Firm Specific Trade Policy: Evidence on Effectiveness and Mechanisms*

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Preliminary and incomplete. Please do not cite.
June 12, 2019

Abstract

Most countries engage in a variety of firm-specific trade policies. In this paper we examine the effectiveness and the mechanisms behind a firm-specific trade policy, export promotion. We use detailed data from the Danish Trade Council to solve measurement problems, and we exploit randomness in the targeting of the policy across firms to solve selection problems. We first find that the firm-specific trade policy boost exports of firms along the intensive margin. Next, we show that this is due to increasing sales, while marginal costs, export prices and quality remain roughly constant. This suggests that firms use the firm-specific trade policy to increase demand for their products on foreign markets consistent with a trade expansion theory such as Arkolakis (2010).

Keywords: Firm-specific trade policy, Firm-level export data, adjustment mechanisms

JEL Codes: D22, F13, F14

*Financial support from the Danish Industry Foundation is gratefully acknowledged.
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1 Introduction

Recent literature examines adjustments in prices, quality and markups to understand firm's responses to tariff liberalizations and success in export markets (De Loecker, Goldberg, et al. 2016; Haichao Fan, Y. A. Li, and S. R. Yeaple 2015; Khandelwal, Schott, and Wei 2013; Fitzgerald, Haller, and Yedid-Levi 2016; Rodrigue and Tang 2019). Beyond tariffs, measurement of trade policy and related evidence are less common (Goldberg and Pavcnik 2016). Widespread trade policies including trade facilitation, export promotion, trade subsidies, export credits etc. are difficult to observe, are specific to firms, and depend on firm's self selection to achieve their desired goals. Existing empirical literature provides limited evidence on their effectiveness to increase export flows, but due to measurement and identification challenges We do not have evidence on how to interpret these policies with respect to standard trade models, WTO rules, and other agreements regulating international commerce.

We solve several data and identification challenges to fill this gap in the literature. Firm's selection to use these trade policy instruments may be related to expected success on export markets, or, an attempt to revitalize failing markets. To solve these identification problems we examine Denmark's export promotion policy. We develop an exogenous instrument based on the Danish Trade Council's strategy to distribute destination specific export promotion services across firms. We apply detailed export data to determine effects of export promotion on sales and prices at the destination-product level. Standard margins of adjustment such as markups, marginal costs, product quality and input quality are not directly observable, but we apply recent developments in structural techniques to measure these outcomes. We then examine adjustment mechanisms by estimating the effects of export promotion on firm-level production, markups, marginal costs, product quality, and inputs.

Our empirical strategy provides the first instrumental variable estimates to examine effectiveness of promotion services. We provide evidence and institutional background to show that the Trade Council's own selection of firms is random conditional on firm, product and destination characteristics. Our first stage shows that the Trade Council's approach of firms with information regarding export promotion services has a positive effect on take-up, suggesting that to reach their full potential, trade policies relying on self-selection must overcome infor-

mation asymmetries.

In the second stage, conditional on high dimensional fixed effects, accounting for self-selection raises the effectiveness of export promotion. Therefore, self-selection downward biases OLS and other estimation techniques. A simple explanation is that low performing firms seek out the trade council for help with export markets. A more nuanced explanation is that firms that self-select to seek out services have good export managements, therefore additional services have limited ability to improve performance.

Exploiting destination and product level variation allows us to provide evidence regarding effects of export promotion on export prices. This evidence does not exist in the literature as most work grapples with more aggregate firm, industry, or country level information. We discuss how price effects combined with evidence on supply side effects of export promotion are useful to distinguish several mechanisms that have recently been studied to examine the effects of trade liberalizations. We find that firms use export promotion to increase sales on foreign markets avoiding significant price adjustments (Fitzgerald, Haller, and Yedid-Levi 2016). At the firm-product level, we provide evidence that export promotion significantly increases production and is associated with a weak and negative effect on marginal costs. We do not find evidence for quality or markup adjustments.

We make several additional contributions to the literature. In a recent paper Munch and Schaur (2018) examine the effect of export promotion on firm level performance beyond export measures. They apply matching estimators to examine the effect of promotion on firm level performance measures including employment, total sales, and value added and they provide a cost-benefit calculation of export promotion. By contrast, we focus on the mechanisms behind export promotion and examine effects of export promotion on prices and product level mechanism consistent with trade theory and the complimentary literature that examines firms' response to tariff liberalization. Also, we apply an instrumental variable technique rather than relying on observables to solve the identification problem. Furthermore, throughout they assume that export promotion does not affect the firm's sales in other markets or the sales of competing firms. Using product level data, we directly examine spillover effects according to theories of multi-product firms.

Recent literature examines variation in export prices and input prices to provide evidence for firms quality differentiation across destinations and incentives

to upgrade quality as a result of standard tariff policy (Manova and Zhang 2012; Bastos, Silva, and Verhoogen 2018; A. Auer, Chaney, and Sauré 2018; H. Fan, Y. Li, and S. Yeaple 2018; Flach 2016). Understanding what determines export success is important to understanding welfare effects of trade and the design of export promotion activities. Within export destinations, we apply direct measures of product quality that take into account variable markups and marginal costs to examine the effects of export promotion on quality. If firms expand export sales due to promotion services, fixed cost arguments and reduced distribution costs suggest that firms may invest to upgrade product quality (e.g. Manova and Zhang (2012).) On the other hand, if promotion services lower per-unit trade costs, then firms may lower export qualities (Hummels and Skiba 2004). We do not find evidence for increased marginal costs or direct measures of quality. Therefore, within markets, trade promotion is most appropriately interpreted as a market expansion due to increased visibility or advertising expenditure (Arkolakis 2010; Gervais 2015). Prices weakly increase, perhaps as consumers learn the true quality of the product (Bagwell and Staiger 1989).

Multi-product firm theories all have tradeoffs between the number of products, the destinations and the intensive margin. We examine how export promotion affects these tradeoffs applying recent approaches to determine marginal costs etc for multi-product firms.

2 Data

2.1 Export Promotion in Denmark

The Trade Council (TC) organizes all governmental export-promotion activities in Denmark, and offers tailored export-promotion services to Danish firms. Firms are charged for these services, but prices are heavily subsidized. In practice, these services are provided by the Danish embassies and consulates abroad, and export-promotion services are then naturally destination-specific.

The Tc offer a variety of services. The largest portion of these, partner search and matchmaking, helps firms find new trade partners such as distributors in foreign markets. Other services include intelligence and analysis on political and economic conditions, advertising, fairs, exhibitions, public relations activities, and communication with customs authorities and diplomacy. The TC's services

are intended for firms interested in engaging in new export activities as well as firms interested in expanding existing exporting activities.

