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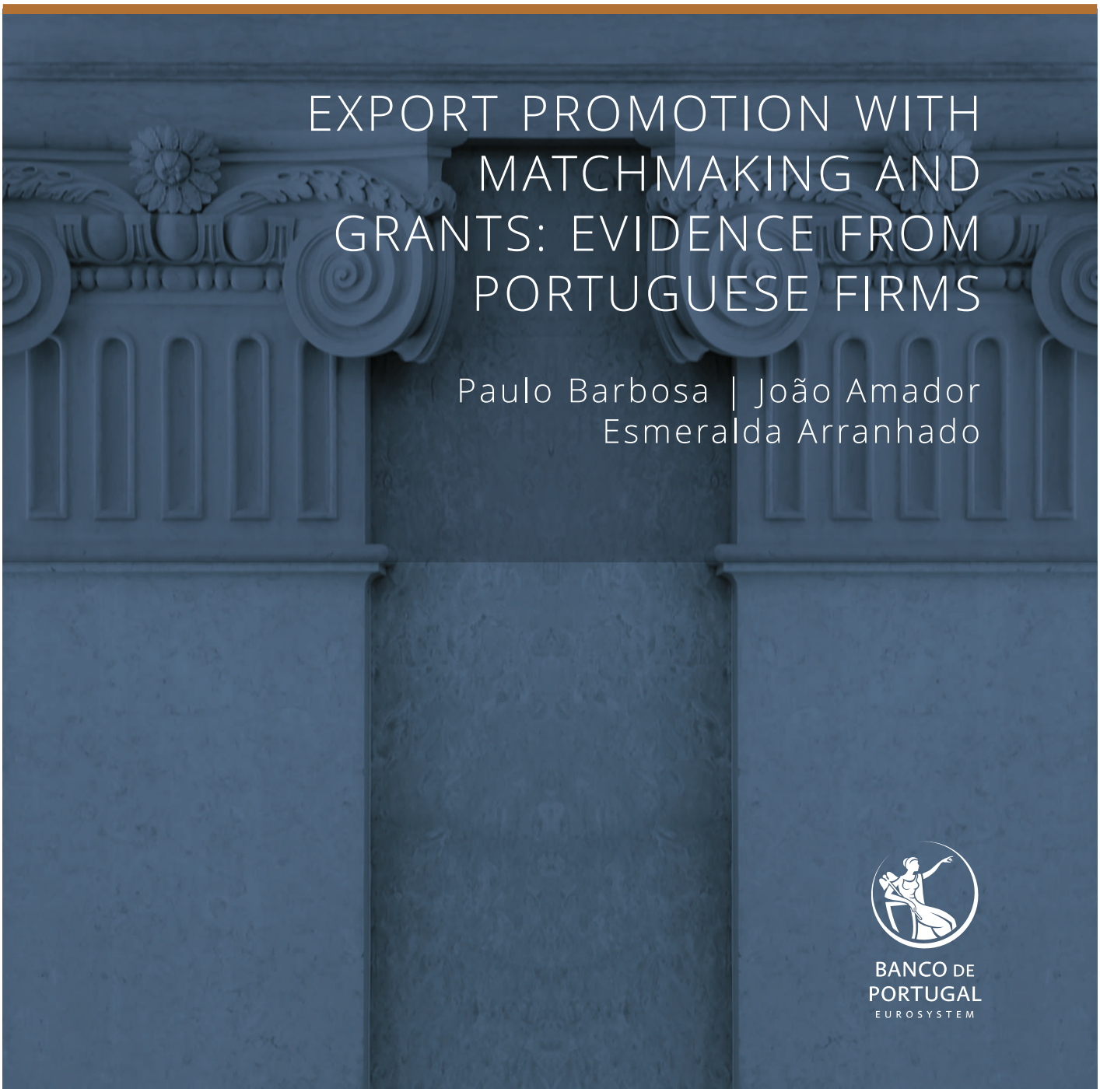

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Export Promotion with Matchmaking and Grants: Evidence from Portuguese Firms

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Abstract
This paper estimates the impact on firms' goods exports of two key policies implemented by export promotion agencies (EPAs): matchmaking in international markets and financial grants for internationalization. We merge Portuguese rich firm-level data on exports of goods, balance sheets, and income statements, with detailed information on the activity of the EPA between 2012 and 2021. The empirical exercise estimates the causal effect of these policies with a staggered difference-in-difference estimator. We conclude that the support provided to Portuguese firms significantly and positively affected their exports of goods. Financial grants for internationalization led to a significant increase in firms' goods exports, with a greater effect on micro and small firms and in the sectors of "Wholesale of household goods" and "Manufacture of wearing apparel". Similarly, matchmaking activities led to a significant increase in exports. In France, the country for which Portuguese companies request the most matching support, the effect is greater for micro and small firms and in the sector of "Manufacturing of other textiles".

JEL: D22, F13, F14, L25, L53

Keywords: Export promotion, Staggered difference-in-differences, Firm-level data, Portugal.

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1. Introduction

Venturing into a new foreign market is a very significant decision for any firm. There are potentially high entry costs associated with establishing a commercial presence abroad, and the outcome of this move is quite uncertain. Although it is up to firms to perform such cost-benefit analysis and decide, Export Promotion Agencies (EPAs) may significantly reduce sunk costs and uncertainties by providing financing or information on potential markets. A positive outcome from EPAs actions would be a large number of successful entries into foreign markets, thus increasing exports and, ultimately, trade gains, employment, and economic growth.

The most prevalent strand of trade models considers heterogeneous firms that choose to be exporters if their productivity is high enough to cover all costs involved in the process (Roberts and Tybout 1997; Melitz 2003; Melitz and Redding 2014). This approach suggests a strong self-selection of the most efficient firms into being exporters, meaning that they would be larger and pay higher wages even without being present in the export market. Nevertheless, several papers have shown that market size, i.e., firms' broader access to foreign markets, strongly influences their innovation and productivity. Therefore, governments' efforts to improve firms' access to foreign markets could lead to more investment in innovation and higher productivity (De Loecker 2007; Harrison and Rodríguez-Clare 2010). This is referred to in the literature as the *learning-by-exporting* argument. In this vein, Lileeva and Trefler (2010) examined the effect of the cut in US tariffs on Canadian products and showed that firms that started exporting or that exported more after this event: (i) increased labor productivity; (ii) engaged in more product innovation; and (iii) adopted more advanced manufacturing technologies. Atkin *et al.* (2017) also report empirical evidence of large gains from *learning-by-exporting*. The paper selected a random sample of handmade carpets producers from a region of Egypt to whom was provided the opportunity to export to high-income markets. Authors reported that treated firms decreased output, but increased prices, total hours worked, and profits. The profit increase was an expected outcome because there is a demand shock for the treated firms. Nevertheless, authors argue that the increase in profits due to the supply-side effect was higher than what is typically found in the literature.[1] These findings suggest that high-income countries demand high-quality products that take longer to produce, thus supporting the *learning-by-exporting narrative*.

Increasing the number of firms selling abroad has been a key objective of policymakers. During the last two decades, EPAs became the most popular institutions helping firms to turn into successful exporters (Srhoj *et al.* 2023). EPAs are mostly public institutions with a significant budget, but there are private firms providing similar services. In this context, an important strand of research is

1. See Banerjee (2013) for an example of supply side effects arising from different access to credit.

the cost-benefit analysis of such government policies, including the impact of EPAs on firms' productivity (see Cruz *et al.* (2018) and Srhoj *et al.* (2023) for a survey).

