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All These Worlds are Yours, Except India: The Effectiveness of Cash Subsidies to Export in Nepal

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Abstract
This paper studies the impact of a `textbook' ad-valorem export subsidy on firm-level export performance. The Cash Incentive Scheme for Exports (CISE) program offered by the government of Nepal offers a cash subsidy to firms exporting a select group of products to countries other than India. Using customs transactions data combined with subsidy disbursements at the firm level from 2011 to 2014, we estimate the impact of the subsidy on exports of targeted and non-target product-destination combinations and their extensive and intensive margins. We employ a range of doubly-robust matching estimators to control for the non-random selection of exporters into the scheme. We find that subsidized firms increased their exports of targeted product-destinations relative to firms in the control group and that this rise is fully accounted for by the extensive margin: a higher number of targeted products exported and foreign markets served. We do not find any significant changes along the intensive margin nor among non-targeted product-destination combinations. While our results show that the CISE scheme fomented export diversification, its limited impact on total exports and high fiscal cost call into question its effectiveness.

Key words: export subsidies, export diversification, export margins, least developed countries, special and differential treatment for developing countries, Nepal
JEL Codes: F13; F14; F61; O24

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1 Introduction

While export subsidies are ubiquitous across the world, according to the World Trade Organization, there are fewer empirical studies investigating them than almost any other instrument of commercial policy (WTO, 2006). As a case in point, the chapter by Bown and Crowley (2016) in the Handbook of Commercial Policy edited by Bagwell and Staiger entitled "The Empirical Landscape of Trade Policy" does not consider export subsidies at all (see footnote *e*, page 7) and the chapter on "Subsidies and Countervailing Duties" by Lee (2016) in the same handbook only reviews theoretical research on this topic.

We contribute to bridge this gap in the literature by evaluating how a 'textbook' ad-valorem export subsidy affects firm-level export performance. To the best of our knowledge, we are the first to ever do so.[1] We take advantage of the Cash Incentive Scheme for Exports (CISE)—a program introduced by the government of Nepal in 2012 to increase exports and foster export diversification—to achieve our goal. CISE offers firms ad-valorem cash payments on the basis of their sales of a select group of products exported to countries other than India.

There are two main reasons behind the dearth of empirical work on export subsidies that we overcome effectively in this paper. First, export subsidies take a wide variety of forms, such as concessions and exemptions on a variety of tax levies; access to public utilities at below-market prices and soft loans granted to firms in special economic zones; export credit guarantees; co-financing grants for training, investment in physical capital, R&D, and business development conditioned on export performance, among others.[2] This remarkable degree of heterogeneity combined with the imposition of different eligibility requirements often makes it difficult to systematically identify which firms are subsidized and to what extent.

In contrast, the CISE scheme is a simple, well defined, ad-valorem cash subsidy granted on the basis of exports of a list of products sold anywhere but India. Our data provides information on which firms are subsidized, how much cash they receive and which products they export and

[1] Earlier work on export subsidies relied on country- or industry-level data; see e.g. Balassa (1978) and the papers reviewed in Rodrik (1995). The fact that there are large difference across firms—even within narrowly-defined industries—is well established. As we discuss in more detail below, the variation afforded by the firm-level data allows us to identify the impact of export subsidies in a way that would not be feasible with more aggregate data at the sector or product levels.

[2] Farole and Akinci (2011), Wang (2013), Defever and Riaño (2017), and Defever et al. (2019) study a broad range of incentives—primarily tax exemptions—offered in special economic zones; Felbermayr and Yalcin (2013) investigate export credit guarantees; Görg et al. (2008) and Cadot et al. (2015) study co-financing grants provided to exporters.

where. This is a crucial advantage relative to existing papers in the literature. Defever and Riaño (2017) and Defever et al. (2019) identify firms that are eligible to receive a broad range of subsidies conditioned on their export intensity being above a given threshold or their location in special economic zones, but do not observe which firms enjoy the different incentives available. Kalouptsidi (2018) does not observe which firms are subsidized either, and therefore infers the presence and magnitude of subsidies received by shipbuilders in China by means of a structural model. Some manufacturing surveys provide information on subsidies received by individual firms, but bundle together disbursements from several programs with different objectives and eligibility requirements (Girma et al., 2009; Helmers and Trofimenko, 2013).

The second reason for the paucity of data and empirical work on export subsidies is that they are prohibited by the WTO Agreement on Subsidies and Countervailing Measures (ASCM). This gives governments the incentive to not report export subsidies in order to avoid being challenged by other WTO members and potentially face countervailing duties; see e.g. WTO (2006) and Haley and Haley (2013). Since Nepal is a WTO member and one of 47 countries classified by the United Nations (UN) as a Least Developed Country (LDC), it is not subject to the disciplines of the ASCM due to the principle of Special and Differential Treatment for Developing Countries (SDT).[3] This exemption allows it to offer an export subsidy like the CISE scheme without risking retaliation. There is very limited research on the SDT principle, and most of the empirical work in this area focuses on the role of non-reciprocal preferences granted by developed countries (Ornelas, 2016); instead we examine whether the use of otherwise prohibited export subsidies can help poorer countries to export more. Similarly, we see our paper as complementary to the theoretical work investigating the normative properties of the WTO's subsidy rules (Bagwell and Staiger, 2006; Lee, 2016).

In addition to being the first paper to evaluate the impact of an ad-valorem export subsidy on firm-level export performance, our paper makes two important contributions to the flourishing literature that evaluates the effect of export promotion policies on export outcomes (Álvarez and

[3]See Article 27.2.(a) of the ASCM. The SDT principle also allows LDCs to, among other things, offer subsidies to agricultural products, investment and to encourage diversification away from illegal crops which are exempt from domestic support reduction commitments; have a higher *de minimis* percentage of Aggregate Measurement of Support (AMS); use restrictive import measures for balance-of-payment purposes and have longer transition periods to implement WTO commitments. Additional examples can be found here: https://www.wto.org/english/tratop_e/devel_e/teccop_e/s_and_d_eg_e.htm.