Crucial for our identification strategy, the TC actively approaches firms and offer them export-promotion services. The TC has no overall strategy for which firms to approach nor is there any coordination across embassies and consulates. Instead, each embassy and consulate approaches firms based on information about industry-specific conditions in the local destination market. This suggests that, once these conditions are controlled for, firms are approached randomly.

2.2 Data sources

First, we briefly describe the data sets needed for the empirical analysis. Then we describe how these data sets are merged and how this shapes the final estimation samples.

We collect data on export-promotion services from TC. For the years 2002-2015, we have the full list of firms that purchased promotion services by country for which the services were directed. Furthermore, we have the full list of firms that were approached by the TC and the location of the embassy or consulate responsible for the approach. That is, for every firm, destination, and year we observe a) whether a given firm purchased export-promotion services, and b) whether a given firm was approached by the TC and offered export-promotion services.

Our export data comes from the statistics for International Trade in Goods. For each firm and year we have exports disaggregated by product and destination country. Trade flows are recorded according to the eight-digit Combined Nomenclature (CN8). To account for changes in product categories over time, we apply the algorithm proposed by Van Beveren, A. Bernard, and Vandenbussche (2012), aggregating categories to the so-called CN8+ level. For each trade flow we observe its f.o.b. value in Danish Kroner (DKK) and its quantity.[1] The trade data consists of two sub-systems, Intrastat (trade with EU countries) and Extrasta (trade with non-EU countries). Intrastat does not have complete coverage as firms are only obliged to report intra-EU trade if the annual export value exceeds a threshold (5

[1]We observe quantities in kilos for all products and, additionally, quantities in a supplementary unit (such as pieces and liters) for a subset of products. If the supplementary unit is present and the same for all trade flows within a product category, we apply quantities in this unit. Otherwise, we apply quantities in kilos.

million DKK in 2015). Extrastat has close-to-complete coverage. However, extra-EU transactions of less than 7,500 DKK are not required to be categorized as separate products. To ensure comparability across intra- and extra-EU exports, we exclude all trade flows with a value lower than this threshold. We construct unit values by dividing values with quantities and refer to these as "prices" in the remainder of the paper.

We collect production data from the statistics for Manufacturers' Sales of Goods. This is the source for the Danish Prodcom statistics, regulated by Eurostat. For each firm and year, we have sales, in terms of value and quantity, by product (CN8, aggregated to CN8+). The unit of quantities vary across products.[2] Importantly, the data set covers only sales of own goods, that is goods extracted, produced, processed or assembled by the reporting firm, and, thus, not resales. Both domestic and export sales are included. The data set covers all firms with at least 10 employees operating within mining and quarrying (NACE B) and manufacturing (NACE C). As for the export data, we construct unit values by dividing values by quantities.

Finally, we extract firm-level characteristics, e.g. industry codes and number of employees, from the Firm Statistics Register and Firm Accounts Statistics, covering the universe of private sector Danish firms.

2.3 Firm sample

Ultimately, we are interested in two estimation samples, consisting of the same set of firms but at two different levels of aggregation. We now describe the sample of firms resulting from merging the various data sources outlined above. All considered data sources apply the same unique firm identifier, easing the merging procedure.

Access to data on export promotion services restricts the sample period to 2002-2015. As our empirical analysis examines effects along the intensive export margin only, we restrict the sample to exporting firms, that is firm-years present in the export data. Further, as part of our empirical analysis examines the effect

[2]At the CN8 level, all quantities are reported in the same unit within a product-year pair. However, this unit changes over time for some products. Furthermore, the aggregation of product codes from CN8 to CN8+ gives rise to some cases where units differ even within product-year pairs. As comparability of prices, and thus quantities, within product categories are crucial for our analysis, we define product categories in terms of product-unit pairs, and refer to such pairs as "products" in the remainder of the paper.

on production costs, we restrict the sample to manufacturing firms (NACE C) with employees. This data set consists of total exports sales of 3.4 trillion DKK and 46,287 firm-year observations, see column 1 and 2 in Table 1.

As TC does not offer export promotion services to all destinations, we restrict interest to destinations for which a Danish firm purchased export promotion services at some point during the sample years. This leaves 77 countries, including all major destinations for Danish exports. Column 3 and 4 in Table 1 shows that this restriction maintains export sales of 3.1 trillion DKK and 43,622 firm-years.

We then restrict the sample to only include firms present in the sales (Prodcom) data. First of all, this limits the sample to firms with at least 10 employees. Column 5 and 6 in Table 1 shows that this restriction maintains export sales of 2.3 trillion DKK and 18,181 firm-years.

2.4 Estimation samples and key variables

Having defined the sample of firms, we now turn to the corresponding, less aggregated samples.

First, consider the firm-destination-year level. Our promotion data allows us to classify firm-destination-year triplets into four mutually exclusive groups: "not promoted, not approached", "not promoted, approached", "promoted, not approached", and "promoted, approached", see Table 2.

For the empirical analysis, we define a binary treatment indicator, TCS_{fdy}, in the following way: TCS_{fdy} takes value one if firm f purchased export promotion services for destination d in year y and/or $y-1$.[3] This timing convention is also applied by Broocks and Van Biesebroeck (2017) and reflects that (as we will see later) the effect of export promotion services under some circumstances is delayed. We define a binary instrument accordingly, based on whether the firm-destination-year triplet was approached by the TC or not.

Next, consider the least aggregated estimation sample, at the firm-product-destination-year level. The top panel of Table 3 shows that the firm sample of 18,181 firm-years turns into 880,955 firm-product-destination-year quadruplets (after the initial year, 2002, is excluded as the treatment indicator TCS_{fdy} is not defined).

[3]Formally, let $d_{fd,y}$ be a binary indicator that takes value one if firm f purchased promotion services for destination d in year y. We then define $TCS_{fdy} = \max(d_{fd,y}, d_{fd,y-1})$.

At this level of aggregation, the treatment indicator, TCS_{fpdy}, is simply defined as $TCS_{fpdy} = TCS_{fdy}$. That is, if firm f was treated in destination d in year y, we consider all of its products to be treated. The instrument is defined accordingly.

Column 5 of Table 3 shows that average export sales are approximately 2.5 million DKK with a standard deviation of 27.2 million DKK, indicating that the dispersion in sales is massive. Quadruplets that received promotion (column 3 and 4) are generally larger, in terms of export sales, that quadruplet that did not receive promotion (column 1 and 2). There is also heterogeneity within treatment groups, as quadruplets that were approached by TC (column 2 and 4) are larger on average than quadruplets that were not approached (column 1 and 3).

In order to facilitate comparison of prices across products, these are first log-transformed, then de-meaned by product fixed effects, before averages and standard deviations are obtained and presented in Table 3. This means that the overall average price is zero by definition, see column 5. As for export sales, the standard deviation of prices (1.184 log-points) indicates massive dispersion. Of course, this dispersion is to some extent explained by firm and destination heterogeneity. Quadruplets approached by TC enjoyed higher prices than those not approached.