EPAs support firms to internationalize by helping them to overcome export barriers. The economic argument for government funding of EPAs is the existence of market failures, such as incomplete information, and positive externalities associated to exporting firms. Firstly, learning about foreign markets is a way of reducing the underlying uncertainty associated to starting to export. The fixed and/or sunk costs of acquiring such information may be large for an individual firm, thus discouraging entry in a foreign market. EPAs face lower average costs in this process because information about foreign markets can be shared across many firms. Secondly, the positive externalities emerging from exporters relate to spillover effects on other firms with similar products. These effects can arise from reputation for product quality and linkages in demand. For a comprehensive discussion of the arguments that support export promotion policies see Copeland (2007) and Aalto and Gustafsson (2020).

Broocks and Van Biesebroeck (2017) and Munch and Schaur (2018) investigate the effect of matching services provided by EPAs on the exports of firms in Flanders (the largest Belgian region) and Denmark, respectively. The former paper shows that firms benefiting from such support had an 8.5 percentage point (pp) higher probability of exporting to an extra-EU market than those without any EPA's support. The latter paper shows that for small firms, the matchmaking service of the Danish EPA increased the probability of entry in foreign markets. Sales and value-added increased by 8 pp, while employment increased by 4 pp relative to control firms. Moreover, the effects of the EPAs' support were higher for micro, small and medium firms.

The literature about the effect of EPAs on firms' performance is scarce. The main reason is the very strong data requirements for an econometric exercise. It is typically necessary to merge three types of data: (i) EPA data on services provided to firms; (ii) firm-level trade transaction data by destination and product; and (iii) control variables, commonly reported in balance sheets and income statements. We were able to merge this type of firm level data for Portugal for the period 2012-2021 using the firm unique identifier. This unique set of data derives from AICEP's firm-level information about time and type of support provided to firms, plus firm-level data on trade transactions by *Statistics Portugal*, the national statistics agency, and the Simplified Business Information database, the official business register, containing information on firm's characteristics.

Our paper contributes to the literature on the evaluation of the impact of EPAs on firms' performance, specifically on their exports. We use an event study methodology to assess the effect of the two main services provided by the Portuguese EPA – Portugal Trade & Investment (AICEP in the Portuguese acronym) – (i) grants for internationalization, and (ii) matchmaking in international markets. The financial aid for firms' internationalization is generally attributed to cover expenses such as trade missions, attending international fairs, advertisement in international markets, and support production upscale. The matchmaking service

consists of providing detailed information about potential importers of Portuguese products. AICEP's offices worldwide collect detailed information about firms that may be prone to import Portuguese products and provide this information in tailored reports. In order to have a sufficient number of observations we measure the matchmaking effect on exports to the country for which there is the highest demand for this service – France. Although it can be argued that matchmaking services for a country can trigger exports elsewhere, the first order effect should occur on the country surveyed. As for grants, which may be used for different purposes, we assess the total impact on firms' total exports.

The methodological challenge is to prove causality from export promotion policies to firm's export performance. Indeed, it is possible that firms that are already good performers in international markets apply for grants and require matchmaking services. These firms may be the ones most aware about the potential benefits of export promotion policies because they have used them earlier. In addition, access may involve costs or the prior fulfillment of requirements, which bias certain types of firms to apply for these funds and services. Indeed, Portuguese firms that benefit from grants are those with relatively higher exports, while those requesting matchmaking services export less than the ones not using this service.

Our database covers the period from 2012 to 2021 and the treatment associated with grants and matchmaking services is staggered, i.e., different firms benefit from it in different moments. Moreover, treatment is a binary variable as no information on the amount of grants or intensity of the matchmaking service is available. The impacts of the treatment are obtained using the staggered Differences-in-Differences (DiD) interaction-weighted estimator proposed by Sun and Abraham (2021).[2]

Usually, matchmaking and, especially, grants are the highest level of support provided by EPAs. For this reason, access to these services requires some degree of conditionality. Thus, to optimize resource utilization, EPAs typically support firms that have already shown basic competence to perform in foreign markets. Virtually almost all firms in the AICEP database record positive exports, and those requesting matchmaking services to France are, in general, already exporting. Therefore, our analysis only refers to the impact of promotion on the intensive margin of exports. Although the extensive margin of exports in the dimensions of the firm, destination, and product are relevant in terms of policy action, other tools are used for this purpose, and this margin does not explain much of the yearly export developments (Amador and Opromolla 2013, 2017).

Our results are robust and suggest that effects of export promotion policies are sizeable. Grants led to an overall increase of about 13% in firms' total exports. The effect is larger for micro and small firms, where financial aid increased exports by 18.9%. In sectors "Wholesale of household goods" and "Manufacture of wearing

2. For recent contributions on the applicability of staggered DiD estimators see Baker *et al.* (2022) and de Chaisemartin and D'Haultfœuille (2020).

apparel" the effect is sizeable, about 36% and 47%, respectively. The analysis of AICEP's matchmaking service for France suggests an increase of about 32% in firm's exports to this country. Furthermore, there is a significant size and sector heterogeneity. The effect on micro and small firms is about 40%, and for firms in the "Manufacture of other textiles", matchmaking led to an increase of 137% in firm's exports.

The paper is organized as follows. Section 2 overviews the relevant literature, describes the Portuguese EPA and details the two export promotion policies under analysis. Section 3 presents the data sources and characterizes firms taking up grants and asking for matchmaking services to enter or increase sales in foreign markets. Section 4 describes the identification strategy used and robustness tests. Results are presented in Section 5, which is divided in two. Subsection 5.1 presents the estimates of the effect of the financial support and the matchmaking service and Subsection 5.2 details the results by sector and size. Section 6 presents the results of the robustness tests. Finally, Section 7 presents some concluding remarks.

2. Background on export promotion

2.1. Literature review

The effectiveness of export promotion policies (EPP) has been studied along two main strands of research: (i) at the aggregate level, evaluating the effect of trade missions and the effect of diplomatic offices on bilateral trade flows, and (ii) using firm-level data, with information about the EPAs' support and firms' characteristics as controls.[3] The first strand of research reports ambiguous effects. Bernard and Jensen (2004) use a panel of US manufacturing plants and find no link between government expenditure on export promotion and the probability of entry into exporting. Head and Ries (2010) analyzed the trade missions carried out by the Canadian government and found no evidence that they increased trade with the respective country. Other aggregate level studies find a significant effect of EPP on exports. Rose (2007) reports a positive effect of opening an embassy on export performance in the US. Similarly, Gil-Pareja *et al.* (2015) shows a positive effect from regional export promotion offices on aggregate exports in Spain. For Japan and Korea Hayakawa *et al.* (2014) also found a positive effect of opening an EPA. The paper concludes that opening an EPA in a country has a similar effect to establishing a free trade agreement with the same country.

Firm-level studies on the impact of grants for entering international markets report a positive effect. Comi and Resmini (2020) take a DiD approach to investigate the impact of several EPPs – grants, vouchers for attending

3. Van Biesebroeck *et al.* (2016) and Srhoj *et al.* (2023) offer a theoretical discussion and a summary of empirical results on the effectiveness of EPPs.

international fairs, trade missions, and external counseling – in Italy. They show that firms assisted by these EPPs presented higher export propensity and export intensity when compared with non-assisted firms, with higher effects on micro and small firms, as well as on those already exporting. Srhoj and Walde (2020) uses Croatian firm-level data to analyze the effect of an export-oriented grant, originally designed to facilitate the accession to the European Union. These grants aimed to support firms in two main activities: (i) commercial activities, for example contract consulting services for entry in international markets and attending international fairs, and (ii) technological development. The paper finds that the EPPs positively affected firms' export value, total sales, value-added, and profit, but not employment. Grants for technological development had a higher impact than commercial activities. The cost-benefit analysis indicates that the value added created by the EPPs is 39.5% larger than costs involved.

