

The Effect of Export Promotion on Firm-Level Performance

Jakob R. Munch, University of Copenhagen

Georg Schaur, University of Tennessee

July 2015

Abstract: Most countries promote exports. In this paper we provide answers to two key questions: First, does export promotion improve the performance of firms, and, second, to what extent do any benefits outweigh direct costs? We find that export promotion provided by the Danish government significantly increases sales, value added, employment and value added per worker of Danish firms. To identify these effects we solve self-selection problems in two ways. First, we account for demand shocks and firms' own entry activities with an extensive set of observed variables. Second, the Danish Trade Council selects firms based on known and observed information. Comparing self-selected firms with council selected firms we find evidence that self-selection leads to an under-estimate of the effects of export promotion. For small firms, summing expenditures on export promotion, subsidies and tax distortions, the gain in value added is roughly three times higher than the direct costs of export promotion.

Acknowledgements: Financial support from the Economic Policy Research Network (EPRN) is gratefully acknowledged. We thank Andrew Bernard, Emmanuel Dhyne, Keith Head, Beata Javorcik, James Rauch, Christian Volpe Martincus and seminar and workshop participants at Lund University, Aarhus University, University of Munich and EITI 2015 for helpful comments. We would also like to thank the Trade Council for providing and assisting with the trade promotion data.

1. Introduction

Most countries allocate public funds to export promotion services. The goal of these services is to help firms in general and in many cases small and medium sized firms in particular to become successful exporters. The key policy question related to promotion activities is whether export promotion creates value and generates employment opportunities to justify the appropriation of tax revenues. Existing studies show that export promotion works to improve various margins of export performance. The question if export promotion affects firms' performance overall in terms of sales, value added and employment and whether the benefits of export promotion outweigh the costs is not discussed in the current literature.

To fill this gap in the literature we merge firm-level data of Danish firms with export-promotion services delivered by Denmark's Trade Council and examine if export promotion activities affect export performance, raise value added, productivity and creates jobs. As is common in this literature, we apply a difference-in-difference estimator that relies on observable firm characteristics to identify the effect of export promotion activities on firm performance.

The main identification challenge is self-selection of firms into export promotion services. The common presumption is that firms decide to purchase export promotion services and this decision is correlated with unobserved export ability. Compared to the existing literature we have several advantages.

First, we observe the universe of Danish firms including detailed firm characteristics and firm-level export and performance measures over several years. This is the most

comprehensive dataset to date that has been used to examine the effects of trade promotion. This matters for identification, because the data allows us to use a much more comprehensive list of firm characteristics to control for selection of firms into export promotion services. For example, we observe variables such as the firm-level composition of labor in terms of education, age, gender and import status that are not commonly included in this literature because they tend to be unobserved. We also construct a world import demand shock variable to capture that firms facing increasing demand abroad are more likely to buy export promotion services.

Second, we have data from the Danish Trade Council on all export promotion activities with firms that have a Danish address. This includes information on the costs of the promotion service and whether the service was initiated by the firm or the Trade Council. The data show that only about half of the firms self-select into export promotion, while the other half are approached by the Trade Council. This is an advantage from an identification point of view, because conditional on observable firm characteristics we argue there is no systematic bias in the Trade Council's selection of firms. This information is also important from a trade promotion point of view. The idea that approaching firms to stimulate export activity as part of trade promotion is a policy action that has not received attention in the literature.

Third, firms may acquire information about foreign markets in other ways than through Trade Council provided services. There are private providers of information about export destinations, and firms may collect information on their own by hiring workers with specific knowledge about export markets. Our data allows us to compare firms buying export

promotion services from the Trade Council with firms that seek to acquire information about export markets in other ways.

A natural first step is to examine whether export promotion increases firm-level exports or specific margins of exporting. However, it is not obvious that positive effects on, say, entry into new export markets necessarily improves the overall performance of firms. For example, instead of increasing capacity or hiring more employees, exporting firms may simply reallocate domestic sales to export activity (Ahn and McQuoid 2013, Nguyen and Schaur 2012, Soderbery 2014) thereby potentially changing mark ups and overall revenues (e.g. Spearot 2013). For that reason we estimate the impact of export promotion on firm performance measures such as employment and value added. If there is a direct relationship between export activity and total real economic activity at the firm level, then the question is if the benefits of the export promotion activities are greater than the direct costs.

We find that export promotion activity leads to entry into export markets across all types of firms. The effect is largest for small firms with 1-20 employees where export promotion raises the probability of exporting by almost 8 percentage points more than control firms. We also find that overall sales, value added and employment are only boosted at small firms. Allowing for a two year lag, sales and value added increase by 8-9 percentage points while employment rises by 4 percentage points as a consequence of export promotion. Value added per worker increases by 3 percentage points. Our results are robust with respect to alternative estimators and classifications of the treatment and control groups.

The finding that export promotion improves performance for small firms is intuitive. These firms face entry barriers on foreign markets that require an upfront investment to learn about market conditions, identify distribution channels and search for foreign partners. This investment is difficult to recover for the smallest firms. By pooling this information and providing it to firms at subsidized rates the Trade Council reduces this fixed cost of entry into the export market. We do not find conclusive effects for medium and large sized firms.

Focusing on the smallest firms and using value added per worker in the treatment year as base, we find that these small firms create additional value that is about three times higher than the cost of export promotion even taking into account tax distortions (but excluding other general equilibrium effects). We provide evidence that conditioning on a more parsimonious set of variables, as is common in the literature, biases the estimates and results in a misleading cost benefit evaluation.

To our knowledge we are the first to examine the effect of export promotion on firm level performance other than specific dimensions of export activity. In one branch of the literature it is common to apply aggregate country level or state level trade data (Head and Ries, 2010; Lederman, Olarreaga and Payton, 2010; Rose, 2007; Wilkinson and Brouters, 2000) or examine the location of U.S. state's overseas offices (Cassey, 2014; Cassey, 2012). Early studies using firm-level data include Bernard and Jensen (2004) and Görg, Henry and Strobl (2008). Bernard and Jensen (2004) find no effect of state level export promotion expenditures on export entry among U.S. firms, while Görg, Henry and Strobl (2008) find that grant support to Irish firms that are not directly aimed at exporting (e.g. employment grants, R&D grants,

training grants) do not encourage nonexporters to start exporting but existing exporters increase export volumes if grants are large enough.

Some more recent studies apply firm level data to examine the effect of export promotion on firms in developed countries (Van Biesebroeck, Yu and Chen, 2011; Hiller 2012) and developing countries (Volpe-Martincus and Carballo 2008, 2010a, 2010b, 2010c). Common to these studies is that they all examine various margins of export activity such as the number of destination countries, the number of exported products or the export volume within a destination-product for firms that already export. Compared to these studies, we observe firm-level trade as well as other performance measures such as value added and employment for all firms including non-exporters. This allows us to identify the effect of export promotion on the overall performance of firms, which is important if the goal of the policy is to affect value added, jobs and growth in firms. For example, the Danish Trade Council's strategy towards 2015 includes value, growth and knowledge.¹

Section 2 discusses theories of implications of export promotion and explains the matching estimator we apply to identify the effect of trade promotion on firm performance. Section 3 describes the data. Section 4 presents and discusses the estimation results, and section 5 concludes.

2. Methodology

Exporters acquire and process a vast amount of information to supply foreign markets. Variation in product and safety standards, tariffs, enforcement of intellectual property rights,

¹ <http://um.dk/en/tradecouncil/about/strategy/>

macroeconomic conditions as well as distribution and supply chain related difficulties that vary across countries make it difficult to translate experiences from the domestic or existing export experiences into familiarity with new export markets. If expertise from existing markets does not easily transfer, then exporters must acquire information related to new markets by investing into their own market research or by buying information from an outside vendor such as from the Trade Council of Denmark. This section outlines existing theory related to this information management problem and our empirical strategy to identify if information that firms purchase from the trade council of Denmark improves firm performance.

2.1 Existing Theory

To sell on foreign markets most exporters match with foreign firms. Recent literature highlights information barriers as an important friction to forming successful international partnerships and several mechanisms that solve this information problem.