Overall, the large degree variation in both export sales and export prices will help our regression based analysis. However, the heterogeneity in both measures across promoted and not promoted observations as well as across approached and not approached observations needs to be addressed carefully in order to isolate the causal effect of purchasing promotion.

Finally, consider the estimation sample at the firm-product-year level, presented in the bottom panel of Table 3. At this level of aggregation, the treatment indicator, TCS_{fpy}, takes value one if $TCS_{fpdy} = 1$ for any d and zero otherwise. That is, a fpy triplet is considered treated if firm f exported product p to destination d in year y and purchased promotion in destination d in year y or $y-1$. The instrument is defined accordingly.

This sample consists of 49,457 firm-product-year triplets and contains two groups of variables: observed (quantities, prices, and export status) and estimated (marginals costs, expenditure shares, and output elasticities).

Quantities exhibit qualitatively the same pattern as export sales in the sense that sizes are increasing across columns. Treated triplets generally enjoyed lower prices than triplets that were not treated. Importantly, part of this heterogeneity

is (potentially) explained by differences between exported and non-exported products. Whereas all considered firms are exporting, firms do not generally export all the products they produce. Of all triplets, 67.5 pct. were exported. By definition, all promoted and approached triplets are necessarily exported.

Using the sales (Prodcom) data together with firm-level characteristics from the Firm Statistics Register and Firm Accounts Statistics, the remaining variables presented in the bottom panel of Table 3 are estimated by applying the estimation procedures proposed by De Loecker and Warzynski (2012) and extended by De Loecker, Goldberg, et al. (2016) to obtain firm-product-year specific marginal cost estimates. The main insight is that marginal costs are identified from the firm's short-run cost-minimization problem, such that the demand side can be left unspecified. Econometrically, the procedure mainly relies on estimation of production functions, which is a well-studied topic in empirical research.

The estimated marginal costs exhibit a large degree of dispersion, even higher than for prices. Triplets that were promoted and/or approached had lower than average marginal costs. This to some extent reflects that firms export the products for which their production is more efficient. But even within the three groups that did have some contact to the TC (column 2-4) there is considerable heterogeneity, with approached triplets having lower marginal costs among the promoted triplets, and the promoted triplets overall having lower marginal costs than the approached but not promoted triplets.

We are mainly interested in the two last variables, expenditure shares and output elasticities, because they, in accordance with the applied estimation procedure, serve as components of marginal costs. When we examine the effects of purchasing promotion on marginal costs, additionally examining the effects on these components will help us understand how promotion services are affecting marginal costs. Expenditure shares are estimates of the fraction of firm-level expenditures allocated to each product within the firm, thus bounded between zero and one. Output elsticities are estimates of the elasticity of produced quantities with respect to real material inputs. As the applied estimation procedure is based on trans-log production functions, these elasticities vary across both firms, products, and time. An average estimate of 0.533 (column 5) means that a 1 pct. increase in real material inputs (allocated to that particular product) will increase production by 0.533 pct. Taking output elasticities as a measure of production efficiency, the pattern across groups reflects that of marginal costs in

the sense that output elasticities are increasing across columns.

As was the case for export sales and export prices, we have documented massive heterogeneity in production efficiency across the four groups of firm-product-year triplets. Addressing these differences is key in our empirical analysis.

3 Empirical Strategy

In this section we first explain how we identify the effect of export promotion on export values and prices. Then, we explain how we obtain measures for firm-product level performance measures using structural techniques to identify the effect of export promotion on marginal costs and markups.

3.1 Empirical Models and Predictions

Let $TCS_{fdt} = 1$ if firm f received trade council services to promote exports to destination d in year t, in year $t-1$, or, both (Broocks and Van Biesebroeck 2017). Let $Exports_{fpdt}$ and $Price_{fpdt}$ be the firm's f.o.b. export value and price of product p realized in destination d in year t. To examine effectiveness of export promotion to increase exports our baseline empirical model relates export values to export promotion

$$ln(Exports_{fpdt}) = \beta_0 + \beta_1 TCS_{fdt} + FixedEffects + u_{fpdt} \tag{1}$$

The parameter of interest is β_1. Based on the existing literature we expect that export promotion raises export values.

To examine the effect of export promotion on prices we relate unit values to export promotion

$$ln(Price_{fpdt}) = \beta_0 + \gamma_1 TCS_{fdt} + FixedEffects + u_{fpdt} \tag{2}$$

Our parameters of interest, γ_1, β_1, capture the effect of export promotion on export values and prices. Given the log-separability of unit values and export values, the total effect γ_1 decomposes into the price effect and quantity effect. Therefore, $\gamma_1 - \beta_1$ equals the residual quantity effect associated with export promotion to determine export values.

Based on the literature the effect of export promotion on prices is ambiguous. If export promotion increases firms exports, then firms potentially engage in in-

novation, upgrade technology to lower marginal cost and reduce export prices (Bustos 2011; Lileeva and Trefler 2010). Therefore, if export promotion increases exports, then based on this mechanism we expect $\gamma_1 < 0$. On the other hand, if export promotion is a strategy to grow the destination market, then, if exporters accumulate demand via export promotion strategies, they upgrade their product quality and charge higher prices (Rodrigue and Tang 2019). Consequently, in this case we expect $\gamma_1 > 0$. Finally, export promotion may be considered a strategy to increase foreign demand through advertising, marketing efforts and matching with new buyers without affecting marginal costs of supplying the foreign market. In that case export promotion is akin to a marketing stratgy that expands demand on the foreign market without affecting prices (Arkolakis 2010; Fitzgerald, Haller, and Yedid-Levi 2016), $\gamma_1 = 0$.

3.2 Identification

Variation in the promotion indicator is due to firms purchasing services from the trade council, but many firms that purchase services only purchase them for specific destinations. Therefore, we observe variation in the promotion indicator across firms and destinations. Our parameters of interest, $\gamma \times 100$, translates this variation in the promotion indicator into percentage changes in export values and prices. In estimating the these treatment effects we tackle several identification challenges.

Firms may self-select to purchase trade promotion services based on unobservable information that is also systematically related to export performance. For example, Holmes and Stevens (2012) shows that firms with high scale invest to reduce distance and border costs. Consequently, highly productive firms, or firms highly productive in certain products, may be more likely to engage in actions to reduce trade costs. In addition, we expect that firms are more likely to invest in destinations that have sufficient scale to recover the investment. Across several specifications we work with firm-year, firm-product-year, firm-destination, and firm-product-destination fixed effects to account for this unobserved heterogeneity. In addition to accounting for unobserved firms characteristics, these fixed effects also accommodate variation in the difficulty to enter certain destination markets even at the product level.