Cruz (2014) studied if firms supported by the Brazilian EPA (*Apex*) have a higher chance of entering an international market. Using a matching DiD and fixed effect estimation procedures, the author estimates that the support led to a market entry probability around 2.5 times higher for treated firms. Similarly, Makioka (2021) investigated the causal effect of a matching service on exports of Japanese firms. More specifically, the author studied the effect of attending a trade fair within an export support program provided by the Japanese EPA. The author concludes that the support provided increased the export probability by 9.6 pp in the year following the fair and exports increased by 25.4%.

In a different vein, Van Biesebroeck *et al.* (2016) investigate whether EPA-supported firms during the global recession of 2009 performed better and recovered faster. The paper uses matching of propensity scores on firms supported by the Flanders Investment and Trade (*FIT*) and Peru's National Public Export Promotion Organization (*PROMPERU*) from 2006 to 2011. The services provided by these EPAs were the resolution of local specific transaction problems, subsidies for foreign market prospecting, market information, and help in attending international fairs. Firms that received EPAs' help performed better during the crisis, i.e., kept higher export levels, were more likely to survive on foreign markets, and recovered faster after the crises. For Belgium, the effect was larger for exports outside the EU. Furthermore, the cost-benefit analysis showed that these EPPs covered their costs.

Van Biesebroeck *et al.* (2015) performs an empirical exercise similar to ours. They evaluated the trade promotion services provided by the Canadian Trade Commissioner Service (*TCS*), namely market prospect information, key contacts search, local company information, visits information, face-to-face briefing and trouble shooting. They merged three datasets containing all active exporters between 1999 and 2006, information on firms' exports, business register, and the TCS's clients dataset. Authors use a DiD estimator and find that these services increased exports to countries already served by the firms by 17.9% on average. However, they did not find an effect on the expansion of new products or the increase of new destinations for exports. Furthermore, the EPP takes a few years to

significantly affect the intensive margin of exports, and this effect is more significant in older firms and in those that export to a larger number of markets.

Similarly, Buus *et al.* (2022) studies the effect of matchmaking services provided by the Danish EPA. Although they report that the matchmaking increased firms' exports within markets, the service did not affect prices, quality, markups, or marginal costs. The authors also provide a detailed discussion on how EPAs impact firms' employment, sales, and productivity.

2.2. The Portuguese Export Promotion Agency - AICEP

AICEP originates from the Portuguese Agency for Investment (*API*) created in 2002. *API* mainly targeted at the reduction of framework costs, thus enabling larger FDI flows. In 2007, *API* was renamed AICEP, also absorbing the functions of a public institute for investment and foreign trade (*ICEP)*. This institute had been created in 1982 and focused on export promotion. The role of AICEP is similar to other EPAs (Cruz *et al.* 2018; Srhoj *et al.* 2023). It is a government agency funded by public resources with offices in close to 50 countries. By 2019, the agency had 464 employees, of which 318 were working in Portugal and 138 abroad. Out of these 138, 11 were in Africa, 10 in North America, 10 in South America, 17 in Asia and Oceania, 67 in Western Europe, 16 in Eastern and Central Europe, and 7 in the Maghreb and Middle East (Castela 2021).

AICEP offers a wide range of services to Portuguese firms, aiming to increase their presence in foreign markets. The set of policies includes grants for entry and expansion in foreign markets, publication of market studies and surveys, training, information on technical regulations, financing firm's presence in trade fairs, exhibitions and missions, and matchmaking in foreign markets, notably through meetings, maintenance of a detailed contact database, and other assistance. AICEP is both an EPA and an IPA, thus it also promotes Portugal as an attractive investment destination, carrying out activities generally categorized in four categories: image building, investment generation, investment facilitation and retention, and policy advocacy. Some examples of these activities are marketing on social media and international fairs, investor targeting, administrative support, and facilities to enable the dialogue between government and investors, either to solve problems and influence policies[4].

As previously referred, our research delves into the pivotal role of AICEP's services for Portuguese firms that aim to increase exports, namely grants for internationalization and matchmaking in specific markets. Indeed, these two types of support are the ones most often requested by Portuguese firms, and we briefly describe them in the next two subsections.

4. For a detailed discussion on the role of IPAs, see OCDE (2018)

2.3. Grants for internationalization

AICEP supports companies that aim to enter foreign markets or expand existing exports. The financial aid of AICEP is earmarked for the internationalization of firms, to facilitate their participation in international fairs and trade missions, to finance marketing campaigns abroad, and increase production. These grants are financed by the European Regional Development Fund (ERDF) and are allocated by AICEP to the most promising internationalization projects presented by the firms.

The total amount of grants attributed in the average of the period 2012-2021 was 63 million euros, and the average amount of each grant was 200 thousand euros. Grants are attributed in connection with an investment proposals by firms and its amount corresponds to about 40% of the investment amount.

In terms of information available, we know the treatment status of each firms in each year. Some firms in the sample received this financial support more than once during the period analyzed (2012-2021). We do not know to which country (countries) firms directed the funds, that is, in which country the firms spent the grant for market entry or expanding its sales. Thus we evaluate the effect of grants on firms' total exports.

2.4. Matchmaking in export markets

AICEP's matchmaking service operates bidirectionally: firms can request matchmaking through their key account manager (KAM), who can also proactively offer this service. We do not have information on whether a firm requested the service or if it was offered by the KAM. After the firm requests the service or it is offered by its KAM, AICEP's headquarters in Portugal contacts its respective office abroad, which then compiles the information into a customized report that is delivered to the firm. The report includes details on potential importers of Portuguese products. Each firm can request this service for up to three markets at once. For example, a company considering the expansion of sales in Germany, France, Brazil, and China must select three countries, and request the service for the fourth country only when it receives one of the three already ordered. On average, 20 business days elapse from the moment the service is requested until the report is received.

Our evaluation of AICEP's matchmaking services relies on the list of markets for which individual firms asked information about, together with data on firm-level exports to each market and additional control variables. The impact of the matchmaking service is assessed as the direct impact on the value of firm's exports to the market surveyed.

Our analysis focuses on the French market, which posts the largest number of observations. In the period 2012-2021 the number of matchmaking requests for France reached 744, with an average of 60 firms involved per year. Germany, UK,

USA and Spain come next in the ranking, but at some distance, with a total of 617, 592, 558 and 503 requests in the period 2012-2021, respectively.

3. Data

3.1. Data sources

The paper is based on a rich and unique firm-level dataset obtained from merging information from three sources: (i) the dataset on exports of firms; (ii) the balance sheet and income statement information; and (iii) the information of the AICEP client dataset.

Statistics Portugal (*Instituto Nacional de Estatística*) compiles the export database, including detailed information on export and import transactions of goods by firms located in Portugal, which is used to compute the official international trade statistics. The data originally comes from customs returns forms for extra-EU trade, and for intra-EU trade, it comes from the Intrastat reports. The dataset includes all transactions with non-EU countries. However, the intra-EU transactions are subject to the assimilation threshold, i.e., the annual trading value below which Intrastat declaration is not mandatory. The assimilation thresholds in Portugal are 350 thousand euros for EU imports and 250 thousand euros for EU exports.

The Simplified Corporate Information (Informação Empresarial Simplificada - IES) is maintained by Statistics Portugal.The IES data set contains the annual mandatory information that firms must report to tax administration, social security and statistical authorities. The information consists of economic, financial, and accounting balances for the respective fiscal year and covers the population of Portuguese non-financial corporations. Firms report detailed balance sheet items and information concerning other key variables such as the number of employees, cost of inputs and turnover.

Finally, the AICEP dataset includes information about its clients and the services provided to them. The dataset contains detailed information about the timing of the services and, for the case of grants, the country to which the firms requested support, as discussed in Section 2.2.