The basic problem is that to engage in international trade, firms must find and appropriate business partner on foreign market. The quality of the match between the two business partners may depend on the ability to rule out partners in a first cut approach (Rauch and Trindade, 2003), membership in a business network (Rauch and Casella, 2003) and ethnic networks (Casella and Rauch, 2002; Rauch and Trindade, 2002). The underlying problem of finding a match on the foreign market, for example in the form of a distributor, directly relates to export promotion. The majority of the Trade Council's activities are in terms of partner search and match making.

Aeberhardt, Buono and Fadinger (2014) extend Araujo and Ornellas (2007) to model an exporter's need to rely on a foreign partner to supply the foreign market. The challenge is that exporters are initially uncertain about the foreign partner's reliability. According to their intuition, it is especially the small exporters who may gain from a reliable partner recommended by export promotion and legal advice. The idea is that impatient importers hold up the exporter and try to renegotiate contracts if the exporter's productivity is low, such that the value of the future relationship for the importer is low and legal institutions are weak. This implies that especially small firms can benefit from promotion programs. Chaney (2014) examines how networks form and how exporters use their existing network of partners to find partners in new markets. Again this suggests some heterogeneity in the effects of export promotion. Firms that are large and have been active for a longer time can draw information from a bigger network and their own experience. If this information is a substitute for Trade Council services, then we expect that export promotion for these firms is not as effective.

Based on standard trade theory (Melitz 2003) and the literature summarized above, we expect that export promotion is especially helpful for small firms. Recovering the fixed costs from information acquisition related to export markets is more difficult to overcome for small firms. Therefore, bundling basic information on exporting and foreign partners in an export promotion office and spreading the acquisition costs over many firms purchasing the information most likely affects small firms that otherwise could not recover this fixed cost of exporting.

Instead of solving these information problems with promotion activities, firms can acquire information about foreign partners without the trade council.⁴ These alternative ways of accumulating information are likely more relevant to larger firms that may already have experience and networks on foreign markets and require specific information related to their products and activities which may be beyond the expertise of the trade council.

2.2 Identification Strategy

The main identification challenge are that it is not clear what type of firm will choose which strategy of information management and that the impact of outside information across firms is likely heterogeneous. For example, if outside information is a substitute to inside information, then small firms that do not have marketing and research departments will likely purchase outside information. For large firms that already perform their own market research there is little value in the outside information. Therefore, they are likely not purchasing outside information and if they do, then we would expect that the benefits are small. If inside and outside information are complements, then all types of firms may purchase information. Small firms because they have little information otherwise and large firms because it complements inside information. Combined, this suggests that certain types of firms are more likely to select into purchasing information from the trade council and that the impact of the services provided by the trade council may be heterogeneous across different types of firms.

⁴ In addition to the literature discussed above, Nugyen (2012) shows how firms predict demand based on market correlations and Albornoz et al (2012) show how firms sequentially export due to experimentation and cross-market correlations. Allen (2014) provides theory and evidence that even in homogenous products firms search across markets to arbitrage price differences.

We apply a difference-in-difference matching estimator to solve these identification challenges (Heckman et al. 1997). For a given measure of firm performance, we compare the change in performance within a firm that buys export promotion services (the treatment group) to the change within a similar firm that does not buy export promotion services (the control group). Let Δw_j^T denote the change in performance of firm j that was treated with export promotion and let Δw_j^{NT} be the firm in the sample of non-treated firms that most closely matches the characteristics of the treated firm. The average treatment effect of the treated is then defined as

$$\delta_{ATE} = \frac{1}{N} \sum_{j=1}^N (\Delta w_j^T - \Delta w_j^{NT}) \quad (1)$$

where N is the total number of treated firms. This estimator is identified, if there is no unobserved information that leads firm j to purchase export promotion and at the same time changes its performance relative to the comparison firm. This implies that for each firm that purchases export promotion services, we need to find a comparison firm that is subject to the same shocks and characteristics as the treated firm but did not participate in export promotion activities.

Within firm differencing eliminates unobserved factors such as productivity as long as the impact of the treatment does not depend on the unobserved time invariant information. This is similar to a linear regression framework where the treatment indicator should be interacted with firm productivity. In that case, time differencing eliminates productivity, but not the interaction of productivity with the treatment indicator. The matching estimator allows

for heterogeneity in the treatment effect across different types of firms. For example, it may be that $\Delta w_j^T - \Delta w_j^{NT} \neq \Delta w_k^T - \Delta w_k^{NT}$. The key is that we choose comparison firms for j and k based on observable firm characteristics such that on average the differences are driven by the treatment and not by endogenous selection into the treatment based on unobserved differences between the treated and the comparison firms.

To make sure that our estimates are not driven by unobserved information and self-selection we match treated firms with control firms based on a high dimension of observed covariates. We use the propensity score method (Rosenbaum and Rubin 1983), which summarizes the matching characteristics X into a single index variable, the propensity score $P(X)$. The propensity score is the conditional probability that a firm receives export promotion services from the trade council. We estimate this propensity with a probit model (we discuss the variables of this model and results in section 4).

The propensity score tells us the relative importance of firm characteristics in predicting if a firm receives export promotion services. With the predicted propensity score for the treated and control firms at hand, we then find for each treated firm the control firm that most closely matches the propensity score of the treated firm. This is the standard nearest-neighbor matching, where each treated firm is matched with the nearest-neighbor control firm based on the propensity score.

If the propensity score appropriately accounts for selection into receiving export promotion services such that no unobserved firm level characteristics that predict treatment and the impact of the treatment remain, then $\Delta w_j^T - \Delta w_j^{NT}$ measures the change in

performance of treated firm j relative to the change in performance of j 's nearest neighbor and the average (1) estimates the average treatment effect of the treated (ATET) firms.

The ATET is especially convenient for ex-post policy evaluation. In theory, treatment effects vary across different types of firms. In that case, an OLS estimator pools over the entire sample averaging the impact of treatment across these different types of firms. By appropriately choosing the comparison group, closest-neighbor matching compares the treated firms' change in performance to what their performance most likely would have been if they did not receive export promotion services.

It is important to emphasize that the underlying identifying assumption is that all relevant variables that affect both the selection process into trade promotion and outcomes of interest are known as summarized by the propensity score, such that conditional on this the treatment effects are identified and unbiased. This is the so-called conditional independence assumption (CIA). We argue that our data set contains so much information that most heterogeneity is observed, thus making the CIA plausible.

First, we observe a long list of firm characteristics that are not usually available and that plausibly affect both selection and outcome. In particular, two micro channels that have not been examined by the export promotion literature relate to a firm's own effort to collect information about export markets and demand shocks that are difficult to measure. Existing literature shows that both are important for market entry. As mentioned Albornoz, Calvo Pardo, Corcos and Ornellas (2012) and Nguyen (2012) show that firms use past information to predict their demand on a new market. We account for this by including proxy variables for a

firms efforts and foreign demand shocks into our model. We explain the set of control variables in Section 3.4 below.

Second, the difficulty of self-selection is based on the fundamental problem that the econometrician does not know what information a firm uses to make the decision to select into export markets and export promotion programs. We observe two types of treatment. The first type are firms that self-select into export promotion. The second type are firms that were selected by export promotion officials based on no more information than we observe in our data. Therefore, for this particular group, we know that our model is identified.

Assume that firms self-select based on the same model as the applied by the trade council. Then, if firms self-select based on unobserved positive shocks, we would expect that the data reveals a greater export promotion effect for self-selected firms. If firms self-select based on negative shocks, then we expect to underestimate the effect of export promotion compared to the trade council selected firms.

Finally, identification of the treatment effect requires that there is no spill over from treated firms to non-treated firms. For example, non-exporting firms may learn from neighboring exporting firms about demand on foreign markets (Fernandes and Tang 2014). In Denmark, we expect that firms know if they have demand on the foreign market and the information friction relates to trade procedures and finding a partner on the foreign market. Therefore, we condition on demand conditions in foreign markets in the matching model. If there is any remaining spill over, then it is worth pointing out that this will likely take some time to kick in and it would downward bias any positive effects of export promotion. Another source

for spill overs are general equilibrium or re-allocation effects through e.g. the labor market or through displacement of Danish competitors in the foreign market. We note that the export promotion program is small relative to the size of the economy and we expect that such general equilibrium effects are negligible.