Conditional on firm-product-destination fixed effects, variation in the promo-

tion indicator across destinations provides a proper control group to identity promotion effects by comparing changes in export flows to treated destination with changes in export flows to non-treated destination. Conditioning on firm-year effects focuses identification on comparing trade flow to multiple destinations within the same firm. Conditioning on firm-product-year effect focuses identification on comparing treated trade flows of the same product within firms across multiple destinations. In terms of identifying export promotion effects, this is the most rigorous and cleanest approach to date in the literature.

To account for growth potential, or decline, across export markets and products we examine effects of including destination-year fixed effects and product-year fixed effects. In all of our specifications we include at least a product fixed effect to account for unit differences in prices. For example, some products may be more appropriately measured in piece counts while other may be measured in gallons. As long as the conversion of these units to weight is stable, product fixed effects account for this heterogeneity.

Firms may self-select to purchase export promotion services to obtain information about changing trade policies in their destination market. This leads to omitted variable bias. For example, imagine that China increase non-tariff barriers in certain products relative to other export destinations and Danish firms purchase information to navigate these changes. Then, more restrictive trade policies are correlated with self-selection into export promotion and we would expect a negative bias. To account for this, we include industry-destination-year fixed effects into our empirical model.

If despite our rigorous fixed effect approach selection of firms into export promotion is still endogenous due to time varying information we can't control with fixed effects, then only randomization will break the endogeneity. It is unclear which way the bias would go. Firm's may have information about future success that leads them to approach the council to deepen their export experience. If they are right, then trade council services are associated with greater export performance generating positive bias. On the other hand, firms concerned about their future success may be more likely to approach the council to save their export markets. If they are right, then promotion services are correlated with future failure on export markets leading to a negative bias. Unfortunately we do not have the ability to randomly select firms for export promotion, but the trade council data provides us with a similar experiment.

The trade council approaches firms to advertise its services. For each firm-destination-year observation in our data we observe if the firm approach the trade council, or, if the trade council first approached the firm. In our data, about x percent of firms-destination year observations were initiated by the trade council. Of these firms, about y percent took up export promotion services. Let $z_{fpdy} = 1$ if the trade council approached a firm for promotion services and zero otherwise. Then, z_{fpdy} is a valid instrument if it predicts the treatment indicator and and is exogenous conditional on fixed effects.

The trade council approaches firms based on industry, firm, and destination specific information. For example, they see whether products are selling well in certain destinations and approach firms that produce such products. They may observe basic firm characteristics to predict who may be interested in services. Conditional on that, it is just calling firms up to promote their services. In our empirical model we account for a much wider range of unobserved firm, product and destination characteristics. To our knowledge, the trade council does not have more information then we do to predict success in export markets. Therefore, conditional on our fixed effects, the trade councils attempt to approach firms for services is as good as random. Then, as long as z_{fpdy} predicts the promotion indicator, the trade council approaching firms for services is a valid instrument to break any remaining endogeneity.

To examine the validity of our identification assumptions we examine both, the treatment and the instrument for pre-trends. As a straight forward placebo test we predate treatment to the year before the actual treatment and estimate our baseline regressions. Next we also predate our instruments and estimate the baseline using two stage least squares. In both cases we expect that treatment does not affect export sales. Next we examine if the instrument is directly associate with export sales before treatment. We predate z_{fpdy} by one period and examine if the trade councils approach of firms was associated with export performance in the previous period. Finally we follow (Autor 2003) and include leads and lags of the treatment indicator to our model. This allows us to examine potential dynamic effects of export promotion and rule out pre-trends.

3.3 Product Level Heterogeneity

International trade is dominated by multiproduct firms that optimize across their product mix (A. B. Bernard, Redding, and Schott 2010; Eckel and Neary 2010; Eckel, Iacovone, et al. 2015). If firms sell multiple products within each destination, then specifying the treatment indicator at firm-destination-year level potentially ignores two sources of heterogeneity.

First, if promotion is destination-product specific, then a firm may ask for services as part of the learning process to successfully establish a low performing product in the export market (Timoshenko 2015). In that sense, export promotion can be considered a subsidy to maintain export markets and avoid early exit (Arkolakis, Papageorgiou, and Timoshenko 2018). In that case, for multiproduct firms, the treatment indicator is miss-measured in that it assigns treatment to all of a firms products in a given destination even though the firm only purchased services for a particularly low performing product. Alternatively, export promotion may be an investment strategy to lower trade costs for products that have sufficient scale to recover fixed costs from these investments (Holmes and Stevens 2012). In this case, firms demand export promotion services for their high performing products, but the promotion indicator considers all of the firm's products within the destination treated.[4]

Second, even if promotion is at the destination level, then it may not be equally effective across all products. For example, a firm may receive intelligence on import permits and customs valuation, but not all products the firm sells may be equally subject to the same regulations (Bowen and Crowley 2016).

We distinguish core products by export performance and within the firm as a whole to examine if export promotion is a mechanism firms use to more actively promote their core competence on foreign markets. We then estimate our baseline models with an interaction term between the treatment indicator and an indicator that equals one if the product is a core product for the firm. We also estimate our baseline empirical models on the sample of core products to examine firm's use and effectiveness of export promotion across core and non-core products.

[4]While the actual fixed costs of export promotion are subsidized and likely to small to justify such a mechanism, the more substantial cost may be in implementing and executing and export strategy based on the received information. Both are required for export promotion to be effective.

3.4 Substitution

Rotemberg (2018) examines the effects of subsidies for small firms on sales. He shows that subsidies determine firm-level sales via two effects, a direct effect and a competition effect. In this set-up, if individual firms' treatment does not affect the destination market as a whole, the standard monopolistic competition assumption, then the direct effect captures export promotions ability to reduce trade distortions and increase exports. However, if only few firms compete on the destination market, or, treated firms are large compared to other firms, then export promotion reduces the average price in the market, making the market more competitive. In that case, not only do treated firms gain sales due to mitigated trade distortions, non-treated competing firms lose sales because market prices drop compared to their own prices.

This creates a challenge for identification and effectiveness of export promotion. From an identification point of view this results in a violation of he stable-unit-treatment-value assumption (Rubin 2005). This is especially concern when identifying variation emphasize with destination product difference in sales and treatment such as with destination-product fixed effects. We examine these indirect effects in several ways.

If the direct effect is the main coefficient of interest, then a simple solution is to include destination-product-year fixed effects. If sufficient variation remains to identify the model, then these fixed effects account for average prices in the destination market. This solution is straight forward, but not satisfying if the concern is whether export promotion raises exports as a whole. For example, the fixed effect specification does not tell us whether the direct effects come at the cost of reducing export sales of competing non-treated Danish firms. To examine this we develop an alternative strategy.