3.2. Treatment condition and control firms

To mitigate the heterogeneity caused by varying intensities of treatment among firms, we restricted our analysis to firms that received AICEP support for a maximum of two consecutive years. For example, a firm receiving AICEP support in both 2015 and 2016 is included in our treatment group. However, a firm receiving support in 2015 and again in 2017 is excluded from our sample. This approach ensures that firms with different levels of treatment exposure, such as those receiving support intermittently over several years, do not bias results. We consider the support provided within two consecutive years as a single treatment.

This is reasonable, since a firm can receive the matchmaking and only use it within a few months. In addition, the methodological approach followed assumes that the treatments are absorbing, i.e., once the treatment occurs, the firm is classified as treated afterwards. This corresponds to a situation where the impact of the intervention at a given moment prevails in time (Sun and Abraham 2021).

AICEP offers matchmaking services to its clients and does not set strict criteria to offer this support. Nevertheless, this service is usually provided to firms with a higher potential to increase sales in international markets, and that have the capacity to pay the inherent sunk costs. In contrast, grants for internationalization are available through a public call open to all Portuguese firms. Due to the limited resources, AICEP allocates grants to the most promising internationalization projects, specifically those deemed by AICEP analysts to have the greatest potential to increase exports.

To assess the effect of matchmaking and grants, we take Portuguese goods exporters that have not received AICEP support as the control group. This approach is correct for grants because they are available to all Portuguese firms, not just AICEP clients. The control group is also suitable for matchmaking services because AICEP served approximately 65% of Portuguese goods exporters in the period, meaning that these firms could have requested matchmaking support anytime.

3.3. Descriptive statistics

Table 1 presents the average and median export values for non-treated firms and firms that benefited from financial support (columns 1 to 3) and matchmaking services (columns 4 to 6), along with their respective numbers, for the sample period 2012-2021. The proportion of treated firms is small for both policies. In 2012, a mere 0.52% of firms in the dataset received grants, while only 0.19% received matchmaking support in France. The small proportion of treated firms persists throughout the analysis period. The treatment is cumulative, meaning that a firm treated in 2012 remains classified as treated in subsequent years. Considering this cumulative effect, by 2021, the percentage of firms benefiting from grants increased to 6.75%, while those receiving matchmaking services rose to 11.45%.

Additionally, Figures A.1 and A.2 in the Appendix illustrate the yearly mean of logged exports during the sample period and the Kernel distribution of export values for both treated and untreated firms. These plots reveal distinct profiles for the firms benefiting from the two services provided by AICEP. Firms with higher export volumes received grants for internationalization, whereas those with lower export volumes benefited more from matchmaking services in France. However, these differences diminished from 2012 to 2021. In 2012, compared to untreated firms, the average export value of firms receiving grants was 64.6% higher, while for those receiving matchmaking services, it was 59.1% lower. By 2021, these percentages had changed to 57.4% higher and 79.4% higher, respectively, with the matchmaking service showing a median export value higher for treated firms than for control firms.

		Exports					
		(1)	(2) Grants	(3)	(4)	(5) Matchmaking	(6)
Year	Treated	Mean	Median	Nb firms	Mean	Median	Nb firms
2012	No	2264.89	88.19	17559	1212.01	228.86	3729
2012	Yes	3727.61	318.55	91	715.82	96.94	7
2013	No	2252.67	84.05	18456	1214.88	233.87	3814
2013	Yes	3612.97	878.04	192	915.03	148.36	69
2014	No	2195.55	80.41	18385	1202.20	237.10	3833
2014	Yes	3127.52	676.02	199	775.51	176.76	113
2015	No	2324.11	79.77	18347	1267.43	219.89	4021
2015	Yes	3124.48	514.08	321	650.08	170.93	183
2016	No	2385.09	84.26	17540	1257.88	234.96	4118
2016	Yes	2689.75	472.48	461	715.70	179.17	220
2017	No	2598.39	92.67	17754	1345.66	231.64	4255
2017	Yes	2704.60	558.40	512	587.12	157.32	270
2018	No	2517.46	77.43	18797	1333.67	224.01	4395
2018	Yes	2668.13	461.19	579	613.04	193.87	294
2019	No	2554.60	67.10	18952	1347.59	235.04	4392
2019	Yes	2823.46	436.69	652	697.22	183.36	340
2020	No	2205.35	71.91	17704	1125.37	213.37	4451
2020	Yes	2609.99	435.13	696	776.82	182.76	368
2021	No	2027.00	60.11	11595	1054.55	153.45	3140
2021	Yes	3191.51	535.79	839	837.62	188.37	406

Table 1. Summary statistics for export values (thousand euros, at 2012 prices)

Note: Export values are in thousands of euros and 2012 values.

Firms receiving grants are typically larger and export more than those that do not. Matchmaking services in international markets can often be purchased privately, making them more accessible to larger companies that can afford to customize these services for their specific needs. In contrast, smaller firms frequently rely on AICEP, which provides matchmaking services free of charge. These differences are also reflected in labor productivity. Table B.1 shows that firms receiving grants are more productive than their counterparts, whereas, for matchmaking services, the median labor productivity is similar between treated and untreated firms.

Finally, regarding the sectoral distribution of firms benefiting from grants and matchmaking services in France, Table B.2 in Appendix B ranks the top five NACE 2-digit sectors. In both export promotion policies, wholesale international traders and firms operating in the manufacture of wearing apparel and textiles dominate.

4. Methodology

4.1. Identification strategy

The methodology to measure the impact of grants and matchmaking services is similar. The model specification of the event study is described by the following specification:

$$y_{i,t} = \gamma_i + \lambda_t + \zeta_{sec} + \delta DiD_{i,t} + \beta X_{i,t} + \varepsilon_{i,t}. \quad (1)$$

where $y_{i,t}$ is the logarithm of exports of firm i in year t, γ_i is a firm fixed effect, λ_t a time fixed effect, and ζ_{sec} a sector fixed effect. $X_{i,t}$ is a matrix of controls with β a vector of coefficients and $\varepsilon_{i,t}$ represents the unobserved shock that is assumed to be uncorrelated with the treatment, $DiD_{i,t}$.

The control variables in $X_{i,t}$ are the natural logarithm of GVA per employee and the firm's size class, defined along four categories: micro, small, medium, and large, according to the classification of the European Commission.[5] The absorbing treatment indicator is a dummy taking value one from the year the firm receives the support to export ($support_t$) onwards, i.e. $DiD_{i,t} = 1[t \geq support_t]$. The primary coefficient of the model (δ) indicates the average treatment effect on treated (ATT), and we cluster the standard errors at the firm level.

We estimate the equation 1 using the interaction-weighted (IW) estimator proposed by Sun and Abraham (2021). This estimator allows the treatment effect to differ according to the moment of treatment. Moreover, it corrects for the heterogeneity of firm's responses to AICEP's support.[6] The ATT is estimated using the never-treated firms as counterfactual.

Although the (Sun and Abraham 2021) estimator is robust, it requires two assumptions. Firstly, it requires the presence of parallel trends, i.e., treated and untreated firms need to trend together before intervention. We check the validity of this assumption on our dataset by plotting nine years of pre-treatment coefficients. The second assumption is the presence of no anticipation behavior prior to treatment. According to our specifications, this means that firms did not try to increase their exports to France before AICEP's matchmaking service, or they were not successful in increasing exports before grants were received. Additionally, a placebo test is considered to check whether the increase in firm's exports was caused by the support or was due to other determinants. The next section details these robustness tests.