3. Data

To estimate the impact of export promotion services on firm performance we need information on export promotion, firm level performance measures, and, firm level characteristics that predict a firms' propensity to select into export promotion services and outcomes of interest. In this section we first describe the institutional framework for export promotion in Denmark and then we explain how we collect and merge information from four distinct data sources. Finally, we provide some descriptive statistics of our data.

3.1 Export promotion in Denmark

In Denmark all governmental trade promotion activities are organized under one roof in the Trade Council (TC) under the Ministry of Foreign Affairs. In 2012 the Trade Council had approximately 75 employees in Denmark and 230 employees abroad located at more than 100 embassies, consulates general and trade commissions. The annual budget of TC is around DKK 400 million corresponding approximately to USD 65 million. The trade promotion services offered are subsidized, but TC still charges the firms for the services corresponding to the number of consultancy hours delivered (the subsidization rate is roughly 50%). As such TC is clearly the most important player offering trade promotion services to Danish firms.

TC focuses on offering Danish firms individual advice on all issues important for their international activities, and according to their web page “The goal is to offer the Danish business community the opportunity to enter a close partnership which will enhance the professional analysis of foreign markets and thereby increase the competitiveness of the companies.” TC accomplish this goal by offering a range of different trade promotion activities which will be explained in more detail below.

3.2 Export Promotion Data

We collect information on export promotion services from TC’s “Customer Relationship Management” (CRM) database. This database reports all companies that received promotion services by country for which the services was directed, the intensity of the service measured by consulting hours, and types of service. All domestically based firms are identified by their so-called CVR number and we observe all promotion activity from 2002 to 2012. These data are then merged with register data for the population of Danish private sector firms from Statistics Denmark via the CVR number, which is also available in all firm-level register data sets. In the raw trade promotion data we have in total more than 86,000 observations accounting for a total revenue (the amount received by TC) of DKK 905 million, see Table 1.⁵ In a given year firms frequently contribute with more than one observation when they buy trade promotion services more than once and often they buy different types of services within the same year.

To merge the data with the register data we clean the trade promotion data in several ways. First, we exclude all firms based abroad since these firms do not appear in the register

⁵ In what follows all nominal variables are measured in 2010 DKK prices using the GDP deflator.

data. This reduces the number of observations by about 20% and the total revenue by about 15%, see Table 1. Second, we cross check CVR numbers with listed firm identifiers in the register data and drop all entries that do not have a match.⁶ Also, we drop a small number of duplicate entries. This reduces the total revenue further to DKK 606 million. In this step we also collapse all observations by firm and year, which reduces the number of observations substantially to 20,992.

A given firm may purchase export promotion services in consecutive years. The last two columns of Table 1 report the new relationships reported in the CRM database in each given year. These account for more than half of the merged firm-year observations and 40% of the total revenue. For example, in 2006 exactly 1000 firms were first-time buyers of trade promotion services in the sense that they did not buy trade promotion services the previous year.

The difference-in-difference matching estimator exploits variation across time to identify the ATET, and so we cannot estimate the impact of trade promotion in a given year for firms that continuously buy trade promotion services. Therefore the treatment group of firms in our baseline scenario will consist of firms from the last two columns of Table 1 that acquired trade promotion in a given year (year t) and did not buy trade promotion the year before (year $t-1$). Similarly, the control group of firms will consist of firms that neither bought trade promotion services in year t nor in year $t-1$. We will perform robustness checks where we condition on not buying trade promotion in additional years (years $t-2$ and $t-3$) and where we allow for trade promotion in year $t-1$.

⁶ Some firms in the CRM database cannot be identified in Statistics Denmark likely due to entry error in CRM.

TC groups their trade promotion services into broad categories according to the goal of the product. Most of the activity relates to four broad categories. Partner search and match making helps Danish firms find new trade partners such as distributors in foreign markets through meeting facilitation, recruitment and other forms of market entry assistance. This group comprises the majority of promotion services. In addition the TC provides intelligence and analysis on political and economic conditions, advertising and promotion activities through e.g. fairs and exhibitions and other PR activities and events, and, help with trade policy through contact with customs authorities, diplomacy and attempts to break down trade barriers in other ways. In general, these activities allow the TC to pool broad information related to foreign markets that can be distributed across Danish firms interested in exporting, or, expanding their foreign activities.

Our goal is to examine the impact of export promotion services on the total performance of the firm. Some of the literature (e.g. Volpe Martincus and Carballo 2010b) examine the effects of different kinds of promotion services and bundled promotion products across various destination markets. In line with most of the literature, in the following we focus on the impact of the aggregate firm-level purchase of export promotion in a given year. Our main advantage compared to the existing literature is then that we can examine effects of export promotion on total firm-level exports as well as firm-level performance measures that are usually not observed such as employment, value added, and value added per worker.

3.3 Performance Measures

We have access to firm register data sets in Statistics Denmark covering all private manufacturing and service firms with addresses in Denmark from 1999 to 2012. These data are drawn from the Firm Statistics and Account Statistics registers, where firms also are identified by their CVR number. For each firm the data reports industry codes (according to the NACE classification), number of employees, wage bill, capital stock, total sales, value added, total exports, total imports and total purchases of intermediate products. A key objective of trade promotions is to help companies be successful in export markets. The information from Statistics Denmark provides us with several performance measures related to exports and firm performance in general.

To be specific, let t be the year where the firm was treated with promotion services. We focus on the change in export status and the log change in export volume, total sales, value added, employment and value added per worker in the treatment year (year t) and the two following years $t+1$, $t+2$ relative to the initial year (year $t-1$).

3.4 Firm Characteristics and Control Variables

As explained in Section 2 to properly identify the effects of export promotion we need in principle to observe all characteristics that affect selection into export promotion and the firm performance outcomes. We improve on the existing literature by exploiting the comprehensive nature of our data to carefully measure relevant firm characteristics.

First, a core variable that should affect both selection and outcome is firm productivity. A flexible way to control for productivity is to include firm output and inputs from the pretreatment year, $t-1$. To characterize output we include total sales, export status (export or not), export intensity (exports as a share of total sales) in addition to one-digit NACE industry dummies. To characterize inputs we use measures for capital stock, raw materials and intermediate inputs, import status, import intensity, total employment and total wage bill. To further characterize the composition of the firm-level labor force we draw in detailed information about all employees of each firm from the Integrated Database for Labor Market Research (IDA) for 1999 to 2012. This data allows us to measure employee characteristics such as age, gender, education (we classify workers into three education groups: workers with further education, vocational education and less than that), occupation and union membership composition of each firm. We use the occupation code (four digit ISCO) to define the share sales workers in the firm.⁷ The purpose of this variable is to measure whether the firm has employees that to some extent can substitute for the purchase export promotion services.

It is also relevant to control for changes in input use and output before the treatment year, because a growing firm is more likely to explore new markets and to buy export promotion services. We include the (log) change in total sales, value added, employment, wage bill between year $t-2$ and $t-1$. In addition, we also use the change in the export and import intensity between year $t-2$ and $t-1$.

⁷ The included occupations are Sales and marketing managers (1233), Advertising and public relations managers (1234), Supply and distribution managers (1235), Philologists, translators and interpreters (2444), Technical and commercial sales representatives (3415), Trade brokers (3421), Clearing and forwarding agents (3422) and Customs and border inspectors (3441).

3.4.1 Firm-Specific Demand Shocks

A related and potentially important driver behind selection into export promotion and firm performance are firm specific demand shocks. Sudden demand increases in world markets for the firm's products will make it more likely for the firm to acquire export promotion services and to perform better.

We construct a firm-specific demand shock variable using three additional data sources. From the Foreign Trade Statistics we have information about each firm's sales abroad broken down by eight-digit CN product codes and destination countries. Information about domestic sales is obtained from the PRODCOM register, where each firm's sales is recorded by ten-digit CN product codes. These two data sources allow us to characterize each firm's pretreatment sales by detailed product codes.⁸ We aggregate these firm-specific pretreatment sales to the six digit HS level and combine then with product specific changes in demand on international markets from the UN COMTRADE database for 1999 to 2012 at the six digit HS level.