We directly examine if treatment of some firms reduced sales of non-treated firms in the same destination market. To do this, we drop the treated trade flows. Then, within a product-destination market in a given year, we assign a treatment indicator equal to one to all the untreated flows within that product-destination combination, if an actually treated flow exists in that destination of that product. In other words, we are testing the performance of non-treated flows in treated product-destination markets. If the treated flows are large relative to the total market we expect a negative sign such that treated flows crowd out existing non-treated flows. If treated flows are small relative to the total market, then we expect

no effect.

3.5 Mechanisms

In the previous subsections we discussed identify the effect of destination specific export promotion on exports across products and destinations. Next we use structural estimates at the firm-product-year level for marginal costs and inputs to further distinguish mechanisms that support export promotion. Based on the results from the previous sections there are several cases to distinguish. Across all results, we expect that export promotion raises export values.

Eckel, Iacovone, et al. (2015) show that firms' core competency may be characterized by their high quality product. Rodrigue and Tang (2019) show that firms invest into quality to grow their export markets. If export promotion supports firms effort to produce and sell higher quality products on foreign markets, then in this case we expect that positive export promotion effects go along with higher prices and greater marginal costs of production.

Alternatively, Eckel and Neary (2010) argue that firms core products are characterized by their high productivity. Bustos (2011) shows in theory and empirics the liberalization of export markets leads firms to invest to lower marginal costs of serving the foreign market and increase export sales. Therefore, if export promotion supports firms investments to upgrade productivity and increase export sales, then we expect that positive export promotion effects are associated with lower prices, greater productivity and lower marginal costs.

Rotemberg (2018) shows that if subsidies mitigate distortions, then this results in lower prices. However, if these distortions are not captured by input prices and observed inputs, then marginal costs are unaffected. Therefore, if export promotion is a policy to mitigate export related distortions, then we expect that export promotion allows firms to lower prices in destination markets to increases sales with constant or lower marginal costs.

Instead of affecting the cost and production structure of exporting firms, export promotion may simply be a way to increase demand without much effect on marginal costs and prices (Arkolakis 2010; Fitzgerald, Haller, and Yedid-Levi 2016). In this case we expect that export promotion raises sales without effects on marginal cost and prices. If marginal cost adjust along without associated changes in prices, then export promotion results in markup changes as a conse-

quence of advertising or marketing activity.

4 Results

In this section we discuss our regression results. We start with the effect of export promotion on export values and prices. Next we examine the effect of export promotion on mechanisms. We finish with robustness checks.

4.1 Export Promotion, Exports, and Prices

Table 4 reports estimates for both of our main empirical models applying OLS and Two-Stage-Least-Squares estimators. In addition to estimates and standard errors clustered at the firm-destination-year level, the bottom panel reports the fixed effects included in each specification. First stage statistics support our instrumental variable approach.

Focusing on OLS estimates, as expected, columns 1 to 7 show that export promotion has a positive and significant effect on export values. Across the columns destination-year, firm-destination, firm-year, firm-product, product and product-year fixed effects account for unobserved destination specific heterogeneity, product characteristics at the firm level, and firm productivity. In the last three columns we estimate with firm-product-destination fixed effects, firm-year, firm-product year, destination year and industry-destination-year fixed effects. These specifications allow for heterogeneity in productivity across firms and products. More importantly, they account for unobserved heterogeneity in trade frictions across destinations and products that could be correlated with firm's self-selection to purchase trade promotion. The specification in column 7 even accounts for unobserved changes in industry specific trade policy over time within destinations and 6-digit HS industries. Across these specifications the estimates are remarkably stable and imply that export promotion raises export values by about 3.5-5 percent. For the average Danish exporter, this is equivalent to a revenue boost of DKK Fill in number.

Remember that in our empirical model export values are exactly log separable into quantities and prices. Below the results for export values, the OLS estimates show that export promotion does not affect prices. Therefore, the effect of export promotion on export values must be driven by an increase in the export quantities

at constant prices.

Below the OLS estimates we report our instrumental variable estimates. Compared to the OLS estimates, the export promotion effects on export values and prices increase. Based on these results we conclude that if self-selection is an issue, then it seems to be lower performing firms and firms realizing lower prices on export markets that seek help from the trade council. Once we account for this selection using our instrument, the effect of export promotion on export values increases. The First-Stage statistics reported at the bottom of Tables 4 confirm that the instrument is predictive and not weak. As we only have one instrument we cannot test if the instrument also satisfies the exclusion restriction.

The weak IV estimates on export prices show that most of the export value effect is still due to an increase in export quantities. However, column 6 shows that about a third of the export value effect is due to a higher export prices significant at the 5 percent level, but the effect becomes insignificant when we focus identification on variation within destinations and industries in column 7. In this case, promotion effects are identified from comparing products that are treated with export promotion, to similar products within the same industry sold in the same destination in the untreated control group. compared to column 6, the effect of promotion on prices drops by half and the standard error increases resulting in insignificant estimates. This difference in estimates may be due to two reasons. First, the more rigorous fixed effects account for important unobserved heterogeneity. Second, the significant change in sample size. To examine what is driving the effect we estimated the specifications in columns 5 and 6 on the sample of column 7. We observe that specifications 5 and 6 produce similar estimates as specification 7 over that same sample. Therefore, we conclude that the change in estimates is due to sampling and we will focus on specifications 5 and 6 to maximize our variation and sample size.

Consequently, we conclude that for the most part the positive effect on export values is consistent with a export promotion driven shift in demand, and, if anything, export promotion leads to higher prices. This addresses the potential policy concern that perhaps export promotion is a government financed strategy to increase firm's competitiveness on foreign markets by lowering export prices. We will examine marginal costs, markups and quality estimates to further examine the mechanisms behind these export promotion effects. Before doing so, we will further examine the validity of our estimates regarding identification and

interpretation of the estimates.

4.2 Parallel Trends

We now examine if firms that were approached by the trade council or purchased promotion services already had superior export performance before treatment, or, even before they were approached by the trade council. To examine these temporal effects of trade promotion, we augment models (5) and (6) of Table 4 with the lag and lead of the promotion indicator. The coefficient on the lag identifies if treatment in $t-1$ has a significant effect on exports in t. The coefficient on the lead, $t+1$, identifies if exports in period t that are treated with promotion in $t+1$ already outperform exports that are not treated with export promotion. To examine pre-trends in the trade council's approaching of firms with export promotion services we repeat the same estimation, but replace the treatment indicator with our instrument. Finally, to examine validity of our instrumental variable approach, we repeat the estimation, but replace the treatment indicator with predicted treatment from the first stage in the instrumental variable regression. In the absence of pre-trends, we expect the coefficients on the lead variables to not significantly effect export values in period t. Table 5 reports the results.