5. For more information on the classification criteriua, see link.

6. See also Baker *et al.* (2022) for a discussion on this estimator.

4.2. Robustness

4.2.1. ***Parallel trends test***. One of the main prerequisites for the use of the DiD method is the assumption of a parallel trend, i.e., the treatment and control groups trend similarly before the intervention. According to the literature, such as Nunn and Qian (2011); Gu *et al.* (2021); Díaz (2024), we adopt the event study method to test the parallel trends assumption. Specifically, we rely on a test based on a model adapted from equation 1:

$$\begin{aligned} y_{i,t} = \gamma_i + \lambda_t + \zeta_{sec} + \sum_{\tau=-5}^{-2} \varphi_\tau DiD_{i,t}^\tau + \\ + \sum_{\tau=0}^{5} \delta_\tau DiD_{i,t}^\tau + X_{i,t}\beta + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where $y_{i,t}$ is the natural logarithm of exports of firm i in year t, γ_i is the firm fixed effect, λ_t a time fixed effect, ζ_{sec} is a sector fixed effect, and $X_{i,t}$ is the set of controls (the same as in equation 2), with coefficients β. $\varepsilon_{i,t}$ represents the unobserved shock that is assumed to be uncorrelated with the treatment, $DiD_{i,t}^\tau$, and φ_τ and δ_τ, are the coefficients of $DiD_{i,t}^\tau$ before and after the treatment. Observations of 5 or more years before and after the intervention are grouped. φ_τ and δ_τ indicate if the groups were trending equally before and after the intervention. The mechanics of the event study's parallel trend test is: if φ_τ (δ_τ) is not significantly different from zero, then the two groups were trending the same before (after) the intervention.

4.2.2. ***Falsification test***. To check the robustness of the DiD estimates, we implement the falsification test along the line of Li *et al.* (2021) and Ai *et al.* (2022), which change the treatment date, i.e., the implementation of the exogenous shock. We set the treatment to 1, 2 and 3 years before the real intervention date and the estimated model is similar to our primary specification in equation 1, as follows:

$$\begin{aligned} y_{i,t} = \gamma_i + \lambda_t + \zeta_{sec} + \sum_{\tau=-9}^{-2} \varphi_\tau^* fakeDiD_{i,t}^\tau + \\ + \sum_{\tau=0}^{8} \delta_\tau^* fakeDiD_{i,t}^\tau + X_{i,t}\beta + \varepsilon_{i,t}, \end{aligned} \tag{3}$$

where the $fakeDiD_{i,t}^\tau$ refers to the treated group with fake intervention time. If the estimated coefficient of $fakeDiD_{i,t}^\tau$, $\hat{\delta}_\tau^*$, is significant, then some external shock before the intervention affected exports of firms in the treatment group or an anticipatory behavior could be present.

4.2.3. ***Placebo test***. Finally, we perform the placebo test to assess whether the increase in firms' exports comes from the support rather than from other external

factors, by randomly assigning firms to control and treatment groups, with the same proportion of our real dataset. Then, again, we randomly generate the treatment year when the AICEP support was given. The estimated test model is also similar to our primary specification in equation 1:

$$y_{i,t} = \gamma_i + \lambda_t + \zeta_{sec} + \sum_{\tau=-9}^{-2} \varphi^{\tau} fakeDiD_{i,t}^{*\tau} + \\ + \sum_{\tau=0}^{8} \delta^{\tau} fakeDiD_{i,t}^{*\tau} + X_{i,t}\beta + \varepsilon_{i,t}, \tag{4}$$

where the $fakeDiD_{i,t}^{*\tau}$ refers to the randomly assigned treated group with the respective randomly assigned intervention year.

In this placebo test, after generating random intervention dates and computing the ATT through our event study model, we expect the estimated ATT to be normally distributed around zero and non-statistically significant.

5. Results

5.1. Global impact on exports

The global impact of AICEP's grants and matchmaking services on the exports of Portuguese firms, as obtained from Equation 1, are presented in Table 2.

	ln of exports			
	(1)	(2)	(3)	(4)
	Grants		Matchmaking	
DiD	0.1019*	0.1226***	0.2044**	0.2749***
	(0.0542)	(0.0436)	(0.1030)	(0.0905)
Controls	No	Yes	No	Yes
Adjusted R^2	0.8139	0.8716	0.7821	0.8123
Observations	166,377	166,377	37,934	37,934

Table 2. Global impact on firms' exports

Note: The controls the logarithm of the gross value added per employee, sector at three digit NACE Rev.2 class and firms' size class. The estimation also included firm and year fixed effects. The standard errors are clustered at the firm level. ***, **, and *, indicate the 1%, 5%, and 10% significance levels, respectively.

Columns (1) and (2) in table 2 refer to grants and columns (3) and (4) refer to matchmaking, with each pair presenting results without and with controls,

respectively. The coefficient related to DiD in Table 2 represents the primary coefficient in our event study model - the estimated ATT.

For grants, the estimated ATT without controls (Column 1) is statistically significant at the 10% level. However, when controls for GVA per employee, sector and firm size class are included (Column 2), the significance increases to the 1% level. Receiving a grant resulted in a 13% increase in treated firms' total exports compared to those that did not receive financial support $((e^{0.1226} - 1) \times 100)$. Similarly, for matchmaking, the estimated ATT is significant at the 5% level without controls (Column 3) and at the 1% level with controls (Column 4). With controls, this service led to a 31.6% increase in firms' exports to France.

Several studies have also analyzed the impact of EPAs on firms' exports, reporting substantial effects. Van Biesebroeck *et al.* (2015) investigated export promotion policies in Canada and found an increase in exports of approximately 16%. Using a DiD estimator in the context of the global financial crisis recovery, Van Biesebroeck *et al.* (2016) reported effects ranging from 19.5% to 24.2% in Belgium and from 13.4% to 22.5% in Peru. Additionally, Martincus and Carballo (2010) analyzed a set of services provided by Peru's EPA and observed an increase in exports of 28.5%.

Focusing on matchmaking services, Makioka (2021) analyzed the Japanese EPA's support for firms attending trade fairs, finding a 25% increase in exports during the year following the fair. Other studies have estimated more modest effects of EPAs' matchmaking services on firms' export values. For instance, Munch and Schaur (2018) reported a 5.8% increase two years after the support, while Broocks and Van Biesebroeck (2017) found an effect of 14.4%.

It is worth noting that these studies typically estimate the impact on firms' total exports after benefiting from matchmaking services. In contrast, our approach provides a more accurate estimation of the effect of matchmaking because it considers both the specific markets for which firms received information and the destinations of their exports.

5.2. Heterogeneous impact on exports by firm size and sector

The empirical literature demonstrates that the effects of Export Promotion Programs (EPPs) can be heterogeneous, varying by firm size and sector of activity (Martincus and Carballo 2010; Cruz 2014; Broocks and Van Biesebroeck 2017; Munch and Schaur 2018). Based on standard international trade theory (Melitz 2003) and the empirical works summarized in Section 2.1, we anticipate that EPPs are more effective for smaller firms. These firms are generally less productive and possess fewer assets to use as collateral, making it more challenging for them to cover the sunk costs required to access international markets (Wagner 2007).

Regarding sectors, certain characteristics are likely to drive stronger impacts from EPPs. Using the IES dataset, we identified firms' sectors according to the 3-digit Statistical Classification of Economic Activities (Carré 2008) and conducted our event study for the five sectors receiving the most support in grants and

matchmaking, as shown in Table B.2. Table 3 reports estimates for sectors where a significant ATT was observed: sector 463 ("Wholesale of food, beverages, and tobacco") and sector 141 ("Manufacture of wearing apparel") for grants, and sector 139 ("Manufacture of other textiles") for matchmaking.

In general, the disaggregated results by size class and sector, presented in Table 3, exhibit greater variability compared to the global effects reported in Table 2. This was expected, as these results are based on subsamples of the main dataset. For grants targeting internationalization, the impact on exports was statistically significant only for micro and small firms. The estimated DiD coefficient in column (1) shows that this type of support increased the total exports of micro and small firms by 18.1% compared to those that did not receive grants.