We use this information to compute firm specific demand shocks in the following way. Let M_{kt} denote total imports by all countries except Denmark of product k in year t. Let s_{kjt-1} be the share of sales of product k of firm j in period t-1 and let Ω_{jt-1} be firm j's product set. We measure the change in global demand for the firm's products as

$$EV_{jt} = \sum_{k \in \Omega_{jt-1}} s_{kjt-1} \frac{M_{kt} - M_{kt-1}}{M_{kt-1}}. \quad (1)$$

⁸ Small nonexporters are an exception as PRODCOM does not record information for very small firms. We circumvent this data issue in two ways. First we replace the firm's product shares in year t-1 (see equation (1)) with those from year t-2 or t-3 if missing. Second, we include a control dummy variable for missing demand shock in pretreatment years in the selection equation.

Instead of just entering EV_{jt} in the selection equation directly we construct a dummy variable that takes the value one if firm-specific demand increased by at least 10 percent between year $t-1$ and t and zero otherwise. In addition we also include a similar dummy variable for increases in demand between year $t-2$ and year $t-1$. The idea is that firms that realize a high share of sales in products that are increasingly purchased by the world market see an increase in the global demand for their products.

4. Results

In this section we use the data described in the previous section to match treated firms with control firms, examine the impact of export promotion on the outlined measures of firm performance and to examine the robustness of our results.

4.1 Export Promotion Propensity

The first step of the matching estimator is to match firms that received export promotion in year t with control firms that have similar characteristics but did not receive export promotion. The initial group of control firms is constructed such that they did not buy export promotion services in year $t-1$ and t .⁹ We then trim this group of firms to make it more likely we compare with firms that are in a similar pretreatment development as the treated firms. To that end, we select control firms that increase their expenditure on sales activities between year $t-1$ and t , where sales expenditures are defined as the sum of annual wages for sales workers (using the matched worker data) and external consultancy work which includes

⁹ Thus the same firm may enter the control group every time it has two consecutive years without buying export promotion services.

expenses for export promotion services offered by private consultancy firms (this variable comes from the Account Statistics). The idea is that control firms can buy substitutes for export promotion from TC either by hiring more sales workers on their own or by buying export promotion from private companies. This trimming procedure cuts the control group roughly in half but it still includes more than 275.000 observations.

The next step is to match treated and control firms based on the propensity score generated by a probit model. Table 2 shows the estimates of the probit model that relates firm characteristics to the probability of receiving export promotion, compares summary statistics of the treated and control firms along the observed characteristics, and, provides standard test statistics examining systematic differences between treatment and control firms. The results imply that there are no systematic differences across the two groups of firms along the variables included in the probit model.

The purpose of the probit is not to estimate a theory driven model that tests hypothesis regarding selection into export promotion. Instead, we want to match firms on all observable characteristics that may predict if a firm received export promotion. Then, if we compare the performance of a treated firm with a matched non-treated firm, the fact that the treated firm received export promotion is most likely random.

Nevertheless, some interesting patterns emerge in the probit estimates. Large firms are less likely to purchase export promotion. This may reflect that large firms also invest in their own market research. Therefore, if a firm's own market research is a substitute to government facilitated export promotion this is the result we would expect.

Firms with a high share of experienced employees measured by their age are less likely to purchase promotion services which might be because their own experience substitutes for purchased information. On the other hand, firms with a more educated work force, more sales workers and more female workers are more likely to purchase export promotion services.

Exporting and importing firms are more likely to receive export promotion. This suggests that even firms that have experience on international markets purchase additional information to extend or improve their international activities. Similarly, growing firms and firms that see an increase in the world demand for its product are more likely to purchase information about international markets. This suggests that growing firms look for expansion opportunities in international markets.

Firms are only included if they did not receive export promotion in year $t-1$. However, if a firm received export promotion in $t-2$, then it is more likely to also purchase export promotion activities in year t . This suggests that firms having good experience with export services offered by the Trade Council are likely to come back for additional services.

Having estimated the propensity scores we can now select the nearest neighbor control firm for every treated firm and verify that our procedure successfully balances all the characteristics across the two groups of firms, see columns 4-9 of Table 2.

In summary, the detailed firm level data we obtain from Statistics Denmark combined with the export promotion services provides a much more detailed and extensive list of firm characteristics than in the previous literature. The ability to merge detailed firm characteristics with firms export promotion activities provides an important identification advantage

compared to existing research on the impact of export promotion on firm performance. We will examine the differences between more parsimonious specifications present in the literature and our approach in the robustness section. Our main estimation results presented in the following sections apply our full set of firm characteristics.

4.2 Export Status

We now compute the average treatment effects for the treated firms as defined by equation (1). We first examine the impact of export promotion on a firm's export status. The hypothesis about the impact of export promotion on a firm's export status is ambiguous. If export promotion lowers information costs and results in a better international experience, then we would expect that export promotion increases the likelihood of exporting. On the other hand, it may also be the case that firms learn their limitations and the information they receive discourages them from exporting.¹⁰

Table 3 shows the results. Across the columns, we distinguish three treatment effects based on timing. Recall that the treatment was received in year t . Then, across all firms, column 2 shows that export promotion increases the probability of being an exporter in the treatment year t by 3.9 percentage points relative to the control firms. Columns 4 and 6 show that one and two years after receiving export promotion the probability of exporting increases by about 5.9 percentage points.

¹⁰ For example see Breinlich, Donaldson and Wright's work "Information and Attitudes towards Exporting – Evidence from a Randomized Controlled Trial" which states in the abstract that "The results of our intervention reveal a surprising, asymmetric response on the part of exporters and nonexporters. Instead of revising their negative perceptions upward, treated nonexporters become more likely to report lower perceived benefits and higher perceived barriers compared to non-treated non-exporters." Source: http://www.uclouvain.be/cps/ucl/doc/core/documents/Trade_sem_breinlich.pdf

Going down in the rows we report estimates for samples split on firm characteristics.¹¹ Especially small firms benefit from export promotion. Across all three estimates, the impact for small firms is about double the impact for larger firms.

Next we estimate the effect of export promotion by manufacturing and services industries. In both industries export promotion has a positive and significant effect on entry into the export market.

Finally we distinguish firms that were selected by the Trade Council and firms that self-selected to receive export promotion. The trade council observes no more information about firms than we do and selection is based on observed variables.¹² Across all time periods, the effects of promotion are greater in the trade council selected group than in the self-selected group. This result conflicts with the standard identification concern that firms self-select based on greater export ability leading to over-estimated treatment effects. Our results show the opposite, self-selection results in an under-estimated effect of promotion services compared to council-selected firms.

Overall the message of the estimates reported in Table 3 is clear. Across all firms and several subsamples, export promotion positively impacts the export status of firms. The effects are economically meaningful, in most cases significant and largest in magnitude for small firms between 1 to 20 employees.

¹¹ We estimate separate probit models for all subsamples. The probit model results and the associated match quality are available upon request.

¹² We have had this confirmed through conversations with the Trade Council. The Trade Council does not have an overall strategy for how to approach firms. Instead the local units (embassies and consulates) make these decisions. Within each unit there may be a particular focus on e.g. certain sectors, but this type information is also observed in the data.

4.3 Export Value

The impact of export promotion on export values reported in Table 4 tells a different story, which to some extent may reflect a smaller sample of firms that export throughout.¹³ The significant effects take a couple of years to kick in and they are concentrated to a few subcategories. Medium sized firms see an increase of about 12 and 16 percentage points over a two and three year period.¹⁴

Comparing self-selected to council-selected firms is challenging because most of the estimates are insignificant. However, in magnitude, the council-selected firms experience a greater effect than self-selected firms. Overall we conclude that effect of export promotion on the expansion of export sales is limited.

4.4 Total Sales

Tables 3 and 4 were concerned with the effects of promotion services on export performance with the conclusion that export promotion facilitates entry into export markets and to a more limited extent promotes export sales. Given these positive effects the next question is whether export performance translates to firms' overall performance.