Crespi, 2000; Bernard and Jensen, 2004; Volpe Martincus and Carballo, 2008; Görg et al., 2008; Volpe Martincus and Carballo, 2010a; Cadot et al., 2015; Van Biesebroeck et al., 2015, 2016; Munch and Schaur, 2018). While the existing literature studying the work of export promotion agencies (EPA) has focused exclusively on middle-income and developed countries (see Table 1 of Van Biesebroeck et al., 2016), we conduct the first impact evaluation of export promotion policies in a least developed country. This is an important contribution because due to the limited integration of LDCs in global trade, one of the UN's Sustainable Development Goals is to double LDCs' share of global trade by 2020.

The second contribution pertains to the specific policy instrument we evaluate. The objective of EPAs is to lessen informational frictions that affect international transactions more severely than domestic ones by offering a wide range of services to exporters such as logistic help to meet foreign buyers; provision of market research; information on customs clearance, shipping and insurance; co-financing of export business plans, and many more. These interventions could affect the fixed and variable costs of trade faced by exporters in different ways. The CISE subsidy, on the other hand, simply increases the marginal revenue of firms exporting a well defined set product-destination pairs. This allows us to establish theoretical predictions that we then corroborate in our empirical work.

Nepal has a GDP per capita close to the median among LDCs and shares two key traits that characterize export performance among these countries—a large trade deficit and a highly concentrated export basket (Nicita and Seiermann, 2016; Papageorgiou and Spatafora, 2012). The trade policy instrument we investigate—cash subsidies granted to exports of specific products sold in certain destinations—is also commonly used by developing countries, particularly Nepal's neighbors. Bangladesh, for instance, offers these subsidies (with ad-valorem rates as high as 30%) to a wide range of products such as frozen shrimp, jute and straw products, leather goods and garments among others. India also provides cash incentives ranging from 2 to 5% of exports to more than 100 products under its Merchandise Exports Incentive Scheme with subsidy rates varying according to the country to which the goods are sold to.[4] Both of these features lend credibility to the external validity of our results.

[4]See http://www.bangladeshcustoms.gov.bd/trade_info/export_incentives and http://dgft.gov.in/sites/default/files/pn0617.pdf.

In order to guide our empirical analysis, we make use of the model of multi-product, multi-destination exporters of Bernard et al. (2011). We derive predictions about how an ad-valorem subsidy granted to firms exporting a subset of products to countries other than India (which we refer to as 'the rest of the world' hereafter) affects firms' exports and their extensive (number of product-destinations exported) and intensive (average exports per product-destination) margins. We add a fixed administrative cost that firms incur in order to receive the subsidy to the model in order to accommodate the low participation of eligible firms in the scheme that we observe in the data.

Our theoretical framework delivers the following predictions. Since the marginal cost of production and market access are independent across all product-destination pairs exported by any given firm, it follows that the subsidy only affects exports of eligible products sold in the rest of the world. The existence of an administrative cost, in turn, implies that only firms for which sales of targeted product-destinations are sufficiently important find it profitable to apply to the scheme. Conditional on participating in the program, the model predicts that subsidized firms increase their exports of targeted products sold in the rest of the world because the marginal revenue firms from selling these varieties increases.

Turning to the effect of the subsidy on export margins, the assumption that both productivity and product attributes are drawn from Pareto distributions means that the expansion of exports is fully accounted for by the extensive margin—i.e. by an increase in the number of targeted product-destination pairs that firms export. Firms' average exports per product-destination are unaffected by the subsidy because the higher sales of existing varieties are exactly balanced by the lower sales of less profitable ones that firms only begin to export after they receive the incentive. Since cost linkages across products within the same firm feature prominently in the theoretical literature on multi-product exporters (Eckel and Neary, 2010; Mayer et al., 2014; Nocke and Yeaple, 2014; Arkolakis et al., 2016), we also investigate empirically whether the CISE subsidy affects subsidized firms' exports of non-targeted product-destinations: i.e. sales of any product to India and of products not included in CISE to the rest of the world.

To carry out our empirical analysis we combine customs transaction data for the period 2011-2014 with information on subsidy payments to individual firms. There are 24 industrial and 7 agricultural products included in the CISE scheme which are of crucial importance for Nepal's

exports. In 2011, the year before the subsidy was introduced, the products included in the scheme accounted for 41% of aggregate exports, two-thirds of which was sold outside India; in the same year, 70% of all Nepalese exporters carried out at least one export transaction eligible to receive the subsidy.

The main obstacle we face to estimate the causal impact of the CISE subsidy on export performance is the non-random selection of firms into the treatment. We tackle this problem by combining the doubly-robust matching estimator proposed by Wooldridge (2007) with a linear panel model with firm and year fixed effects. The identification assumption underlying our matching estimators is that observable pre-treatment characteristics control for firms' decision to participate in the subsidy program while firm and year fixed effects control for time-invariant factors and aggregate shocks affecting export performance respectively. Evidence from field interviews with exporters conducted by Pazzini et al. (2016) reveal that the low participation of eligible firms in the scheme is mainly due to lack of awareness about the program among exporters, red tape and coordination problems among the different government bodies involved in the administration of the program.

Our theoretical framework, in turn, predicts that exporters who stand to gain the most to overcome the administrative barriers—i.e. larger firms for which sales of targeted product-destinations account for a higher share of their sales—are more likely to receive the subsidy. This is exactly what we find when we estimate the propensity score. Crucially, the high uncertainty involved in the allocation of the subsidy ensures that even after controlling for the observable characteristics driving firms' participation, there are still several eligible exporters that did not receive the subsidy but which are otherwise very similar to treated firms in terms of their pre-treatment characteristics—to proxy for the latter's counterfactual outcomes.