In terms of sectoral impacts, we identified significant effects in "Wholesale of household goods" (column 3) and "Manufacture of wearing apparel" (column 4). The former experienced a 35.6% increase in total exports, while the latter saw an increase of approximately 47% compared to the control group.

For matchmaking in France, the estimated DiD coefficient in column (5) indicates that micro and small firms achieved a 39.8% increase in their exports to France. Column (6) reveals a significant effect for medium and large firms, albeit only at the 10% significance level, with an export increase of approximately 23.2%. We also observed heterogeneous sectoral impacts. The coefficient was statistically significant only for the sector "Manufacture of other textiles." The model estimates that the matchmaking service increased exports of firms in this sector to France by 136.5% compared to firms that did not receive the treatment.

	ln of exports						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Grants				Matchmaking		
	Size		Sector		Size		Sector
	Micro Small	Medium Large	NACE 463	NACE 141	Micro Small	Mid Large	NACE 139
DiD	0.167***	0.010	0.305**	0.389**	0.335**	0.21*	0.862***
	(0.056)	(0.049)	(0.138)	(0.169)	(0.150)	(0.113)	(0.216)
Sec. FE	Yes	Yes	No	No	Yes	Yes	No
Size FE	No	No	Yes	Yes	No	No	Yes
Adj R^2	0.84	0.90	0.90	0.87	0.78	0.84	0.85
Obs.	135,693	30,683	6,979	4,055	21,572	16,361	1,316

Note: The table reports the results of Equation 2 for size classes (micro–small and medium–large) and the main sectors in which supported firms operate (NACE 463 - "Wholesale of household goods," 141 - "Manufacture of wearing apparel," and 139 - "Manufacture of other textiles"). The model controls for the natural logarithm of GVA per employee. The estimations also include firm and time fixed effects. Standard errors are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Results by firm size class and sector of activity

6. Robustness of results

In this section, we conduct a series of tests on our estimated event study models. The analysis begins with an assessment of the robustness of the estimated global effects, followed by tests evaluating the robustness of the estimated impacts across firms' size classes and sectors of activity. Specifically, we test the parallel trend assumption and perform falsification and anticipation tests to validate our findings.

6.1. Global effect

As discussed in Subsection 4.2.1, the parallel trend hypothesis is central to the DiD methodology. The parallel trends between the treatment and control groups are reflected in the coefficients of the dummy treatment variables, φ_τ and δ_τ. Figure 1 presents the estimated DiD coefficients for grants and matchmaking.

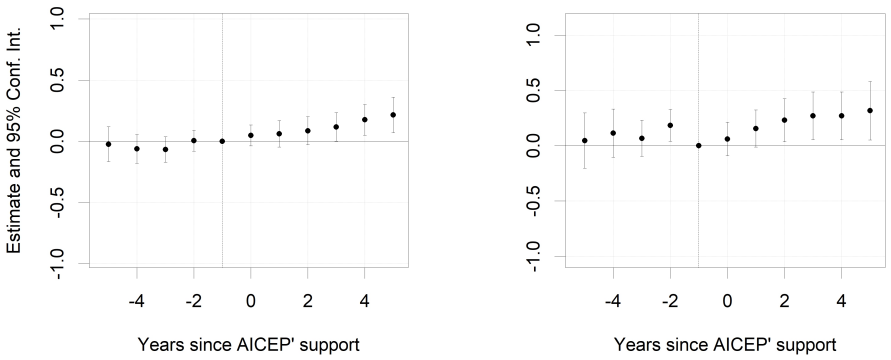
In both cases, prior to the policy intervention, the control and treatment groups exhibit parallel trends, with one exception for matchmaking two years before the intervention. This deviation could suggest isolated anticipatory behavior by treated firms. The falsification test provides additional evidence on this issue.

After the period when grants are received, all estimated treatment coefficients (δ_τ) are positive. Furthermore, the financial support appears to impact firms' exports with a delay, as the estimated coefficients only become significantly different from zero three years after the financial support is provided.

For matchmaking, the treatment coefficient δ_τ is not significantly different from zero during the intervention period. However, it subsequently increases systematically, remaining positive and significant. This suggests that the matchmaking service enhanced firms' exports compared to those that did not receive the support.

On the other hand, the falsification test described in Subsection 4.2.2 involves shifting the treatment period to 1, 2, and 3 years before the actual date. This sensitivity analysis assesses whether external factors influenced the increase in exports for the treatment group relative to the control group prior to the actual treatment date. The results in Table 4 show that the false ATTs are significant for both types of support when the intervention dates are shifted to one year before the actual dates, albeit only at the 10% significance level. However, these significant effects disappear when the intervention dates are shifted to 2 and 3 years before the actual support dates.

As for the placebo test discussed in Subsection 4.2.3, we investigate whether the significant effect on firms' exports stems from these interventions rather than external factors. We ran Equation 4 on the data with fake interventions 1,000 times and present the results in Figure C.1 (the 1,000 estimated δ_τ^* values are reported for grants in the top panel and matchmaking in the bottom panel). The mean of the estimated coefficients, indicated by the vertical dashed line, is close to zero, while the estimated values from our event study model are 0.123 and 0.275 for grants and matchmaking, respectively. Furthermore, almost all estimates are not



(a) Grant (b) Matchmaking

Figure 1: Parallel trend test

Note: The figure reports the parallel trend test, i.e., the core coefficients of our event study model, from Equation 2: φ_τ, representing coefficients before the support, and δ_τ, for coefficients after the support. The zero on the horizontal axis represents the time of the support. We set the period just before the support as the reference, i.e., set to zero. The vertical axis represents the grant's estimated coefficients and confidence intervals.

	ln of exports					
	(1)	(2)	(3)	(4)	(5)	(6)
		Grants			Matchmaking	
	1 year	2 years	3 years	1 year	2 years	3 years
fake DiD	0.153*	0.0318	0.0231	0.1421*	0.1083	0.0385
	(0.0814)	(0.074)	(0.0668)	(0.0837)	(0.0941)	(0.094)
Adjusted R^2	0.8934	0.8934	0.8934	0.81427	0.81425	0.81421
Observations	166,377	166,377	166,377	37,934	37,934	37,934

Table 4. Anticipatory effect

The table reports the results of Equation 3, where the actual support date is anticipated. Columns (1) to (3) pertain to financial grants, while columns (4) to (6) relate to matchmaking. The controls include the natural logarithm of GVA per employee, sector classification at the three-digit RACE Rev 2 level, and firm size class. The estimates also account for firm and year fixed effects. Standard errors are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

significant at the 5% level. These results suggest that the increase in firms' exports is attributable to the intervention rather than other external factors.

6.2. Heterogeneous effect by firm size and sector

Similarly to what we do in the model for the global effect in Subsection 4.2.1, we perform the parallel trends tests in the context of heterogeneous effects for firm size classes and sector of activity. Figure C.2 report the results. The global patterns discussed in the previous section appear to mainly reflect the results of micro and small firms, which represent 81.6 percent and 56.9 percent of the sample for grants and matchmaking services, respectively. Moreover, these global patterns are very close to those exhibited by the three selected sectors under analysis. In general, the estimated φ_τ mostly fluctuate around zero before the intervention point, i.e., the control and treatment groups trended together before receiving the grants and the matchmaking services. A single exception to this behavior is observed for grants to micro and small firms. The significant effect two years before the intervention likely explains the significance of the estimate for this period in the global analysis of the previous section.