Table 5 examines the effect of export promotion on firms' total sales. Promotion activities lead to an increase in total sales with a one and two year lag for small firms. This finding is intuitive. We know from the results above that export promotion mostly affects entry

¹³ Compared to Table 3 we lose some observations. This is because we require that all firms included in the estimation are in the sample for three consecutive years and are exporters throughout. Otherwise the change in $\log(\text{exports})$ is not defined.

¹⁴ Similar results are presented in Volpe Martincus, Carballo and Garcia (2010).

into the export market. If firms enter in period t , then it may take some time before export opportunities have fully materialized and results in greater total sales.

For the medium and large sized firms export promotion does not lead to significantly greater sales. This suggests that instead of increasing total sales, these firms divert output from domestic to foreign markets (Nguyen and Schaur, 2012; Ahn and McQuoid, 2013, Soderbery, 2014).

Averaged over the three time periods, trade council selected and self-selected firms show a similar response to trade promotion services with Council selected firms mostly improving at longer time horizons. Similarly, both manufacturing and services firms see an increase in sales only two years down the road.

4.5 Value Added, Employment, Value Added per Worker

We now examine if export promotion activity has real effects on the organization of the firm in terms of value added, employment and value added per worker. Tables 6, 7 and 8 report the estimates.

Table 6 shows that especially small firms, trade council-selected and manufacturing firms increase their value added in response to export promotion. The difficulty with value added is that we still do not know if this creates jobs, and, whether this increases productivity. Tables 7 and 8 answer these questions.

Consistent with the previous results, only small firms experience positive employment effects. The industry split and split on how the firms were selected into promotion services are not very informative. Most of the estimates are insignificant and not useful for comparison.

Table 8 shows the effects on worker productivity. These results combine the value added and employment effects to see if trade promotion driven export behavior increases productivity. In the short run the answer is no. In fact, the results show that in the short run many firms and industries see a decrease in labor productivity. However, allowing firms to adjust to their new export activities, especially small firms see an improvement in labor productivity. Therefore, while export promotion improves value added and seems to create jobs in some industries and firms, long run positive productivity effects are isolated to the smallest firms.

In summary, across Tables 3 to 8 the most consistent and robust finding is that export promotion affects the smallest firms in the Danish economy. Using our information on self-selected versus council selected firms we verify next that this results is not driven by self-selection.

4.7 Trade-Council versus Self-Selection among the Smallest Firms

Table 9 provides estimates for the treatment effects on all performance variables only for firms with 1 to 20 employees across samples split by selection mode. In addition, we report estimates for the effect of export promotion when we directly match firms that were selected by the trade council with firms that self-selected to receive trade promotion services. These estimates answer two questions. First, against the benchmark of council-selected firms, is

there any evidence for selection bias among the group of self-selected firms? Second, how important is the trade council selection of firms to the success of export promotion?

Across the performance variables and especially for export status, value added and employment, the picture is the same as in the previous tables. If anything, council-selected firms show treatment effects that are greater than the self-selected firms. In addition, when we match council-selected firms with self-selected firms, then these differences do not appear statistically significant other than in employment in the first period. These results confirm that among the smallest firms the positive results of export promotion are not driven by self-selection.

The results also show that in most cases council selected firms experience significant treatment effects and the estimates imply that the council is just as good at identifying firms for export activity as firms are able to self-identify. Therefore, the trade council's active approach to identify firms for export activity appears to be a successful strategy to promote exports.

4.8 Back of the Envelope Cost-Benefit Analysis

The estimates on value added, employment and value added per worker allow us to perform a back of the envelope cost-benefit calculation. Table 10 summarizes the cost and benefits of the export promotion program. We are not suggesting a welfare analysis, because many general equilibrium effects are unobservable and we do not know how any gains or costs are distributed and valued across the population. Instead we simply compare the direct costs related to providing the export promotion service with the estimated benefits in terms of value added. This procedure can be applied to any subgroup of firms. We focus on firms with 1-20

employees because this is where the effects of export promotion are significant and these firms are the focus of trade promotion dedicated to small and medium sized enterprises in many countries.

The average value added in the sample of small firms that purchased export promotion in year t over all year t observations is about DKK 5.4 million. The effect of export promotion on value added in year $t+2$ is 0.0927. This implies that for the average Danish firm that purchased export promotion in year t , value added increased by about DKK 0.5 million two years down the road. Similarly, total value added of all small firms that purchase export promotion is DKK 20.8 million. The estimates imply that export promotion activity raised total value added by DKK 1.93 billion two years down the road. In other words, with a two year lag, export promotion increases the total amount of value that is created by the treated firms by about DKK 1.93 billion.

This increase in value added is to some extent created by additional workers employed by the export promotion firms. Similar calculations using the estimated employment effects and the total number of workers initially employed by the export promotion firms show that the number of employees increase by about 900-1300 in years t , $t+1$ and $t+2$. These additional workers are likely coming from other productive jobs, so in a welfare calculation the relevant outcome is the estimated increase in value added per worker. Two years down the road value added per worker is found to increase by about 0.03, which translates into an increase in the average value added per worker of about DKK 21,000 ($0.03 * 0.695$ million DKK). So for all the

initially employed workers in the export promotion firms the additional value created amounts to DKK 677 million.

Our data from the Trade Council show revenue of DKK 79 million for export promotion services by the firms with 1-20 employees. The subsidy rate for these services is roughly 50 percent, which implies that tax money of another DKK 79 million are dedicated to export promotion. The Danish Ministry of Finance estimates that the marginal cost of public funds is about 20% of each dollar in distortions. At the high end, Kleven and Kreiner (2006) estimate for Denmark a marginal cost of public funds of 75 percent. Therefore, DKK 79 million in subsidies are worth an additional 16 to 59 million DKK in tax distortions. Summing up this implies that the total cost of export promotion to firms with 1 to 20 employees is DKK 174 to 217 million. Ignoring all sunk costs of establishing the Trade Council etc., this means that the gains in value added are worth about three times the cost of trade promotion for small firms. In summary, the benefits in terms of value added clearly outweigh the direct costs and associated tax distortions. Of course, in this calculation direct costs for export promotion services to larger firms are not accounted for. For these firms there will be a deficit, since there are no effects on value added or value added per worker.

4.9 Robustness

In this section we perform some robustness checks for the definition of the treatment and control groups. As outlined in section 3.2 the treatment group in our baseline scenario consists of firms that acquired trade promotion in a given year (year t) and did not buy trade promotion the year before (year $t-1$). Similarly, the control group consists of firms that neither

bought trade promotion services in year t nor in year $t-1$. Table 11 first replicates the effects on value added and employment from tables 6, 7 and 8 using this definition of the treatment and control groups. Then in the next row for each outcome we strengthen the requirement such that neither group of firms acquired export promotion in years $t-2$ and $t-1$. In the third row we further require that the firms did not buy export promotion in years $t-3$, $t-2$ and $t-1$. These additional restrictions clearly imply that fewer firms enter the treatment and control groups. It is evident that estimated impacts of export promotion only changes marginally. In the final robustness check we allow both treatment and control firms to acquire export promotion in the pretreatment year (year $t-1$), such that firms that continuously buy export promotion are included. In this case the effects tend to be somewhat smaller, which is to be expected since they will be a mix of export promotion in the current and previous years.

Table 12 shows robustness of the treatment effects on value added, employment and value added per worker that we employed in the cost benefit quantification with respect to alternative estimators and more parsimonious matching models considered in the literature. Again, in the main specification we repeat our estimates for comparison.

In the parsimonious specification we match treatment and control firms only based on sales, employees, export status, import status, export and import intensity, lagged treatment and a year indicator. This approach leads to an over-estimation of the treatment effect on value added and employment, in some cases by more than double compared to our full specification. Value added per worker on the other hand is under-estimated suggesting

negative effects of export promotion. These results imply that matching on a broad set of firm characteristics is important to remove selection bias.

The remaining estimates of Table 12 show that our results are robust with respect to a Kernel matching estimator and nearest neighbor matching with two neighbors.

5. Conclusions

Most countries invest resources to help firms access foreign markets, but the literature has so far been silent about whether export promotion improves firm performance and, if so, whether the benefits outweigh the direct costs of export promotion. In this paper we examine the effects of Denmark's export promotion program on export and firm-level performance. We find that for small exporters export promotion activities increase export performance, raise value added, employment and productivity. In terms of value added, the benefits are about three times higher than the direct costs of the promotion program.