Our results lend support to the predictions derived from our theoretical framework and show that the CISE scheme has been most effective in encouraging firms' export diversification—particularly along the geographic dimension. More specifically, we find that, relative to the control group, firms that received the subsidy increase the number of destinations (other than India) they sell to by 10-12%, and the number of products included in the CISE scheme they export by 6-7%. The impact on the extensive margin of exports we estimate is very similar to what the literature evaluating the effect of support services provided by export promotion agencies finds in developing countries (Álvarez and Crespi, 2000; Volpe Martincus and Carballo, 2008, 2010a; Cadot et al., 2015). Consis-

tent with our theory, we do not find any significant impact of the subsidy on the intensive margin of exports—i.e. on average exports per product, destination and product-destination. Furthermore, and consistent with the assumption that the cost of production and market access are independent across the product-destination pairs exported by a given firm, we do not find any evidence of the subsidy affecting firms' exports to India (regardless of whether the products are included in the CISE scheme or not) nor on sales of non-eligible products sold in the rest of the world.

We find a positive, yet not precisely estimated, impact of the subsidy on total export sales of treated firms. Digging deeper into this reveals two key features that have weaken the impact of the scheme: firms' low participation rates and its broad scope in terms of the products being incentivized. While the CISE scheme could potentially be available to three out of four Nepalese exporters, only few of them obtained it and even fewer receive it more than once. Our results show, however, that the subsidy only produces significantly positive effects on export sales when firms receive the incentive repeatedly. The second problem is that the broad product coverage of the scheme tends to attenuate its impact. For instance, we find that the positive results we estimate are mainly driven by the exporters of textiles and clothing, while among we do not find significant results for firms exporting other products included in the scheme.

While the scheme has succeeded in redirecting Nepalese exports towards the rest of the world, the lack of a significant effect on firms' total exports suggests the CISE scheme has not been effective in achieving its objectives. This is all the more salient when we consider that the annual expenditure on the scheme exceeds the entire budget of EPA in countries that are substantially richer than Nepal (see Section 5 for more detail) and the tight constraints that Nepal faces on its public finances after the disastrous earthquake that hit it in 2015, generating economic losses in the order of 10 billion US dollars.[5]

The rest of the paper is organized as follows: Section 2 describes the CISE export subsidy, its eligibility requirements and institutional characteristics. Section 3 introduces our data and provides summary statistics on export patterns in Nepal and the usage of the CISE export subsidy. Section 4 establishes a set of predictions about the effects of the CISE subsidy on firms' exports and their extensive and intensive margins grounded on a workhorse model of trade with multi-product and multi-destination exporters; Section 4 also lays out our empirical strategy to estimate the causal

[5]This is also the reason why we only have data until 2014 to conduct our empirical analysis.

effect of the CISE subsidy on firm-level export performance. Section 5 presents our results and Section 6 concludes.

2 The Cash Incentive Scheme for Exports

The Cash Incentive Scheme for Exports (CISE) is an ad-valorem cash subsidy offered to firms by the government of Nepal with the objective of increasing exports and fostering export diversification. It is hard to find a country for which both of these goals are more pressing than Nepal (WTO, 2012). Fuelled by large inflows of remittances from abroad, Nepal's chronically high trade deficit has continued to worsen since 2000, reaching 24% of GDP in 2011.[6] In the same year, only 5 HS 6-digit products accounted for one-third of its exports and 85% of its exports were sold to 5 countries, 80% of which were destined to India alone.

The subsidy is provided to firms on the basis of their exports of 24 industrial and 7 agricultural products sold in countries other than India.[7] Subsidy payments are disbursed by the Nepalese Central Bank (*Nepal Rastra Bank*) on a 'first come, first served' basis upon receiving evidence that payment for an export transaction in foreign exchange has been deposited in a Nepalese bank. The initial budget allotted to the scheme in 2012 was 240 million Nepalese rupees (approximately 3.2 million US dollars), and was further increased to 300 million rupees in 2013. Across the three years for which we have data (2012-2014), yearly disbursements have always been lower than the scheme's annual budget. This suggests that the low participation rate of firms in the scheme, which we document in more detail in the next section, is not due to larger exporters claiming the subsidy earlier in the year and crowding out smaller exporters once the scheme's funding has ran out.[8] The subsidy is available both to direct exporters and "Export Trading Houses" (i.e. wholesalers), which are required to transfer 50% of the cash payment to the producer of the good in question.[9]

The list of products included in CISE and their respective subsidy rates is presented in Table 1. The products included in the scheme were selected on the basis of the recommendations made

[6] This is a very high trade deficit, even among least developed countries. In 2011, only 9 out of 48 LDCs had a trade deficit higher than Nepal.

[7] What the Nepalese Customs Act Rules and Regulations refers to as "third countries".

[8] We do not find systematic differences in the seasonal export patterns of the products included in the CISE scheme that would suggest that, everything else equal, exporters of certain products would be more likely to receive the subsidy because they are more likely to apply for it earlier in the year before funding runs out.