Results by dimensional classes suggest that effects on exports are only significant for micro and small firms. For these firms, the effect of the intervention for grants becomes significant at the third year after the support is received, displaying a systematic increasing magnitude afterwards. Regarding the matchmaking service, it only became relevant for these firms at the fifth and following years in analysis. Medium and large firms do not display significant benefits from the AICEP's intervention. In addition, the plot on the left bottom of Figure C.2 shows that the firms in sectors "Wholesale of food, beverages and tobacco" (463) and "Manufacturing of clothing" (141) had an increase in their total exports one year after receiving grants. This effect became significant two years after the intervention, one year later than in the global results, but then lost significance for one year and returned to the significance status in the fourth year for both sectors and in fifth and following years for the latter sector. For sector "Manufacture of other textiles" (139) the effect from the matchmaking service mimics the global pattern as reported in the plot on the right bottom of Figure C.2. The impact is observed immediately after treatment, that is, the coefficients $\hat{\delta}_\tau$ begin to increase rapidly and systematically after the intervention and remain high afterwards.

Similarly to subsection 4.2.2, where we present the falsification test for the global effect of grants and matchmaking by shifting the treatment period to 1, 2, and 3 years before the actual date, we now perform the test in the heterogeneous effect setup. Results for grants are reported in Table C.1 and for matchmaking in Table C.2. In all cases, results indicate that when we replace the real intervention dates with the falsified ones, the treatment does not significantly affect exports at a 5% significance level. Placebo tests were also performed in the framework of this heterogeneous approach, however, the results mimic those of the global scenario described in the previous section. Therefore, they are not discussed in the paper, but they are available from the authors upon request.

7. Conclusion

The paper analyses the impact of financial grants for internationalization and matchmaking services in international markets on exports by Portuguese firms. To evaluate the impact of financial grants we consider all firms that exported in from 2012 to 2021, while the impact of matchmaking is focused on exports to France in the same period. Our empirical analysis uses a rich and unique dataset built from three different sources: the AICEP clients' dataset, the official trade transaction dataset, and the official business register dataset.

Results from our event study indicate a sizable impact from these export promotion policies. Grants for internationalization led to an increase in total exports of about 12%, reaching almost 17% for micro and small firms. In sectors "Wholesale of household goods" and "Manufacture of wearing apparel", the impacts were about 34% and 47%, respectively. As for the effect of matchmaking in France, the increase in firms' exports to France was about 29%. Micro and small firms recorded an increase in their exports by about 38%, and for firms in the "Manufacture of other textiles" the matchmaking led to an increase of 137% in exports to that market.

Although results are sizable and robust, it is necessary to acknowledge that the assumption that the treatment given by the Portuguese EPA is not correlated to any variable captured by our error term remains a challenge. In fact, companies that approach AICEP can have more information about their services, be more productive, less risk averse, and more willing to venture into international markets. This could lead to a bias in the estimated effect of the EPPs but would hardly eliminate it.

Looking ahead, the research agenda includes additional exercises, that should shore up and expand results. Firstly, it would be interesting to assess the differential impact of receiving the two treatments versus just one. Such weak versus strong treatment analysis would further reduce concerns raised in the previous paragraph. Secondly, future work may go beyond the intensive margin of exports, thus investigating the long-term effect of EPA's services on firms' export prices, product quality, markups, employment and productivity. Thirdly, it may be relevant to try a partial cost benefit analysis by comparing the cost of policies with a proxy of the value added generated by the new exports.

There is extensive literature documenting the benefits of having an outward-oriented economy. As previously discussed, the primary advantage is a higher productivity for domestic firms, which stems from the interaction with foreign companies possessing more advanced (or distinct) knowledge bases.[7] In recent years, however, the global economy has been shifting towards a more protectionist stance. This trend towards higher tariffs and non-tariff barriers implemented by major economic blocks, along with the usual retaliatory actions, risks severely

7. See the case of *learning-by-exporting* (De Loecker 2007).

reducing social welfare and global stability. In contrast, the adoption of export promotion policies, primarily aimed at correcting market failures, stands as a good policy approach, with significant positive impacts on firms' exports.

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Appendix A: Description of treatment and control groups

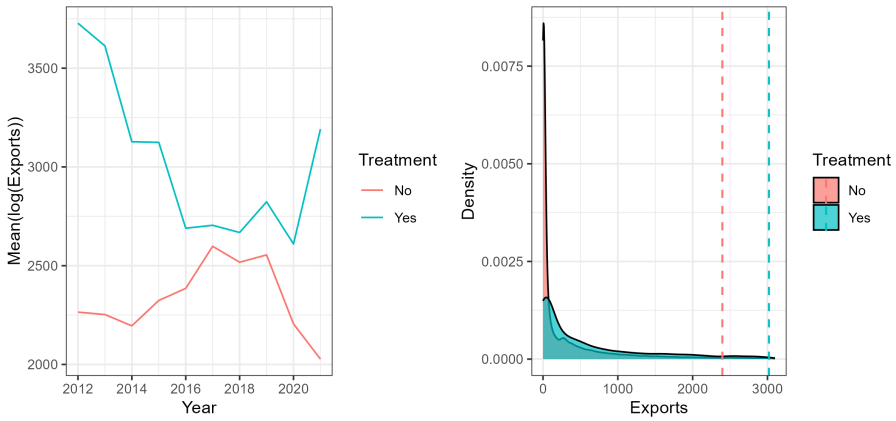


Figure A.1: Exports of treatment and control firms - grants

Note: Vertical dashed lines identify the mean values and exports are in euros of 2012.

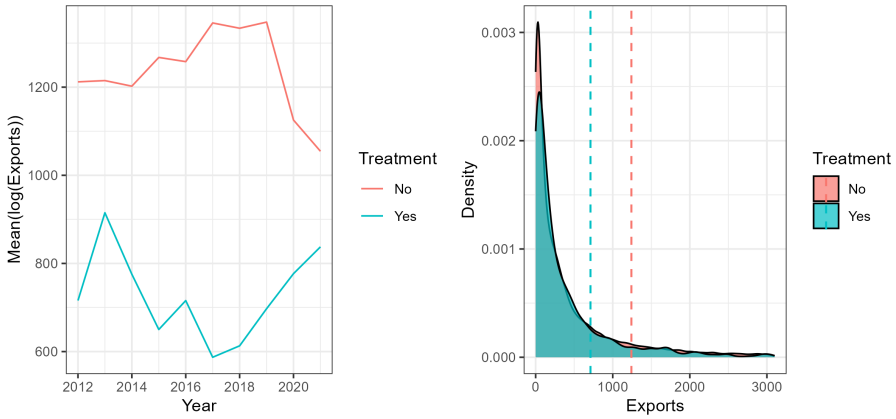


Figure A.2: Exports of treatment and control firms - matchmaking

Note: Vertical dashed lines identify the mean values and the exports are in euros of 2012.

Appendix B: Descriptive statistics

	Grants			Matchmaking		
	Mean	Median	Std dev	Mean	Median	Std dev
No	16,315	106,442	361,363	45,399	24,036	165,017
Yes	194,939	125,779	66,541	36,058	24,204	64,537

Table B.1. Gross value added per employee

Note: "No" and "Yes" refer to control and treatment firms, respectively.

Rank	NACE sector
Grants	
1	464 - Wholesale of household goods, except food, beverages and tobacco
2	463 - Wholesale of food, beverages and tobacco
3	467 - Other specialized wholesale
4	469 - Non-specialized wholesale trade
5	141 - Manufacture of wearing apparel, except fur apparel
Matchmaking	
1	141 - Manufacture of wearing apparel, except fur apparel
2	464 - Wholesale of household goods, except food, beverages and tobacco
3	139 - Manufacture of other textiles
4	463 - Wholesale of food, beverages and tobacco
5	257 - Manufacture of cutlery, tools and general hardware

Table B.2. Top 5 sectors in treatment group

Note: The firm's sectors are sourced in the INE dataset. We consider the 3-digit Statistical Classification of Economic Activities in the European Union (Carré 2008) as the sector.