We provide evidence that export performance is not necessarily the same as firm performance. The Trade Council's activities help firms across the entire size distribution enter the export markets and medium sized firms with 20 to 50 employees see the largest increase in export values due to promotion activity. All the gains in employment and value added are with the smallest firms of 1 to 20 employees.

The estimates imply that if raising value added and creating job opportunities is the goal, then promotion activity should focus on the smallest firms active in the economy. In addition, only the smallest firms experience an increase in labor productivity following export

promotion. Measured by the direct effect of promotion activities on value added the benefits of promotion activities justify the costs. We expect that the benefits in developing countries, where information barriers are likely more severe, are even greater.

Our estimates do not provide a full welfare evaluation. This would for example require that we take into account the reallocation of resources across different sectors and how the export promotion and performance leads to firm level growth. Based on our evidence that export promotion does have an impact on value added and employment this is a fruitful avenue of future research.

Finally, we conclude that approaching firms about export opportunities is a productive part of trade promotion even in countries that are already very open such as Denmark. To increase their impact, this implies that trade promotion offices should take an active role and seek out firms to increase export activity.

References

- Ahn, J. and McQuoid, A., (2013) Capacity Constrained Exporters: Micro Evidence and Macro Implications," Working Paper, Florida International University.
- Albornoz F., Calvo-Pardo H., Corcos G. and Ornellas, E., (2012), Sequential Exporting, *Journal of International Economics*, 88(1), 17-31.
- Allen T., (2014), Information Frictions in Trade, *Econometrica*, 82(6), 2041-2083.
- Aeberhardt R., Buono I. and Fadinger H., (2014), Learning, incomplete contracts and export dynamics: Theory and evidence from French firms, *European Economic Review*, 68, 219-249.
- Araujo, Luis and Ornelas, Emanuel, (2007), Trust Based Trade, CEP Discussion Paper 820.
- Bernard, A. and B. Jensen (2004), Why Some Firms Export, *Review of Economics and Statistics* 86, pp. 561-569.
- Casella A. and Rauch, J.E. (2002), Anonymous market and group ties in international trade, *Journal of International Economics*, 58, 19-47
- Casella A. and Rauch, J.E., (2003), Overcoming Informational Barriers to International Resource Allocation: Prices and Ties, *The Economic Journal*, 113(484) 21-42.
- Cassey, A. (2012), California's Exports and the 2004 Overseas Office Closures, *Economic Inquiry*, 50(3): 541-651.
- Cassey, A., (2014), The Location of U.S. States' Overseas Offices, *Review of International Economics*, 22(2): 310-325.
- Chaney T., (2014), The Network Structure of International Trade, *American Economic Review*, 104(11), 3600–3634.
- Fernandes, A. P. and Tang H. (2014) Learning to Export from Neighbors, *Journal of International Economics*, 94(1), pp. 67-84.
- Görg, H., M. Henry, and E. Strobl (2008), Grant Support and Exporting Activity, *Review of Economics and Statistics* 90, pp. 168-174.
- Head, K. and Ries, J. (2010), Do trade missions increase trade? *Canadian Journal of Economics*, 43: 754–775.
- Heckman, J.J., Ichimura, H., and Todd, P. (1997), Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Program, *Review of Economic Studies*,

64, 605-654.

Hiller, S. (2012), Do Private Export Associations Promote Exports? Evidence from Denmark, Working paper.

Kleven, H. and C. T. Kreiner (2006), The Marginal Cost of Public Funds: Hours of Work Versus Labor Force Participation, *Journal of Public Economics* 90, 1955-1973.

Lederman, D., M. Olarreaga and L. Payton (2010), Export Promotion Agencies: Do They Work?, *Journal of Development Economics*, 91 pp. 257-265.

Melitz, M. (2003), The impact of trade on intra-industry reallocations and aggregate industry productivity, *Econometrica* 71 (6), pp. 1695–1725.

Nguyen, D.X., (2012), Demand Uncertainty: Exporting Delays and Exporting Failures, *Journal of International Economics*, 86, 336-344.

Nguyen, D. and Schaur, G., (2012), Export and Import Linkages Transmit Volatility Across Markets, Working Paper.

Rauch, J. E., and Trindade, V. (2002), Ethnic Chinese Networks in International Trade, *Review of Economics and Statistics*, 84(1), 116–30

Rauch, J. E. and Trindade, V. (2003), Information, International Substitutability and Globalization, *American Economic Review*, 93(3), 775-791

Rauch, J.E. and Watson, J. (2003), Starting small in an unfamiliar environment, *International Journal of Industrial Organization*, 21, 1021–1042

Rose, A. (2007), The Foreign Service and Foreign Trade: Embassies as Export Promotion, *The World Economy* 30, pp. 22-38.

Rosenbaum, P.R. and Rubin, D.B. (1983), The central role of the propensity score in observational studies for causal effects, *Biometrika*, 70, 41–55.

Soderbery, A., (2014), Market Size, Structure, and Access: Trade with Capacity Constraints, *European Economic Review*, 70, pp 276-298.

Spearot, A. (2013), Variable Demand Elasticities and Tariff Liberalization, *Journal of International Economics* 89 (1), 26-41.

Van Biesebroeck, J., E. Yu and S. Chen, (2011), The Impact of Trade Promotion Services on Canadian Exporter Performance, CEPR Discussion Paper No. 8597.

Volpe Martincus, C. and Carballo, J. (2008). Is export promotion effective in developing countries? Firm-level evidence on the intensive and extensive margin of exports, *Journal of International Economics*, Vol. 76, 89 - 106.

Volpe Martincus, C., and Carballo, J. (2010a). Beyond the average effects: The distributional impacts of export promotion programs in developing countries, *Journal of Development Economics*, Vol. 92, 201 - 214.

Volpe Martincus, C., and Carballo, J. (2010b). Export Promotion: Bundled Services Work Better', *The World Economy*, Vol. 33, 1718-1756.

Volpe Martincus, C., and Carballo, J. (2010c). Entering new country and product markets: does export promotion help?', *Review of World Economics*, Vol. 146, 437 - 467.

Volpe Martincus, C., Carballo, J. and Gallo, A. (2011). The impact of export promotion institutions on trade: is it the intensive or the extensive margin?, *Applied Economics Letters*, Vol. 28, 127 - 132.

Volpe Martincus, C., Carballo, J. and Garcia, P. (2010). Public Programs to Promote Firms' Export in Developing Countries: Are There Heterogeneous Effects by Size Categories?, *IDB Working Paper 205*.

Volpe Martincus, C., Estevadeordal, A., Gallo, A. and Luna, J. (2010). 'Information barriers, export promotion institutions, and the extensive margin of trade', *Review of World Economics*, Vol. 146, 92 - 111

Wilkinson, T. and E. Brouters (2000), An Evaluation of State Sponsored Promotion Programs, *Journal of Business Research*, 47, 3, 229–36.

Table 1. CRM database merged with register data

Year	All observations in CRM		Observations for Danish based firms		Firms in CRM merged with register data		Firms in CRM current year but not previous year	
	# obs.	Million DKK	# obs.	Million DKK	# obs.	Million DKK	# obs.	Million DKK
2002	7240	41.8	6166	36.3	2157	28.5	1850	20.9
2003	7061	49.7	6145	43.9	2362	35.2	1301	13.1
2004	10334	65.5	8649	57.2	2791	44.0	1603	16.2
2005	8677	74.7	7143	66.2	2323	52.9	1160	19.1
2006	7925	80.8	6346	70.8	2014	57.5	1000	21.2
2007	7616	87.3	6038	78.2	1817	59.7	909	22.1
2008	8596	102.0	6585	88.4	1767	68.0	923	22.0
2009	8327	99.4	6394	82.8	1621	66.2	853	20.8
2010	7308	98.8	5540	82.0	1407	64.2	734	21.3
2011	7235	110.9	5387	91.1	1412	72.4	817	29.7
2012	6399	94.2	4474	74.9	1321	57.7	701	24.0
Total	86718	905.1	68867	771.7	20992	606.4	11851	230.5

Table 2. Probit model and mean characteristics for treatment and selected control firms.