[9] Our data, however, does not allow to distinguish direct exporters and wholesalers.

in the 2010 Nepal Trade Integration Strategy. The report, produced by the Ministry of Commerce and Supply in consultation with Nepalese business leaders, used three key criteria to identify products for which the government should prioritize export support: (i) current and potential export performance; (ii) high domestic value added and (iii) socioeconomic impact.[10]

Table 1: Products Included in the Cash Incentive Scheme of Exports and Subsidy Rates

Industrial Products		Agricultural Products
2% subsidy rate	1% subsidy rate	1% subsidy rate
Processed coffee	Ready-to-eat chow chow	Seeds
Semi-processed hides & skins	Bran	Cut flowers
Handicraft & wooden craft	Wheat flour	Fruits
Crust skin	Polyester or viscous yarn	Vegetables
Handmade paper & rel. products	Ready-made garments	Ginger
Processed honey	Polyester textile yarn	Cardamom
Tea	Vegetable fat/oil	Herbs
Carpet & woolen products	Transfer	
Pashmina & silk products	Ball pens	
Processed herbs & essential oils	Lentils	
	Precious & semi-precious jewelry	
	Gold & silver ornaments	
	Turmeric	
	Dried ginger	

Source: CISE 2070, Government of Nepal Ministry of Commerce and Ojha (2015).

There are two reasons that justify the exclusion of exports to India from the CISE scheme. The first is that one of program's goals is to promote the diversification of Nepalese exports—particularly away from India. The second is the free movement of people and goods between India and Nepal, which has been in place since 1950 following the signature of the India-Nepal Treaty of Peace and Friendship (Sharma, 2015). The Ministry of Finance's concern was that extending the subsidy to exports to India would encourage firms to ship their products there, claim the subsidy and then bring the goods back to be sold in Nepal—thereby subsidizing domestic sales instead of actual exports.[11]

[10]The first criteria was assessed by means of products' export values and growth rates in 2008, the size of import markets and import tariffs faced by Nepalese exporters. The third considers a sector's total employment, female participation and overall importance in poorer regions.

[11]To further ensure that no subsidies are granted to exports to India, the CISE regulations stipulate that export transactions have to be denominated in convertible currencies. Doing so effectively excludes sales invoiced in Indian

The CISE subsidy was first introduced by the Ministry of Finance in the Public Statement on Income and Expenditure for the 2010-11 fiscal year in November 2010, but the scheme only began to operate in 2012 due to delays in the preparation of guidelines and regulations (Sapkota, 2011). In its inception, the CISE scheme required export shipments to incorporate at least 30% of domestic value-added and subsidy rates were increasing in the share of local content. This aspect of the program was quickly reformed in 2013 following complaints from exporters about the administrative burden involved in the calculation of domestic value-added.[12] Exporters, for instance, were required to fill new value-added assessments for every export transaction for which they claimed the subsidy. This procedure was made even more cumbersome due to the fact that different government agencies involved in the administration of the scheme, such as the Department of Customs and the Ministry of Industry, use different methodologies to calculate domestic value added (Sapkota, 2011).

Field interviews with Nepalese exporters conducted by Pazzini et al. (2016) reveal that the main barriers that exporters face to take advantage of the incentive are a widespread lack of awareness about the scheme as well as lengthy and complex administrative procedures involved in claiming the subsidy. One of the interviewees vividly likened the process involved in obtaining the subsidy to "being invited for dinner and then asked to climb through the roof after knocking on the door." Interviewees, however, do not mention political connections nor the need to pay bribes to government officials as being significant factors precluding their participation in the scheme. It follows that only eligible exporters for which subsidy payments are sufficiently large would find it profitable to face the red-tape associated with receiving the incentive. Even then, many eligible firms did not received subsidies either because they did not apply for them or because their application was not approved by the government authorities in charge of the scheme.

rupees, which are deemed to be non-convertible by the Nepalese Central Bank.

[12] It is important to note that the products selected for the scheme in 2013 are characterized by a high share of domestic value added. All beneficiaries of the subsidy in 2012 exported products included in the list in Table 1. While the Ministry of Industry reviews the list of products to be included in the scheme and their subsidy rates every year, no changes have been made to the program since 2013.

3 Data and Summary Statistics

We utilize transaction-level customs data provided by the Nepalese Department of Customs to conduct our analysis. The data contain the universe of international trade transactions (exports and imports) by product at the HS 6-digit level and by country of origin/destination between 2011 and 2014. Throughout this period there are 1,698 firms reporting at least one positive export transaction in at least one of 1,762 HS 6-digit products sold to 177 countries.

Table 2: Export Patterns in Nepal, 2011-2014

Year	# Firms	Median exports per exporter	Mean exports per exporter	Mean # HS-6 per exporter	Mean # destinations per exporter
2011	1,310	80.08	644.97	5.27	4.02
2012	1,313	94.60	686.76	5.20	3.82
2013	1,346	80.79	635.09	5.28	3.62
2014	1,375	98.49	684.70	5.44	3.73

Export values are denominated in thousand US dollars.

Table 2 provides a first pass at the export patterns in our data across different margins. The number of active exporters remains stable throughout our period study, with around 1,300 to 1,400 firms exporting each year. On average, Nepalese firms export 5 HS 6-digit products to 4 foreign markets. The average value of exports per exporter and the substantial degree of right skewness reflected in the large difference between mean and median exports per firm are very much in line with the figures for other Least Developed Countries reported by Fernandes et al. (2016).[13] The only noticeable difference is that Nepal has about twice as many exporters as other LDC countries for which data are available, with the sole exception of Bangladesh.

[13]The Least Developed Countries included in the World Bank's Export Dynamics Database are Bangladesh, Burkina Faso, Cambodia, Lao PDR, Malawi, Mali, Niger, Senegal, Uganda and Yemen.

Table 3: Composition of Export Value by Product Type and Destination in 2011 (%)

Destination / Product	Included in CISE	Not included in CISE	Total
India	15.4	51.3	66.7
Rest of the World	25.6	7.7	33.3
Total	41.0	59.0	100

Table 3 decomposes Nepal's exports in 2011—the year before the CISE export subsidy started to operate—according to the scheme's product and destination eligibility requirements. Two key insights emerge from Table 3. As we have noted before, India accounts for two-thirds of aggregate exports, and most of these are of products that are not included in the CISE scheme. Products listed in CISE are very important in Nepal's export basket and are sold primarily outside India. Thus, there is substantial overlap between the product and destination eligibility criteria of the CISE scheme.