The top panel of columns 1 and 2 of Table 5 reports the effects of actual treatment with export promotion in periods, $t-1$, t and $t+1$ on log export values in period t. Trade flows treated in period t+1 do not show systematically different export performance in period t before they receive promotion.[5] Therefore, we rule out that treated firms were already outperforming non-treated firms before receiving promotion services. Furthermore, export promotion in period t increases export performance in period t. However, this effect is temporary, as export performance in t of trade flows that were treated in t-1 are not significantly different from non-treated flows.

The middle panel of columns 1n and 2 of Table 5 reports similar results as the top panel, but where we replace actual treatment with our instrument, an indicator that equals 1 if the firm was approached with an offer of promotion services for a given destination and year. Again, the results show that trade flows in period t that are approached in period $t+1$ do not outperform other trade flows.

[5]Adding further leads thus not change this conclusion, but drops a significant part of the sample as we require that firms are active on the same export market in these consecutive time periods.

We also note that trade flows approached in period t do weakly outperform other flows and trade flows approached in $t-1$ significantly outperform trade flows in period t. This pattern is reasonable. It likely takes some time between being approached with trade promotion services and actual treatment. As a consequence these effects take longer to materialize than actual treatment with promotion. This justifies our application a treatment indicator that spans two time periods in the main regression results.

Finally, we replace the treatment variable and the instrument with the prediction from the first stage of the IV regression. This prediction can be interpreted as the likelihood of receiving treatment, having been approached by the trade council. Similar to the instrument itself, the results do not provide evidence for pre-trends and the effects take some time to kick in.The bottom panel of columns 1 and 2 of Table 5 report these results.

Furthermore, coefficients based on predicted treatment in the bottom panel are higher than actual treatment in the top panel of Table 5. This confirms our intuition from the main estimation results that the instrument solves a negative selection bias. Under performing trade-flows self-select into promotion resulting in a negative bias in OLS estimates. The estimates in the bottom panel are also greater than in the middle panel. The likely reason is that the middle panel essentially reports intent-to-treat estimates. Not all firms that are approached by the trade council actually take up services. If export promotion is performance improving, this creates a negative bias that is resolved in the instrumental variable estimates in the bottom panel.

In summary, the first stage statistics and the results in Table 5 support our identification assumptions. Firms' purchasing of promotion services and the trade councils approach of firms to sell services is independent of pre-existing trends.

In columns 3 and 4 of Table 5 we repeat the same examination of pre-trend for export prices. The top panel shows that treatment in period t+1 is not systematically associated with prices in period t, confirming that there are no systematic differences in prices between treated and untreated firms immediately before treatment. The contemporaneous effect of treatment on prices is also not significant. However, treatment in period t-1 significantly raises prices in period t.

In the middle panel and bottom panel of columns 3 and 4 show a similar pat-

tern for firms that were approached by the trade council and predicted treatment. There is no pre-treatment effect and contemporaneous effect. However, in both cases the lagged effect doubles in magnitude and are just marginally insignificant in the most rigorous specification in column 4.

Overall we conclude that we do not find evidence for pre-trends in export prices and that export prices show lower export promotion effects that are slower to respond to treatment compared to export values.

4.3 Multi-Product Firms

Next we examine potential heterogeneity in export promotion effects across firms' products. We have two objectives. First, most of international trade is driven by multi-product firms and we want to understand how these firms may use export promotion across their product mix. Second, to examine mechanisms in later sections we must assign the observed firm-destination-year specific treatment at the firm-product-year level. For firms that export multiple products to a treated destination, and, firms that export multiple products across destinations this section will facilitate our approach to identify promotion effects on firm-product level mechanisms in later sections.

In Table 6 we define a firm's core-export product as that product that has the greatest total export sales over our sample period. We then augment our baseline specifications with an interaction terms of promotion with an indicator that equals one for a firm's core product. A given firm may export its core product and several non-core products to a treated destinations. On the other hand, a given firm may export it core product to a treated destination and a non-core products to a different treated destination. Therefore, Within treated destinations and across destinations, if the interaction effect is positive, then core products have greater treatment effects relative to non-core products.

Columns 1 and 2 of Table 6 show that in OLS regressions export promotion has a positive and significant direct effect. The interaction terms are small and insignificant. Results in columns 3 and 4 show that as we instrument for both, promotion and the interaction of promotion with the core indicator, the direct effects increase in magnitude. The interaction effects remain insignificant.

Next we split our sample to allow for even more heterogeneity while examining promotion effects on core products. Columns 5 and 6 report OLS and IV results

when we estimate promotion effects over the sample of firms' core products. These total effects for core products are significant and similar in magnitude to the total promotion effects over the whole sample estimated in Table 4.

Nocke and S. R. Yeaple (2014) model firms marginal costs of supplying a product as a function of managerial or organizational capital. There is a trade-off, to expand one product requires reallocation of managerial capital at the loss of greater marginal production costs of other products. Therefore, within destinations, as firms focus on their core products, this could imply that firms drop non-core products to reallocate managerial capital across products to support heir core competencies.

Table 7 reports results where we regress the number of of products a firm exports at the destination-year level on export promotion. According to OLS and IV estimates, we do not find significant effects on the product mix.[6]

We draw several conclusions. First, within and across destinations, evidence shows that export promotion affect core and non-core products in similar ways. This is consistent it the standard modeling assumption that trade costs are similar across these products.

Second, effects of promotion on the product mix are not significant. Therefore, the promotion effects we report are due to export adjustments within the existing firm-destination level product baskets and not driven by attrition of low performing products. In the theory of Nocke and S. R. Yeaple (ibid.), export promotion is therefore consistent with an expansion of managerial export capital as opposed to a reallocation across products.

4.4 Substitution

Now we examine if treated flows affect untreated flows, or the stable unit treatment assumption. Within each product-destination market in any given year we drop the treated flows, but assign an indicator equal to one to the untreated flows if a treated flow exists within the given market. Then we estimate our baseline specification in columns (5) and (6) from Table 4. Table 7 reports the results. Across all specification we do not find evidence that treatment affects untreated flows in a significant way. If anything, treatment raises exports of untreated flows. Therefore we conclude that export promotion leads to net trade creation and does

[6]Conclusions are similar if we use the log number of products as dependent variable.

not crowd out exports of non-treated firms.

4.5 Mechanisms

The results in the previous sections show that export promotion raises export sales and quantities, and has a weak positive effect on prices. Assuming that marginal costs are firm-product specific (De Loecker, Goldberg, et al. 2016), with product-firm-year fixed effects these effects on prices are actually changes in markups. What we do not observe from the export data, however, is how marginal costs are affected by export promotion.

Table 9 examines the effect of export promotion on marginal costs, input expenditure shares, quantity produced, and the materials input cost elasticity. The export promotion indicator is destination specific. Therefore, at the firm level, we consider all products treated that are exported to the destination for which the firm received treatment.