	Probit model		Treatment	Control	Percent	Procent	t-test	
	Coefficient	Std. Error	firms	firms	bias		t	p> t
Log (full time employees)	-0.1077	0.0226	2.966	2.937	2.1	2.1	1.17	0.243
Share further education	0.6536	0.0305	0.290	0.296	-2.3	-2.3	-1.39	0.166
Share vocational education	0.0113	0.0316	0.387	0.386	0.5	0.5	0.36	0.719
Share union members	-0.0262	0.0251	0.614	0.611	0.9	0.9	0.63	0.527
Share 40+ years	-0.1090	0.0236	0.460	0.463	-1.0	-1.0	-0.76	0.449
Share women	0.1277	0.0235	0.344	0.338	1.9	1.9	1.41	0.159
Share sales workers	0.4272	0.0467	0.056	0.060	-3.9	-3.9	-1.56	0.119
Log (sales)	-0.0372	0.0119	17.275	17.262	0.8	0.8	0.47	0.638
Log (raw materials and int. inputs)	0.0609	0.0100	16.724	16.707	1.0	1.0	0.55	0.579
Log (capital)	0.0055	0.0043	15.100	15.038	3.1	3.1	1.79	0.074
Log (wage bill)	0.2768	0.0229	15.810	15.800	0.6	0.6	0.36	0.716
Export status	0.3866	0.0274	0.678	0.682	-1.0	-1.0	-0.57	0.568
Import status	0.3739	0.0181	0.712	0.723	-2.6	-2.6	-1.47	0.141
Export intensity	0.0391	0.0085	0.238	0.252	-1.1	-1.1	-0.26	0.792
Import intensity	-0.0523	0.0121	0.184	0.221	-1.1	-1.1	-0.78	0.433
Δ Log (full time employees)	0.1145	0.0254	0.068	0.073	-1.4	-1.4	-0.86	0.391
Δ Log (sales)	0.0696	0.0137	0.117	0.122	-1.0	-1.0	-0.60	0.549
Δ Log (value added)	0.0271	0.0122	0.113	0.119	-1.0	-1.0	-0.62	0.534
Δ Log (wage bill)	-0.0179	0.0226	0.103	0.111	-2.1	-2.1	-1.35	0.176
Δ Export intensity	-0.0144	0.0075	0.000	-0.014	1.3	1.3	0.42	0.673
Δ Import intensity	0.0156	0.0065	-0.018	0.002	-0.6	-0.6	-0.82	0.412
Missing year t-2	0.1700	0.0294	0.040	0.044	-1.8	-1.8	-1.21	0.226
Δ Demand from year t-1 to t	0.0432	0.0181	0.383	0.398	-3.8	-3.8	-1.92	0.055
Missing demand year t-1	-0.1013	0.0409	0.285	0.276	2.0	2.0	1.13	0.257
Δ Demand from year t-2 to t-1	-0.0284	0.0192	0.303	0.313	-2.7	-2.7	-1.36	0.172
Missing demand year t-2	-0.1115	0.0331	0.328	0.324	0.9	0.9	0.48	0.629
Export promotion year t-2	0.8371	0.0247	0.146	0.144	1.0	1.0	0.44	0.663
Number of observations	284605		7658	7658				

Note: Coefficients in bold are significant at the 5% level. The matching estimator is nearest neighbor matching without replacement. The bias for a given variables is defined as the difference between the means of treatment and control firms scaled by the average variance. The model also includes one-digit industry dummies and year dummies (not shown). In addition to the data restrictions mentioned in the text the table also conditions on the firms being observed in year t+1 and t+2.

Table 3. Change in export status from year t-1.

	ATET, t	T-stat	ATET, t+1	T-stat	ATET, t+2	T-stat	Number of firms
All firms	0.0388	9.30	0.0585	12.42	0.0593	11.46	7766
1-20 employees	0.0470	7.42	0.0735	10.32	0.0783	10.00	4110
20-50 employees	0.0234	2.81	0.0342	3.71	0.0449	4.33	1673
More than 50 employees	0.0141	2.19	0.0303	4.04	0.0328	4.05	1983
Manufacturing	0.0243	4.09	0.0473	7.02	0.0492	6.27	3128
Service	0.0308	5.53	0.0546	8.59	0.0664	9.70	4636
The Trade Council's initiative	0.0344	5.60	0.0666	9.42	0.0755	9.81	3636
Firm's initiative	0.0327	5.76	0.0479	7.47	0.0470	6.58	4130

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed.

Table 4. Growth in exports from year t-1.

	ATET, t	T-stat	ATET, t+1	T-stat	ATET, t+2	T-stat	Number of firms
All firms	0.0128	0.57	0.0375	1.35	0.0580	1.77	4754
1-20 employees	0.0565	1.41	0.0599	1.23	0.0472	0.85	1980
20-50 employees	0.0341	0.87	0.1200	2.37	0.1575	2.53	1165
More than 50 employees	0.0193	0.57	-0.0149	-0.35	0.0546	1.08	1609
Manufacturing	0.0108	0.41	0.0573	1.71	0.0604	1.54	2516
Service	0.0704	1.85	0.0603	1.33	0.0499	0.93	2236
The Trade Council's initiative	0.0084	0.26	0.0563	1.45	0.0935	2.07	2330
Firm's initiative	0.0049	0.15	0.0068	0.17	0.0440	0.94	2424

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed. Only firms that are observed in the data all years from $t-1$ to $t+2$ as exporters are included.

Table 5. Growth in sales from year $t-1$.

	ATET, t	T-stat	ATET, $t+1$	T-stat	ATET, $t+2$	T-stat	Number of firms
All firms	0.0028	0.35	0.0307	2.82	0.0524	3.57	7658
1-20 employees	0.0152	1.23	0.0490	2.94	0.0846	3.80	4044
20-50 employees	0.0024	0.18	0.0316	1.69	0.0497	1.76	1649
More than 50 employees	-0.0181	-1.35	-0.0092	-0.49	-0.0003	-0.01	1965
Manufacturing	-0.0204	-1.84	0.0196	1.27	0.0570	2.72	3100
Service	0.0092	0.83	0.0276	1.79	0.0422	2.05	4555
The Trade Council's initiative	-0.0032	-0.27	0.0240	1.51	0.0639	2.96	3586
Firm's initiative	0.0080	0.73	0.0362	2.44	0.0496	2.43	4072

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed.

Table 6. Growth in value added from year $t-1$.

	ATET, t	T-stat	ATET, $t+1$	T-stat	ATET, $t+2$	T-stat	Number of firms
All firms	0.0060	0.70	0.0289	2.60	0.0318	2.25	7359
1-20 employees	0.0259	1.94	0.0665	3.84	0.0927	4.32	3813
20-50 employees	-0.0214	-1.40	0.0098	0.45	0.0040	0.13	1617
More than 50 employees	0.0009	0.08	-0.0199	-1.19	-0.0179	-0.73	1928
Manufacturing	-0.0067	-0.59	0.0193	1.23	0.0480	2.32	3022
Service	-0.0019	-0.16	0.0135	0.90	0.0009	0.05	4331
The Trade Council's initiative	0.0108	0.90	0.0376	2.35	0.0361	1.79	3437
Firm's initiative	0.0010	0.08	0.0117	0.78	0.0077	0.38	3922

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed.

Table 7. Growth in number of employees from year $t-1$.

	ATET, t	T-stat	ATET, $t+1$	T-stat	ATET, $t+2$	T-stat	Number of firms
All firms	-0.0022	-0.43	0.0077	1.07	-0.0001	-0.01	7474
1-20 employees	0.0280	3.38	0.0404	3.67	0.0361	2.58	3895
20-50 employees	-0.0095	-1.14	0.0018	0.15	-0.0120	-0.65	1632
More than 50 employees	-0.0263	-3.30	-0.0198	-1.62	-0.0311	-1.65	1939
Manufacturing	-0.0164	-2.22	0.0000	0.00	0.0061	0.42	3043
Service	0.0063	0.91	0.0178	1.83	-0.0031	-0.24	4429
The Trade Council's initiative	0.0014	0.18	0.0185	1.76	0.0065	0.46	3505
Firm's initiative	-0.0061	-0.88	0.0088	0.90	0.0022	0.16	3964

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed.