Table 4: Eligibility, Usage, and CISE Subsidy Disbursements

Year	# Exporters	# Eligible exporters	# Exporters receiving subsidy	# First time subsidy recipient	Total subsidy disbursements (mill. US dollars)
2011	1,310	917	-	-	-
2012	1,313	878	28	28	1.570
2013	1,346	912	57	42	1.805
2014	1,375	921	151	103	3.813

Eligible exporters are those that have conducted at least one export transaction of a product listed in CISE to a country other than India in a given year. The CISE subsidy is not in place in 2011.

We next examine the amount of subsidies disbursed throughout our period of analysis using data provided by the Central Bank of Nepal, the entity in charge of paying out the subsidies to firms. These data inform us of the total amount of cash that exporters receive in a given fiscal year, and therefore, do not allow us to identify the individual export transactions for which a firm receives the subsidy. Table 4 shows that approximately two-thirds of Nepalese exporters in 2011 would have been eligible to receive the CISE subsidy—i.e. they carried out at least one export transaction of a product listed in CISE to a country other than India. In 2012, however, only half

of the allotted budget for the subsidy was distributed among 28 firms. While subsidy outlays more than doubled and the number of subsidized exporters increased fivefold between 2012 and 2014, only 16.4% of eligible exporters participated in the scheme. Average subsidy payments per firm in 2014 are 31 thousand US dollars, a substantial amount considering that median exports per firm in the same year are 98 thousand US dollars.

Table 5 examines the importance of listed products, exports to the rest of the world, and the allocation of subsidy monies across Nepal's largest export sectors (in terms of value). Column 1 shows that Nepalese exports are significantly less concentrated across sectors than in terms of destinations served—no single HS 2-digit sector accounts for more than 10% of total exports over the 2012-2014 period. We can also see—consistent with the message provided by Table 3—that the sectors in which products listed in CISE account for the largest share of export value are also the ones in which exports are mostly sold in the rest of the world.

Table 5: Sectoral Export Patterns and Subsidy Disbursements, Top-10 Export Sectors 2012-2014

Sector HS 2-digit	Export value (%)	Exports to the Rest of the World (%)	Exports of CISE products (%)	Eligible firms receiving subsidies (%)	Subsidy outlays (%)
Iron and steel	10.2	0.01	0.0	0.0	0.0
Coffee, tea, mate & spices	8.2	4.2	99.3	0.5	0.3
Carpets & textile floor coverings	8.1	99.2	100.0	12.1	45.3
Man-made staple fibres	7.8	18.0	75.3	75.0	12.2
Man-made filaments	7.2	0.9	6.7	14.3	0.3
Apparel & clothing accessories	6.3	94.0	100.0	0.6	2.2
Preparations of vegetables, fruit, nuts	4.7	0.2	0.0	0.0	0.0
Articles of iron or steel	4.2	6.4	6.7	14.3	0.5
Other made up textile articles	4.1	23.5	0.9	0.0	0.0
Edible vegetables, roots & tubers	3.2	94.4	99.8	29.7	31.4

Figures are averages over the period 2012-2014. Eligible exporters are those that have conducted at least one export transaction of a product listed in CISE to a country other than India in a given year.

The last two columns of Table 5 examine the usage of the CISE subsidy and the allocation of expenditure across sectors. While the overall share of exporters eligible to receive the CISE subsidy receive it, there is substantial heterogeneity across sectors: close to half eligible exporters of carpets and one third of those exporting edible vegetables benefit from CISE, but less than

1% of those eligible exporters in the coffee and tea and apparel sectors receive any monies. This heterogeneity is also reflected in the allocation of subsidy outlays across sectors; disbursements are highly concentrated among exporters of carpets, man-made fibers and edible vegetables, which account for 89% of all monies granted between 2012 and 2014.

4 Empirical Strategy

Our objective is to estimate the causal effect of the CISE export subsidy on export outcomes for the firms that received the subsidy—i.e. the average treatment effect on the treated. To be more precise, we estimate the impact of the subsidy on export sales and across both the extensive (number of products exported, number of foreign destinations served and the number of product-destination combinations exported) and intensive (average exports per product, average exports per country and average exports per product-destination) margins of exports. Based on the theoretical framework described below, we estimate the impact of the subsidy program on the four possible combinations of product-destination firm-level exports defined by the CISE scheme: exports of products listed in CISE sold in the rest of the world—the set of varieties targeted by the scheme—as well as non-listed products sold in the rest of the world and both listed and non-listed products sold in India.

Theoretical Effects

We analyze how the CISE subsidy affects firm-level exports and their extensive and intensive margins through the lens of the model of Bernard et al. (2011). This is a generalization of the Melitz (2003) model that features firms producing multiple products which can be sold in multiple countries. In what follows, we briefly describe the assumptions of the model and establish predictions about the effects of the subsidy; formal proofs are provided in Appendix A.

Firms can sell their products in $C + 1$ foreign markets—India and the 'rest of the world'. The representative consumer in each country has CES preferences defined over a continuum of symmetric products. After paying a sunk entry cost to establish their 'brand', firms can produce one horizontally-differentiated variety of each of the continuum of products. All product varieties are produced with a linear technology that uses labor as the sole input. Firms are heterogeneous

in terms of their productivity, which determines the marginal cost for all varieties produced by a firm, and in terms of how consumers in different countries value these varieties; firms draw both of these random variables from independent Pareto distributions. These two sources of heterogeneity generate variation in firms' sales across products and destinations. In order to sell a product in a foreign market, a firm incurs a fixed cost and a variable iceberg transport cost.

