^B$)	-0.186*	-9.80e-05
	(0.0970)	(0.0142)
(Voucher A x $Post^A$)x (Voucher C x $Post^B$)	-0.346***	-0.00136
	(0.0805)	(0.0129)
(Voucher B x $Post^B$) x (Voucher C x $Post^C$)	-0.250	-0.0181
	(0.157)	(0.0127)
(Voucher A x $Post^A$)x (Voucher B x $Post^B$) x (Voucher C x $Post^C$)	0.429**	0.0453**
	(0.208)	(0.0222)
Constant	-0.433	0.0101
	(0.273)	(0.101)
Observations	3,105	29,086
R-squared	0.163	0.032
Number of firms	866	7,555
Firm FE	YES	YES
Year FE	YES	YES

Notes: Each estimate (column) is obtained from a separate regression. Column (1) is estimated on a sub-sample of firms including only non-exporting firms with a linear probability FE DID model. Column (2) is estimated on the full sample with a FE DID model. All the specifications include (log) labour productivity, age, age squared, (log) employment and firm and year fixed effects. Voucher A is a dummy equal to one if the firm applied for technical assistance and counselling activities; Voucher B is a dummy equal to one if the firm applied to the grant supporting participation in outgoing missions, while Voucher C is a dummy equal to one for those firms who applied for participating in trade fairs. $Post^A$, $Post^B$, $Post^C$ are dummy variables for the period after the firms received for the first time a Voucher A, B or C. Robust standard errors are in parentheses. They are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. The interaction between the vouchers for internationalization and other grants. 2007-2013.

VARIABLES	All firms		Firms with no other grants	
	(1) Export Propensity	(2) Export Intensity	(3) Export Propensity	(4) Export Intensity
Treated x Post	0.127***	0.0115***	0.143***	0.0124***
	(0.0303)	(0.00441)	(0.0287)	(0.00440)
Other grants x $Post^{OG}$	-0.00119	0.00218		
	(0.00740)	(0.00291)		
(Treated x Post) x (Other grants x $Post^{OG}$)	0.0424	0.0134**		
	(0.0474)	(0.00569)		
Constant	-0.359	-0.137*	-0.605*	-0.0799
	(0.279)	(0.0830)	(0.360)	(0.117)
Observations	3,105	29,086	2,715	20,625
R-squared	0.144	0.031	0.152	0.033
Number of firms	866	7,555	821	5,857

Notes: Each estimate (column) is obtained from a separate regression. Columns (1) and (3) are estimated on a sub-sample including only non-exporting firms with a linear probability FE DID model. Columns (2) and (4) are estimated on the full sample with a FE DID model. Other grants is a dummy variable equal to one if the firm received other grants in the relevant period (2006-2013). $Post^{OG}$ is a dummy variable equal to one in the years after having received other grants for the first time. All the specifications include (log) labour productivity, age, age squared, (log) employment and firm and year fixed effects. Robust standard errors are in parentheses. They are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8. The effect of EPPs on export propensity: internal and external control groups. 2011-2012

	Internal Control group			External Control group		
	All firms	Non exporter in 2011	Exporter in 2011	All firms	Non exporter in 2011	Exporter in 2011
	Export Propensity	Export Propensity	Export Propensity	Export Propensity	Export Propensity	Export Propensity
Treated x Post	0.0207*	0.0480	0.0158*	0.0780***	0.146***	0.0663***
	(0.0110)	(0.0475)	(0.00869)	(0.0130)	(0.0396)	(0.0129)
(Log) employment	-0.0112	-0.0113	-0.00927	0.0817***	-0.0151	0.102***
	(0.0105)	(0.0299)	(0.00950)	(0.0140)	(0.0329)	(0.0148)
Constant	0.879***	0.0161	1.024***	0.656***	0.0209	0.737***
	(0.0256)	(0.0443)	(0.0247)	(0.0337)	(0.0468)	(0.0383)
Observations	7,608	1,128	6,480	7,608	1,128	6,480
R-squared	0.001	0.228	0.036	0.046	0.166	0.105
Number of firms	3,804	564	3,240	3,804	564	3,240
Treated firms	634	94	540	634	94	540
Control firms	3170	470	2700	3170	470	2700

Notes: The internal control group consist of matched firms observed in the Lombardy archive that had applied for EPPs for the first time in 2013 and/or 2014. The external control group consists of firms observed in ASIA that never applied for EPPs. Treated and control firms have been matched in 2011 using a semiparametric procedure as in Abadie et al (2004). Each estimate (column) is obtained from a separate regression with a linear probability FE DID model. All the specifications include (log) employment and firm and year fixed effects. Robust standard errors are in parentheses. They are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Back of the envelope cost-benefit analysis

Description	
(A) Estimated effect of EPPs on export turnover	€185,545[a]
(B) Average number of years after the treatment	2.91
(C) Average yearly effect (A/B)	€65,000
(D) Average number of firms assisted each year	2800
(E) Yearly increase in total export sales (C*D)	€182 million
(F) Average yearly cost of EPPs (public cost)	€9.52 million
(G) Average yearly private expenditure	€10.5 million

[a] This figure has been estimated by using a regression equation similar to that in Table 3 (column 3) over the same sample of firms. This exercise is not included in the paper, but available upon request from the authors. This coefficient is highly significant (Standard error: 67,652).