Table 8. Growth in value added per worker from year $t-1$.

	ATET, t	T-stat	ATET, $t+1$	T-stat	ATET, $t+2$	T-stat	Number of firms
All firms	-0.0021	-0.29	0.0031	0.36	0.0220	2.41	7109
1-20 employees	-0.0145	-1.23	0.0014	0.10	0.0303	2.15	3632
20-50 employees	-0.0288	-2.19	-0.0302	-1.94	-0.0296	-1.79	1583
More than 50 employees	0.0123	1.19	-0.0136	-1.07	0.0057	0.42	1893
Manufacturing	-0.0202	-2.17	-0.0193	-1.67	-0.0084	-0.71	2950
Service	0.0046	0.45	-0.0009	-0.08	0.0257	2.03	4150
The Trade Council's initiative	0.0027	0.25	-0.0120	-0.99	0.0005	0.04	3332
Firm's initiative	-0.0084	-0.82	-0.0100	-0.84	0.0048	0.39	3777

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed.

Table 9. Selection among firms with 1-20 employees

	ATET, t	T-stat	ATET, t+1	T-stat	ATET, t+2	T-stat	Number of firms
<i>Change in export status</i>							
All firms	0.0470	7.42	0.0735	10.32	0.0783	10.00	4110
The Trade Council's initiative	0.0487	5.00	0.0793	7.27	0.0776	6.59	1829
Firm's initiative	0.0425	5.79	0.0592	6.27	0.0592	5.12	2281
TC selected vs. self-selected	-0.0055	-0.57	0.0093	0.87	0.0126	1.06	1825
<i>Growth in exports</i>							
All firms	0.0565	1.41	0.0599	1.23	0.0472	0.85	1980
The Trade Council's initiative	-0.0123	-0.21	0.0662	0.93	0.1054	1.28	922
Firm's initiative	0.1067	2.00	0.0544	0.84	0.0006	0.01	1058
TC selected vs. self-selected	-0.0032	-0.05	0.0569	0.80	0.1167	1.41	920
<i>Growth in sales</i>							
All firms	0.0152	1.23	0.0490	2.94	0.0846	3.80	4044
The Trade Council's initiative	0.0190	0.96	0.0648	2.46	0.0994	3.08	1795
Firm's initiative	0.0378	2.48	0.0629	2.96	0.0848	2.93	2249
TC selected vs. self-selected	0.0087	0.45	0.0129	0.51	0.0532	1.54	1790
<i>Growth in value added</i>							
All firms	0.0259	1.94	0.0665	3.84	0.0927	4.32	3813
The Trade Council's initiative	0.0502	2.45	0.0987	3.77	0.1116	3.54	1683
Firm's initiative	-0.0126	-0.67	0.0179	0.77	0.0374	1.29	2130
TC selected vs. self-selected	0.0127	0.63	0.0190	0.76	0.0185	0.58	1681
<i>Growth in employment</i>							
All firms	0.0280	3.38	0.0404	3.67	0.0361	2.58	3895
The Trade Council's initiative	0.0444	3.56	0.0754	4.55	0.0683	3.29	1738
Firm's initiative	0.0115	1.14	0.0180	1.29	0.0132	0.73	2157
TC selected vs. self-selected	0.0265	2.13	0.0271	1.61	0.0241	1.15	1735
<i>Growth in value added per worker</i>							
All firms	-0.0145	-1.23	0.0014	0.10	0.0303	2.15	3632
The Trade Council's initiative	-0.0147	-0.81	0.0036	0.18	0.0288	1.36	1611
Firm's initiative	-0.0224	-1.41	-0.0108	-0.58	0.0139	0.74	2021
TC selected vs. self-selected	-0.0001	0.00	0.0140	0.66	0.0019	0.09	1606

Note: All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed. For the growth in exports only firms that are observed in the data all years from $t-1$ to $t+2$ as exporters are included.

Table 10. Quantification of effects for firms with 1-20 employees

Outcome	Year t	Year t	Year t+1	Year t+2
Average value added (million DKK)	5.4			
Total value added (million DKK)	20765			
Estimated effect		0.0259	0.0665	0.0927
Quantification (million DKK)		537	1380	1925
Average number of employees	8.2			
Total number of employees	32125			
Estimated effect		0.0280	0.0404	0.0361
Quantification		899	1299	1160
Average value added per worker (million DKK)	0.695			
Total number of employees	32125			
Estimated effect				0.0303
Quantification (million DKK)				677

Table 11. Treatment group definitions, firms with 1-20 employees

	ATET, t	T-stat	ATET, t+1	T-stat	ATET, t+2	T-stat	Number of firms
<i>Growth in value added:</i>							
Main specification	0.0259	1.94	0.0665	3.84	0.0927	4.32	3813
No export promotion in t-1 and t-2	0.0241	1.70	0.0746	4.14	0.0791	3.56	3405
No export promotion in t-1, t-2 and t-3	0.0357	2.43	0.0692	3.69	0.0978	4.20	3214
Export promotion in t-1 included	0.0147	1.31	0.0595	4.21	0.0842	4.70	5530
<i>Growth in employment:</i>							
Main specification	0.0280	3.38	0.0404	3.67	0.0361	2.58	3895
No export promotion in t-1 and t-2	0.0249	2.91	0.0400	3.51	0.0365	2.52	3465
No export promotion in t-1, t-2 and t-3	0.0230	2.55	0.0431	3.54	0.0373	2.42	3278
Export promotion in t-1 included	0.0121	1.84	0.0254	2.88	0.0239	2.11	5724
<i>Growth in value added per worker:</i>							
Main specification	-0.0145	-1.23	0.0014	0.10	0.0303	2.15	3632
No export promotion in t-1 and t-2	-0.0105	-0.85	0.0058	0.40	0.0396	2.65	3236
No export promotion in t-1, t-2 and t-3	-0.0087	-0.66	-0.0056	-0.38	0.0504	3.17	3057
Export promotion in t-1 included	-0.0309	-3.17	0.0022	0.20	0.0068	0.58	5287

Note: Results for the main specification that conditions on no export promotion in year $t-1$ are repeated from tables 6-8. All treatment effects are calculated using nearest neighbor matching without replacement. The dependent variable is measured as the difference in outcome between $t-1$ (the year before treatment) and t or $t+1$ or $t+2$ (as indicated). A common support restriction has been imposed.

Table 12. Robustness calculations, firms with 1-20 employees

	ATET, t	T-stat	ATET, t+1	T-stat	ATET, t+2	T-stat	Number of firms
<i>Growth in value added</i>							
Main specification	0.0259	1.94	0.0665	3.84	0.0927	4.32	3813
Parsimonious selection model	0.0432	3.11	0.0864	5.04	0.1233	5.79	3909
NN matching, two neighbors	0.0242	1.98	0.0594	3.82	0.0935	4.82	3813
Kernel matching	0.0262	2.60	0.0621	4.87	0.0875	5.48	3813
<i>Growth in employment</i>							
Main specification	0.0280	3.38	0.0404	3.67	0.0361	2.58	3895
Parsimonious selection model	0.0619	7.79	0.0966	9.08	0.0935	7.01	3979
NN matching, two neighbors	0.0253	3.4	0.0346	3.49	0.0303	2.41	3895
Kernel matching	0.0222	3.55	0.0412	4.94	0.0338	3.21	3895
<i>Growth in value added per worker</i>							
Main specification	-0.0145	-1.23	0.0014	0.10	0.0303	2.15	3632
Parsimonious selection model	-0.0276	-2.31	-0.0137	-1.01	0.0178	1.25	3700
NN matching, two neighbors	-0.0183	-1.68	-0.0026	-0.21	0.0299	2.32	3632
Kernel matching	-0.0148	-1.59	-0.0064	-0.60	0.0219	2.01	3632

Note: Results for the main specification are repeated from tables 6-8. The parsimonious selection model includes the following control variables: Log(sales), log(full time employees), export status, import status, export intensity, import intensity, lagged treatment indicator and year effects. Local-linear matching without replacement is used as the Kernel estimator.