The CISE scheme provides an ad-valorem subsidy granted on the basis of firms' export sales of a given set of products (what we have called listed products in the empirical analysis) to countries other than India. Following the discussion in Section 2, we assume that firms need to incur a fixed administrative cost to participate in the CISE scheme and receive the subsidy when they export eligible products to the rest of the world. This cost allows us to rationalize the low participation of eligible exporters in the scheme—a salient feature of the data documented in Section 3. Having discussed the main assumptions of the model we can now establish the first prediction it delivers:

Prediction 1 *Conditional on participating in the CISE scheme, the subsidy only affects a firm's exports of targeted products to the rest of the world.*

This result follows directly from the assumption of CES preferences and constant marginal costs, which imply that firms maximize the profits they derive from each product-destination variety independently. Thus, a firm would choose to export a product to a given destination if and only if the variable profit it derives from doing so exceeds the fixed cost of market access. The CISE subsidy, therefore, does not affect the decision to export nor the sales of non-targeted product-destination combinations. Following Prediction 1, we now focus our attention on firms' decision to opt into the scheme and, conditionally on participation, on the effect that the subsidy has on exports of listed products to the rest of the world.

The subsidy has the same effect on a targeted export transaction as a reduction in the marginal cost of production or the variable cost of trade. That is, it induces firms to lower the price they charge for these products, thereby increasing the sales (and operational profits) of targeted product-destination combinations. It follows that only firms for which the increase in operational profits brought about by the subsidy is higher than the fixed administrative cost would find it profitable to participate in the CISE scheme. Solving for the level of subsidy that would make a firm indifferent between taking part in CISE or not provides a useful result that we use in our empirical specification

to control for the non-random selection of firms into the program; namely,

Prediction 2 *An exporter is more likely to participate in the CISE scheme the higher its exports of listed products to the rest of the world are before the subsidy is in place.*

In an environment in which the subsidy is not disbursed automatically to all those eligible to receive it, only large firms and those for which exports of listed products or sales to the rest of the world are sufficiently large will incur the necessary costs to join the CISE scheme. It also follows naturally that,

Prediction 3 *Conditional on participating in the CISE scheme, the subsidy increases firms' exports of listed products to the rest of the world.*

The positive impact of the CISE subsidy on the incentivized firms' exports of targeted product-destination pairs can be decomposed along the extensive and intensive margins: i.e. the effect on the number of product-destination pairs that a firm exports and on the average exports per product-country respectively. The subsidy increases the sales and variable profits that a firm obtains from exporting targeted products to the rest of the world. This, in turn, implies that the productivity and product attribute thresholds that characterize the decision to export subsidized product-destination pairs fall.[14] Therefore, we can establish that:

Prediction 4 *Conditional on participating in the CISE scheme, the subsidy has a positive effect on the extensive margin of exports of subsidized product-destination pairs. That is, a subsidized firm increases the number of listed products it sells to the rest of the world.*

The response of the intensive margin involves two effects that operate in opposite directions. On the one hand, the subsidy increases the sales of product-destinations that firms were already exporting, as we established in Prediction 3, and this naturally increases average exports per product-country. On the other hand, once the subsidy is available, firms start to export product-destination combinations that generate lower revenues and this has a negative effect on average

[14] Because of the CES demand function that firms face, both productivity and product attributes that shift consumers' demand enter firms' sales of a given product in a given market in the same way. To establish the results in Appendix A we assume that firms are heterogeneous in terms of the demand they face across products and destinations. These two formulations are equivalent for the purposes of establishing the effect of the CISE subsidy on firm-level exports and their margins.

exports per product-country. As it is well known, these two effects cancel each other out when firms' sales follow a Pareto distribution (Chaney, 2008). This yields our last prediction:

Prediction 5 *Conditional on participating in the CISE scheme, the subsidy does not affect average exports per product-destination—the intensive margin of exports—of listed products sold in the rest of the world.*

As we noted above, the prediction that the CISE subsidy does not affect exports of non-targeted product-destination combinations rests on the assumption that there are no cost linkages—either in terms of production or market access—across a firm's portfolio of export products and the destinations it sells them to. Several models of multi-product firms such as Eckel and Neary (2010), Mayer et al. (2014), Nocke and Yeaple (2014) and Arkolakis et al. (2016) relax this assumption and instead incorporate the notion of core competence—i.e. that firms are most efficient in producing a specific product variety and become less so as they expand the scope of products they produce.

This class of models, therefore, raises the possibility that the CISE subsidy could affect firms' export performance in non-targeted products as well as sales to India. For instance, if the subsidy induces firms to export more products to the rest of the world, this could overstretch the organizational capital that a firm utilizes to manage different product lines, as in the model of Nocke and Yeaple (2014). Higher marginal costs across the whole product range of a firm can therefore have a negative impact on exports of non-targeted product-destinations. Expanding the range of subsidized products that a firm exports can also have a positive effect on non-targeted products if firm-destination-specific market access costs are decreasing in the number of products that a firm sells in a given market, as Arkolakis et al. (2016) find for Brazilian exporters. Since several firms that receive the subsidy export multiple products to multiple markets, we investigate empirically whether there is any evidence of indirect effects of the subsidy on firms' export performance among non-targeted product-destination pairs.