Columns 1 and 2 report estimates of export promotion accounting for firm-product and firm-year, firm-product and product-year fixed effects. The results show that export promotion is associated with an increase in production and expenditure shares. Therefore, export promotion is associated with specialization in treated products consistent with the notion that firms develop competency in treated products. The effects are large. Within firm-product and firm-year firm-product observations, export promotion raises output by up to 21 percent. This is significantly larger than what we see in the export results.

There are several identification issues. At the firm product level the estimates combine the effect of export promotion on expanding existing export markets and entry into new markets. In our export regressions we mostly focus on the intensive margin. Furthermore, exporters are more productive and export status may be correlated with export promotion. As a result, promotion may be correlated with firm product combinations that are large.

To account for this, we augment the specifications in columns 1 and 2 with an export status indicator and a variable that counts the number of destinations to which a firm exports. Holding export status and the number of export destinations fixed, the promotion effects are then more aligned with the intensive margin effects in Table 4. Export promtion increases output of treated products between 3.5 and 5.5 percent. The IV estimates in column 5 shows a relatively large ef-

fect of 0.186, but this effect is also estimated with a relatively large standard error. Expenditure shares on treated products increase along with the increase in production. The production technology remains unaffected, as output elasticities remain unchanged. Combining all components, export promotion does not significantly affect marginal costs of production.

We do not report out the estimates on export status and number of destination markets.[7] However, the coefficients are as expected and significant. Exporters have lower marginal costs, greater expenditure shares and they produce more output. Firms that export a given product to more markets have lower marginal costs, greater expenditure shares and produce greater output of that product. In sum, firms with lower marginal costs are more likely to export and export greater quantities to more markets.

In all, contrary to existing results that examine the effect of input and output tariff liberalizations on firms' production structure, these results show that export promotion does not affect marginal costs of the firm. Treated products experience an increase in output, while markups and marginal costs remain unchanged. Therefore, we conclude that export promotion is best interpreted as a shift in demand along relatively constant marginal cost curves.

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[7] Results are available upon request.

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Table 1: Firm sample

	Manufacturing firms w. employees		Restricting to promoted destinations		Restricting to firm-years in PRODCOM	
year	Export sales	N	Export sales	N	Export sales	N
2002	185	3,378	157	3,183	119	1,204
2003	188	3,381	158	3,182	120	1,214
2004	196	3,274	168	3,100	131	1,398
2005	216	3,221	184	3,030	151	1,386
2006	234	3,300	205	3,097	169	1,407
2007	249	3,288	221	3,063	134	1,135
2008	258	3,267	233	3,085	144	1,174
2009	228	3,188	201	3,007	130	1,177
2010	228	3,245	220	3,064	152	1,202
2011	260	3,223	251	3,071	197	1,364
2012	276	3,299	264	3,116	215	1,334
2013	276	3,385	262	3,188	212	1,381
2014	283	3,418	269	3,205	225	1,403
2015	276	3,420	261	3,231	214	1,402
Total	3,354	46,287	3,053	43,622	2,316	18,181

Unit of observation: firm-year. Export sales are measured in billion DKK. Firm-product-destination-year observations with a value of less than 7,500 DKK are excluded from all samples.

Table 2: Treatment and instrument

	Not promoted		Promoted		Total
	Not approached	Approached	Not approached	Approached	
2002	16,076	15	275	172	16,538
2003	16,373	27	254	214	16,868
2004	19,324	22	306	251	19,903
2005	19,493	30	251	234	20,008
2006	20,440	39	161	187	20,827
2007	17,867	26	125	133	18,151
2008	18,550	23	165	125	18,863
2009	18,545	15	129	175	18,864
2010	19,373	54	106	131	19,664
2011	21,436	39	135	151	21,761
2012	21,647	27	145	161	21,980
2013	22,043	49	106	159	22,357
2014	22,596	83	98	170	22,947
2015	22,738	141	89	155	23,123
Total	276,501	590	2,345	2,418	281,854

Unit of observation: firm-destination-year.

Table 3: Descriptive statistics, means and (standard deviations)

	Not promoted		Promoted		Total
	Not approached	Approached	Not approached	Approached	
Firm-product-destination-year level export data					
Export sales	2.352	3.546	4.016	6.258	2.495
	(24.855)	(41.107)	(26.213)	(71.500)	(27.211)
Export prices	0.000	0.119	-0.077	0.026	0.000
	(1.184)	(1.219)	(1.175)	(1.181)	(1.184)
N	834,055	4,957	19,463	22,480	880,955
Firm-product-year level production data					
Quantities	-0.140	0.359	0.645	0.889	0.000
	(2.213)	(2.087)	(1.910)	(1.889)	(2.196)
Prices	0.000	0.083	-0.013	-0.004	0.000
	(1.221)	(1.365)	(1.119)	(1.048)	(1.202)
Export status	0.617	1.000	1.000	1.000	0.675
	(0.486)	(0.000)	(0.000)	(0.000)	(0.468)
Marginal costs	0.043	-0.076	-0.193	-0.277	-0.000
	(1.964)	(1.992)	(1.634)	(1.598)	(1.920)
Expenditure shares	0.333	0.423	0.337	0.320	0.332
	(0.394)	(0.413)	(0.390)	(0.382)	(0.393)
Output Elasticity	0.527	0.536	0.553	0.572	0.533
	(0.183)	(0.129)	(0.156)	(0.148)	(0.179)
N	41,940	503	2,172	4,842	49,457

In the top panel, the promotion indicator is defined as $TCS_{fpdy} = \max(d_{fd,y}, d_{fd,y-1})$, where $d_{fd,y}$ be a binary indicator that takes value one if firm f purchased promotion services for destination d in year y. In the bottom panel, the promotion indicator is defined as TCS_{fpy} that takes value one if $TCS_{fpdy} = 1$ for any d and zero otherwise. In both panels, the approach indicators are defined accordingly. In accordance with these definitions, data for 2002 is excluded. *Export sales* are in million DKK. *Export prices*, *Quantities*, *Prices*, and *Marginal costs* are in logarithms, then purged for product dummies. *Export status* is a binary indicator. *Marginal costs*, *Expenditure shares*, and *Output elasticities* are estimated. *Expenditure shares* is the share of firm-level input expenditures allocated to the given product. *Output elasticities* are the elasticity of output w.r.t. product-level material inputs.