Statistical Appendix

Table A1. Summary statistics and differences between treated and control firms before the matching procedure in 2009. Any voucher

	Treated Firms (A)	Non-treated Firms (B)	Difference (A)- (B) (S.E.)
Export intensity	0.351	0.222	-0.129***
			(0.011)
(Log) labour productivity	12.14	12.01	-0.130***
			(0.04)
(Log) Employees	2.77	2.22	-0.553***
			(0.049)
(Log) total revenue	14.91	14.23	-0.68***
			(0.062)
Exporters (%)	0.85	0.66	-0.18***
			(0.016)
Size (%):			
Micro firms	0.13	0.27	0.14***
			(.015)
Small-sized firms	0.57	0.55	-0.015
			(0.015)
Medium-sized firms	0.29	0.16	-0.12***
			(0.016)
Other grants (%)	0.67	0.31	-0.37
			(0.017)
Number of firms	*1260*	*1425*	

Table A2. Pre-treatment parallel trend estimates. Different types of EPPs.

VARIABLES	(1) Export Propensity	(2) Export Intensity	(3) Export Propensity	(4) Export Intensity	(5) Export Propensity	(6) Export Intensity
Trend	-0.00435	-0.00330	-0.00331	0.00374	0.00998**	0.00966**
	(0.0102)	(0.00404)	(0.00955)	(0.00369)	(0.00452)	(0.00416)
Trend*treated Voucher A	0.0150	0.00466				
	(0.0300)	(0.00783)				
Trend*treated Voucher B			0.0250	-0.000577		
			(0.0218)	(0.00756)		
Trend*treated Voucher C					-0.00401	-0.000512
					(0.00662)	(0.00542)
Constant	0.716***	0.342	0.615***	0.105	0.912***	-0.0889
	(0.00876)	(0.220)	(0.0101)	(0.100)	(0.00480)	(0.204)
Observations	1,966	1,966	1,837	1,837	7,952	7,952
R-squared	0.000	0.006	0.002	0.003	0.006	0.022
Number of id	817	817	664	664	1,513	1,513
Firm FE	YES	YES				
Year FE	YES	YES				

Notes: Each estimate (column) is obtained from a separate regression. All the specifications include firm and year fixed effects. Each specification also includes time variant covariates, i.e. (log) employment and (log) labour productivity. Trend is a linear trend that takes value one in 2006, two in 2007, three in 2008 and four in 2009. Robust standard errors are in parentheses. They are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table A3. Differences between treated, and internal and external control groups before the matching procedure in 2011.

	(A) Treated firms	(B) Internal control firms	(C) External Control Firms	Diff. (A)-(B) (S.E.)	Diff. (A)-(C) (S.E.)
Export propensity	0.851	0.79	0.11	-0.06*** (0.018)	-0.76*** (0.021)
(Log) Employees	2.40	2.31	0.59	0.088 (0.05)	-0.013*** (0.05)
Age	20.75	20.33	14.05	-0.41 (0.29)	-6.69*** (0.46)
Size (%):					
Micro firms	0.42	0.46	0.94	0.02 (0.02)	0.50*** (0.009)
Small-sized firms	0.29	0.31	0.04	0.01 (0.02)	-0.258*** (0.007)
Medium-sized firms	0.27	0.22	0.01	-0.039** (0.019)	-0.24*** (0.005)
Number of firms	*634*	*1723*	*706929*		

Notes: The internal control group consist of matched firms observed in the Lombardy archive that had applied for a EPPs in 2013 and/or 2014. The external control group consists of firms observed in ASIA that never applied to the EPPs. Treated and control firms have been matched using the Abadie et al. (2004) semiparametric procedure in 2011 with an exact matching on the pre-treatement outcome, being an exporter. Treated and controls are balanced in term of location (province) and sector of activity. Those statistics are available upon request from the authors.

Table A4. Differences between treated, and internal and external control groups after the matching procedure in 2011.

	(A) Treated firms	(B) Internal control firms	(C) External Control Firms	Diff. (A)-(B) (S.E.)	Diff. (A)-(C) (S.E.)
Export propensity	0.851	0.851	0.851	0.00 (0.021)	0.00 (0.021)
(Log) Employees	2.40	2.42	2.39	-0.013 (0.05)	0.01 (0.053)
Age	20.75	20.52	21.47	0.22 (0.60)	-0.73 (0.62)
Size (%):					
Micro firms	0.42	0.43	0.43	-0.01 (0.021)	-0.01 (0.021)
Small-sized firms	0.31	0.30	0.31	-0.004 (0.02)	-0.00 (0.02)
Medium-sized firms	0.27	0.26	0.26	.010 (0.02)	.011 (0.02)
Number of firms	*634*	*3170*	*3170*		

Notes: The internal control group consist of matched firms observed in the Lombardy archive that had applied for a EPPs in 2013 and/or 2014. The external control group consists of firms observed in ASIA that never applied to the EPPs. Treated and control firms have been matched using the Abadie et al. (2004) semiparametric procedure in 2011 with an exact matching on the pre-treatement outcome, being an exporter. Treated and controls are balanced also in term of location (province) and sector of activity. Those statistics are available upon request from the authors.