Empirical Implementation

Guided by Prediction 1 from our theoretical framework, we first set out to estimate the effect of the CISE subsidy on firm-level exports of listed products sold to the rest of the world. Letting i index firms, k products, c export destinations and t years, we define firm i's total exports of CISE-listed

products sold to the rest of the world in year t as $R_{it}^{E} = \sum_{c=1}^{C}\sum_{k=1}^{\underline{k}} r_{ikct}$, where $c \in \{1,\ldots,C\}$ denote export destinations other than India (which is indexed by $c = 0$) and $k \in \{1,\ldots,\underline{k}\}$ index products included in CISE. The number of eligible product-destinations exported by firm i in year t is given by $N_{it}^{E,kc} = \sum_{c=1}^{C}\sum_{k=1}^{\underline{k}} \mathbf{1}(r_{ikct} > 0)$, where $\mathbf{1}(\cdot)$ is the indicator function, and average exports per product-destination are given by $\overline{R}_{it}^{E,kc} = R_{it}^{E}/N_{it}^{E,kc}$. With these definitions at hand, we estimate the following outcome regression using firm-year data over the period 2011-2014:

$$\ln y_{it}^{E} = \beta S_{it} + f_i + f_t + \varepsilon_{it}. \tag{1}$$

In the regression above, y_{it}^{E} denotes a given export outcome—total exports, number of products, destinations, product-destinations exported or average exports per product, destination or product-destination—of products included in CISE sold in the rest of the world for firm i in year t.[15] Our variable of interest is S_{it}, an indicator that turns on when firm i receives the subsidy in year t, and f_i and f_t are firm and year fixed effects respectively. Standard errors are clustered at the firm level.

The main challenge we face in estimating the effect of the CISE subsidy on export performance is the so-called fundamental problem of causal inference—we cannot observe what the exports of treated firms would have been had they not received the subsidy—and therefore need to estimate the expectation of this potential outcome. Since the allocation of subsidies is not random, export outcomes of firms that did not receive the subsidy are unlikely to be appropriate proxies for the expected counterfactual performance of treated firms. Therefore, to control for selection into the treatment based on observables we use the doubly-robust matching estimator method proposed by Wooldridge (2007).[16] This method involves estimating regression (1) using different weighting schemes, which we describe in detail below, to construct an appropriate counterfactual for subsidized firms on the basis of their observable characteristics before receiving the treatment—i.e. in 2011, the year before the CISE scheme came into place. This estimator has the advantage that it

[15] The number of products and destinations exported as well as the average exports per product and average exports per destination are defined in an analogous way to the extensive and intensive margins at the product-destination level above. Let $R_{it}^{E,k} = \sum_{c=1}^{C} r_{ikct}$ denote firm i's total exports of product k in year t and $R_{it}^{E,c} = \sum_{k=1}^{\underline{k}} r_{ikct}$, indicate total exports of firm i to country c in year t. Then, the number of eligible products that firm i exports in year t is $N_{it}^{E,k} = \sum_{k=1}^{\underline{k}} \mathbf{1}(R_{it}^{E,k} > 0)$ and the number of rest-of-the-world countries that firm i exports to in year t is $N_{it}^{E,c} = \sum_{c=1}^{C} \mathbf{1}(R_{it}^{E,c} > 0)$. Average exports per product and per country for firm i in year t are $\overline{R}_{it}^{E,k} = R_{it}^{E,k}/N_{it}^{E,k}$ and $\overline{R}_{it}^{E,c} = R_{it}^{E,c}/N_{it}^{E,c}$ respectively.

[16] This estimator has also used by Van Biesebroeck et al. (2015) to evaluate the effect of the Trade Commissioner Service, an export promotion program in Canada.

is consistent as long as either the conditional mean regression (1) or the treatment selection model are correctly specified (Imbens and Wooldridge, 2009). The key identifying assumption is that the pre-treatment observable covariates contain all relevant characteristics determining whether a firm receives the export subsidy or not, while the firm and time fixed effects in the outcome regression control for time-invariant factors and aggregate shocks affecting export performance. This means that we identify the effect of the subsidy by exploiting within-firm variation in export performance of treated firms relative to the firms in the control group determined by our weighting scheme.

We now specify our model for the probability of receiving the export subsidy among firms that carried out at least one export transaction satisfying the scheme's eligibility criteria (i.e. exporting one of the products listed in Table 1 to a country other than India) in 2011. We estimate a probit model in which the dependent variable takes the value 1 if a firm received the export subsidy at any point after 2012 and 0 otherwise. The set of covariates we use, $\mathbf{X}_i$, are informed by Prediction 2: the log value of total exports, the share of exports sold in the rest of the world, and the share of exports accounted for by products listed in CISE; we also include a dummy variable taking the value 1 when the difference between a firm's exports and imports exceeds 30% (a proxy for firms' domestic value addition, one of the eligibility criteria of the CISE scheme in its first year), an indicator for the firm's importer status, the Herfindahl index of exports calculated at the HS 6-digit product level, and sectoral measures of physical and human capital intensity.[17]

We implement three weighting schemes based in our specification of the treatment selection model: (i) inverse probability (IPW), (ii) propensity score matching (PSM) and (iii) Mahalanobis or nearest neighbor matching (NNM). To estimate the average treatment effect on the treated using IPW we assign a weight of 1 to subsidized firms and $\widehat{\rho}(\mathbf{X}_i)/(1-\widehat{\rho}(\mathbf{X}_i))$ to control firms, where $\widehat{\rho}(\mathbf{X}_i)$ denotes the estimated propensity score. PSM matching assigns a weight of 1 to each treated firm and its respective control—i.e. the unsubsidized firm that is closest in terms of its propensity score—and 0 otherwise. NNM works in the same way as PSM, but treated and control firms are matched according to the Mahalanobis distance between covariates instead of the propensity score.[18]

Several papers in the literature evaluating the effects of export promotion agencies, e.g. Volpe Martincus and Carballo (2008) and Görg et al. (2008), use a propensity score matching coupled with

[17] The latter two variables are constructed from U.S. data from Bartelsman and Gray (1996).