Table 4: Export Value and Price Effects

Estimator	Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	Export Value	0.0363***	0.0361***	0.0484***	0.0511***	0.0346***	0.0346***	0.0474***
		(0.0119)	(0.0110)	(0.0118)	(0.0126)	(0.0120)	(0.0127)	(0.0181)
	Price	0.00372	0.00389	0.00566	0.00752	0.00102	0.00531	-0.0005
		(0.00727)	(0.00668)	(0.00580)	(0.00565)	(0.00571)	(0.00554)	(0.0093)
IV	Export Value	0.0582***	0.0518***	0.0770***	0.0772***	0.0635***	0.0636***	0.0709**
		(0.0221)	(0.0200)	(0.0215)	(0.0228)	(0.0229)	(0.0241)	(0.0337)
	Price	-0.008	0.00325	0.00681	0.0129	0.00875	0.0198**	0.00978
		(0.0128)	(0.0121)	(0.0106)	(0.0103)	(0.0105)	(0.0101)	(0.0166)
Observations		871,232	870,134	813,127	737,220	721,737	651,065	423,467
Fixed Effects		FD DY P	FY FD DY P	FY FP FD PY DY	FPY FP FD DY	FY FPD PY DY	FPY FPD DY	FPY FPD HS6DY
IV F-Stat		4,014	4,059	3,933	3,917	3,529	3,525	2,532

Unit of observation: firm-product-destination-year. Standard errors clustered at the firm-destination-year level in parentheses.*** p<0.01, ** p<0.05, * p<0.1. Sample includes only firm-years linked to prodcom. Observations of less than DKK7,500 are excluded.

Table 5: Parallel Trends

Treatment	Effect on Export Values in period t		Effect on Export Prices in period t	
Purchased Promotion in:				
t+1	0.0177	0.0100	0.001	0.005
	(0.0160)	(0.0165)	(0.007)	(0.007)
t	0.0312**	0.0345**	-0.001	0.005
	(0.0158)	(0.016)	(0.007)	(0.007)
t-1	0.0234	0.0222	0.0126**	0.0132**
	(0.0144)	(0.0146)	(0.006)	(0.006)
Approached by Trade Council in:				
t+1	0.0183	0.013	0.009	0.006
	(0.023)	(0.023)	(0.009)	(0.008)
t	0.034	0.031	0.008	0.009
	(0.023)	(0.024)	(0.008)	(0.008)
t-1	0.044**	0.050**	0.018**	0.020**
	(0.021)	(0.021)	(0.008)	(0.008)
Predicted Treatment in:				
t+1	0.025	0.018	0.012	0.008
	(0.031)	(0.031)	(0.012)	(0.011)
t	0.046	0.043	0.011	0.012
	(0.032)	(0.032)	(0.011)	(0.011)
t-1	0.061**	0.068***	0.025**	0.028**
	(0.028)	(0.028)	(0.011)	(0.011)
Fixed Effects	FY FPD PY DY	FPY FPD DY	FY FPD PY DY	FPY FPD DY
Observations	379,577	355,216	379,577	355,216

Unit of observation: firm-product-destination-year. Standard errors clustered at the firm-destination-year level in parentheses.*** p<0.01, ** p<0.05, * p<0.1. All coefficients estimated with OLS.

Table 6: Export Promotion Effects on Core and Non-Core Products

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	OLS	OLS	IV	IV	OLS	IV
Sample	All Exports				Exports of Core Products	
Promotion	0.0351**	0.0351**	0.0673**	0.0673**	0.0476**	0.0835**
	(0.0137)	(0.0147)	(0.0264)	(0.0285)	(0.0194)	(0.0329)
Promotion	-0.003	-0.002	-0.018	-0.016		
×Core	(0.0227)	(0.0232)	(0.04)	(0.0413)		
Observations	721,737	651,065	721,737	651,065	162,833	162,833
Fixed	FY FPD	FPY FPD	FY FPD	FPY FPD	FPY FPD	FPY FPD
Effects	PY DY	DY	PY DY	DY	DY	DY
IV			1257.7	1187.6		8,699
F-Stat(VB)						

Standard errors clustered at the firm-destination-year level in parentheses.*** p<0.01, ** p<0.05, * p<0.1

Table 7: Promotion Effects on Product Mix

	(1)	(2)	(3)	(4)
Estimator	OLS	OLS	IV	IV
Promotion	-0.0875	-0.0394	0.104	0.105
	(0.0710)	(0.0707)	(0.131)	(0.130)
Observations	251,552	251,552	251,552	251,552
Fixed	FY FD	FY FD	FY FD	FY FD
Effects		DY		DY
IV			11,741	12,030
F-Stat(VB)				

Standard errors clustered at the firm-destination-year level in parentheses.*** p<0.01, ** p<0.05, * p<0.1
Unit of observation: Firm-destination-year

Table 8: Substitution

	(1)	(2)	(3)	(4)
Estimator	OLS	OLS	IV	IV
Promotion	-0.002	0.00913	0.0124	0.0228*
	(0.00625)	(0.00643)	(0.0125)	(0.0128)
Observations	682,516	614,313	682,516	614,313
Fixed	FY FD	FY FD	FY FD	FY FD
Effects		DY		DY
IV			34,790	29,609
F-Stat(VB)				

Standard errors clustered at the firm-destination-year level in parentheses.*** p<0.01, ** p<0.05, * p<0.1
Unit of observation: Firm-destination-year

Table 9: Mechanisms

Estimator	Dependent Variable	(1)	(2)	(4)	(5)
OLS	Marginal Cost	-0.0229	0.0624	0.00867	0.0872*
		(0.0186)	(0.0450)	(0.0187)	(0.0452)
	Expenditure Share	0.133**	0.283***	0.0727***	0.138***
		(0.0129)	(0.0269)	(0.0126)	(0.0252)
	Quantity	0.156***	0.210***	0.0360**	0.0548 ***
		(0.0177)	(0.0473)	(0.0173)	(0.0466)
	Output Elasticity Materials	0.00198	-0.0005	-0.000562	-0.00347
		(0.00128)	(0.00290)	(0.00129)	(0.00297)
IV	Marginal Cost	-0.077***	-0.0424	-0.0297	-0.0103
		(0.0298)	(0.0773)	(0.0305)	(0.0793)
	Expenditure Share	0.156***	0.414***	0.0546**	0.177***
		(0.0216)	(0.0461)	(0.0217)	(0.0435)
	Quantity	0.243***	0.432***	0.0463*	0.186**
		(0.0280)	(0.0821)	(0.0276)	(0.0813)
	Output Elasticity Materials	0.00216	0.00477	-0.00056 *	-0.00347 *
		(0.00208)	(0.00486)	(0.00129)	(0.00297)
Export Controls		No	No	Yes	Yes
Observations		31,638	12,857	31,638	12,857
Fixed Effects		FP	FY FP PY	FP	FY FP PY
IV F-Stat(VB)		6,503	910	6,155	849

The top and bottom 1 percent of the markup distribution are excluded to avoid outliers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 The export controls include and indicator for export status and the number of destinations to which a firm exports each product.