Appendix C: Robustness of results

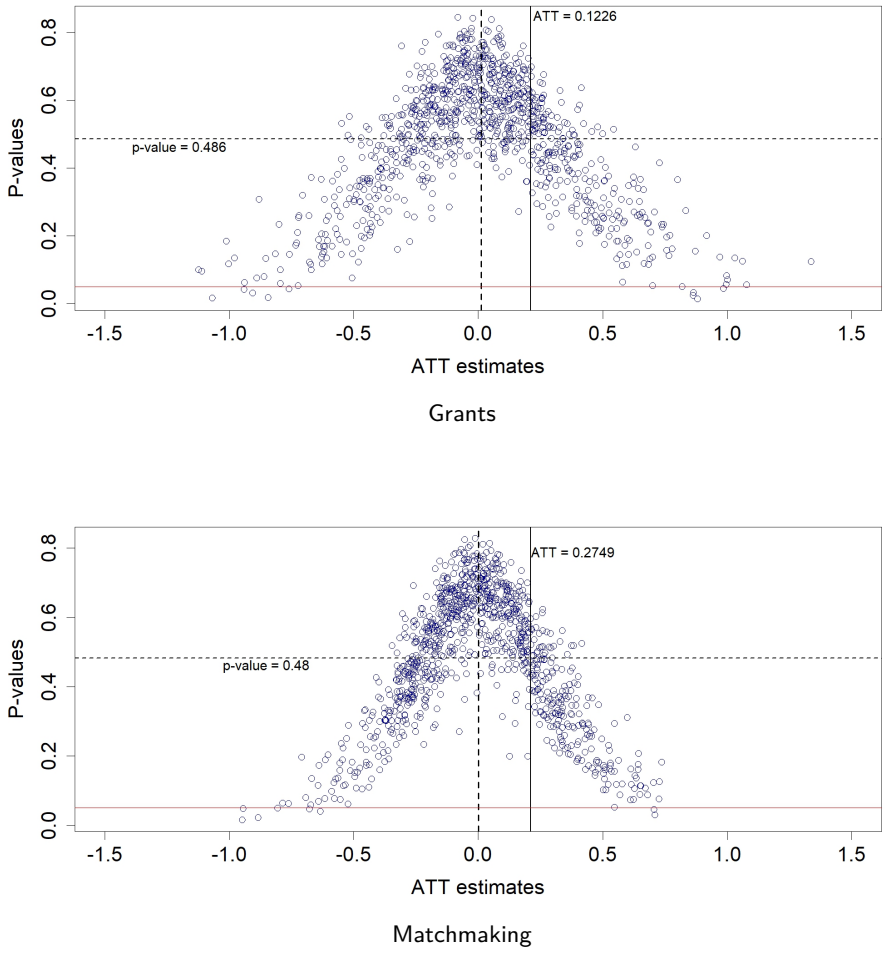
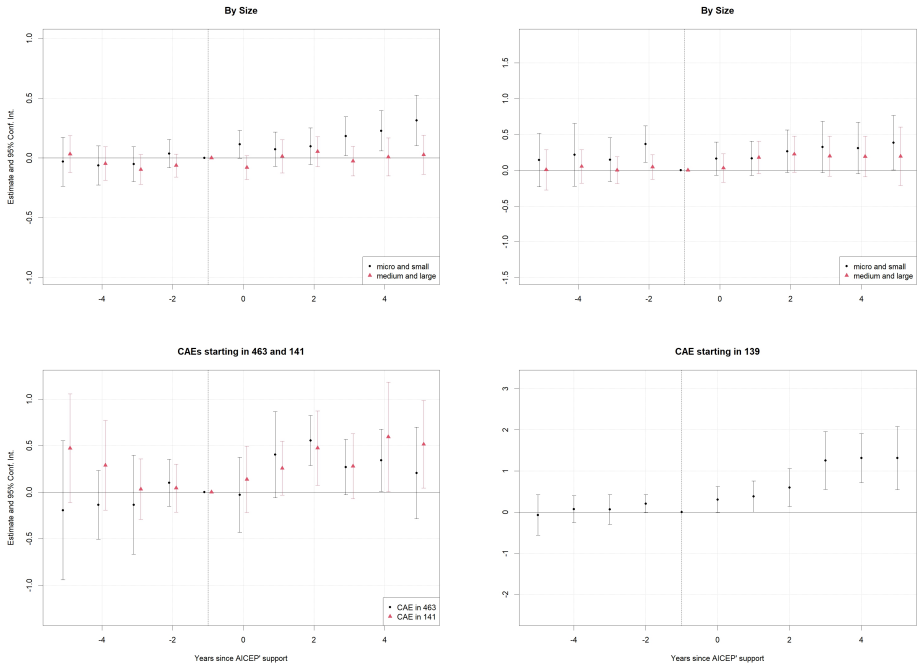


Figure C.1: Placebo test: Grants and matchmaking

Note: This figure reports the 1000 estimations of the DiD coefficients from equation 4. The vertical black line is the estimation from our primary Equation 2, the dashed horizontal line is the average p-value from this simulation, and the red horizontal line refers to the 5% significance level.



(a) Grants (b) Matchmaking

Figure C.2: Parallel trend test

Note: The figure reports the parallel trend test, i.e., the core coefficients of our event study model, from Equation 2: φ_τ, representing coefficients before the support, and δ_τ, for coefficients after the support. The zero on the horizontal axis represents the time of the support. We set the period just before the support as the reference, i.e., set to zero. The vertical axis represents the estimated coefficients for grants (a) and matchmaking (b) and their confidence intervals.

	ln of exports								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Micro and Small			NACE 463			NACE 141		
	1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
Fake DiD	0.1205*	0.0941	0.0914	0.3561*	0.1796*	0.1607	0.1052	0.1175	0.0208
	(0.0665)	(0.0717)	(0.0607)	(0.1935)	(0.0973)	(0.1384)	(0.1045)	(0.1263)	(0.0963)
Adjusted R^2	0.84388	0.84386	0.8438	0.8985	0.8986	0.8986	0.91222	0.91218	0.91219
Observations	135,693	135,693	135,693	6,978	6,978	6,978	6,008	6,008	6,008

Table C.1. Anticipatory effect: Grants

Note: The table reports the results of equation 3, where we anticipate the actual support date. Columns (1) to (3) report financial grants and columns (4) to (6) refer to the matchmaking. We control for the ln of the GVA per employee, sector at 3 digits NACE Rev. 2 level and firms' size class. The estimates include firm and year fixed effects. Standard errors are clustered at the firm level. ***, ** and *, indicate the significance levels of 1%, 5%, and 10%, respectively.

	ln of exports					
	(1)	(2)	(3)	(4)	(5)	(6)
	Micro and Small			NACE 139		
	1 year	2 years	3 years	1 year	2 years	3 years
Fake DiD	0.2085*	0.1664	0.0036	0.0278	0.0378	0.0474
	(0.1124)	(0.180)	(0.1567)	(0.2387)	(0.1119)	(0.0837)
Adjusted R^2	0.77844	0.77851	0.77851	0.8238	0.8238	0.8238
Observations	24,071	24,071	24,071	766	766	766

Table C.2. Anticipatory effect: Matchmaking

Note: The table reports the results of equation 3, where we anticipate the actual support date. Columns (1) to (3) report the financial grants, and columns (4) to (6) refer to the matchmaking. We control for the ln of the GVA per employee, sector at 3 digits NACE Rev. 2 level and firms' size class. The estimates include firm and year fixed effects. Standard errors are clustered at the firm level. ***, **, and *, indicate the 1%, 5%, and 10% significance levels, respectively.

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