[18] Our results are robust to changing the number of control firms used to match each treated firm with the PSM and NNM methods.

difference-in-differences method to estimate the impact of policy interventions. Doing so would involve matching treated and untreated firms using the propensity score and then comparing the difference in export outcomes pre- and post-treatment between the two groups. This estimation strategy is very close to the one we employ. The main difference is that matching difference-in-differences requires us to identify different pre- and post-treatment periods for different firms depending on when they receive the subsidy for the first time. Our panel estimator relies instead on variation over time on export performance when the treatment status of a firm changes. For this reason we prefer to use the weighted panel regression method.

Another alternative could have been to estimate a triple differences model in which we compare within-firm exports of listed and non-listed products between firms that are subsidized and those that are not over time. The identifying assumption in this case is that non-listed products are an appropriate control group for products included in CISE. However, the data strongly suggests the contrary. CISE products integrate a higher share of domestic value-added and are more important among exports to the rest of the world. Additionally, it is also plausible that exports of non-listed products and to foreign destinations not covered by the CISE scheme could be affected by the subsidy through cost linkages within firms, as we discussed in our theoretical framework. Under these circumstances, products not included in CISE and non-targeted destinations should not be used as control groups either. We investigate the presence of such indirect effects of the CISE subsidy in a separate set of regressions instead.

5 Results

In this section we first discuss the estimates of our model predicting the probability that a firm exporting products included in the CISE to the rest of the world before the scheme began to operate received the subsidy after 2012, and evaluate the quality of our matching procedure. We then move to discuss our estimates of the average treatment effect of the subsidy on firm-level export outcomes, both for listed products sold in the rest of the world and the other product-destination combinations that are not directly targeted by the CISE scheme.

Table 6 presents the estimates of the probit model used to calculate the propensity score. Column (1) shows that exporter size (in terms of export sales) is a strong predictor of treat-

ment. Similarly, the coefficients reported in columns (2)-(4)—all of which are positive and strongly significant—indicate that the firms that received subsidies after 2012 were already engaged in the activities that the CISE scheme sought to incentivize in 2011: i.e. exporting a high share of products listed in CISE incorporating a high proportion of local content to countries other than India. These results are consistent with Prediction 2 obtained from our theoretical framework. Column (5) includes all the variables discussed before; interestingly, once that size and the share of exports of listed products to the rest of the world are controlled for, high domestic value added loses its significance in predicting a firm's treatment status. This is likely the case because CISE products sold outside India incorporate a high share of local inputs already, as we noted in Section 2. Column (6) presents the full specification used to estimate the propensity score. In addition to the covariates included in column (5), we add an indicator for a firm's importer status, the product-level Herfindahl index of export sales—which accounts for the possibility that higher sales concentration facilitates firms' coordination to lobby for subsidies (Caves, 1976; Grossman and Helpman, 1994)—and sector-level human and physical capital intensities, which intend to capture the potential for domestic value addition. While the first-stage probit model does a good job in predicting firms receiving the CISE subsidy, there still is substantial variation left unexplained. This allows us to find unsubsidized firms (exporting eligible products to the rest of the world) that closely resemble treated firms in terms of their observable characteristics, and therefore provide a suitable control group to estimate the effects of the subsidy on export outcomes.

Table 6: First Stage Probit for the Probability of Receiving the Export Subsidy

	(1)	(2)	(3)	(4)	(5)	(6)
Log export value	0.365***				0.506***	0.488***
	(0.034)				(0.052)	(0.054)
Shr. exports to ROW		0.542***			1.385***	1.322***
		(0.172)			(0.260)	(0.284)
Shr. exports eligible products			0.828***		1.031***	0.944***
			(0.183)		(0.214)	(0.230)
Domestic VA $\geqslant$ 30% dummy				0.707***	-0.001	-0.003
				(0.112)	(0.138)	(0.146)
Importer dummy						0.526
						(0.593)
Product-level Herfindahl						-0.213
						(0.334)
Physical capital intensity						-0.516
						(0.581)
Human capital intensity						2.555***
						(0.695)
Observations	917	917	917	917	917	912
Pseudo R-squared	0.194	0.012	0.032	0.050	0.309	0.329
χ^2 joint significance test (p-value)	0.000	0.002	0.000	0.000	0.000	0.000

The table reports the coefficients of a probit model estimated among the set of firms that conducted at least one export transaction of a CISE-listed product sold to a country other than India in 2011 (the pre-treatment year). The dependent variable takes the value 1 if a firm received the CISE export subsidy at any point between 2012 and 2014 and 0 otherwise. All covariates, with the exception of physical and human capital intensities, which come from Bartelsman and Gray (1996), are measured for the year 2011. The propensity score used to weight the regressions presented in the main body of the paper corresponds to the specification in column (6). Standard errors in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

The identification of the treatment effect requires that the procedure used to match treated and control firms achieves balancing of the covariates used to predict treatment status. Indicators of the quality of our matching procedure are reported in Appendix B. Table B.1 presents standardized differences and variance ratios for each of the three weighting schemes we utilize. The large pre-treatment differences between subsidized and control firms—particularly in terms of size, the allocation of exports across products and destinations and domestic value-added—are largely eliminated by weighting. The standardized differences of all covariates with one exception fall well below 20%, the informal criterion employed in the literature (Girma and Görg, 2007; Volpe Martincus and Carballo, 2008). Similarly, the variance ratios move closer towards unity after weighting and the overidentification test proposed by Imai and Ratkovic (2014) does not reject the null hypothesis

that covariates are balanced. Table B.2 presents the pseudo R-squared and joint significance tests obtained after running the treatment status probit model using only the treated firms and their respective controls (Caliendo and Kopeinig, 2008). The results of this exercise show that the pseudo R-squared measures are very close to zero and that we do not reject the null hypothesis of the joint significance test, and therefore indicate that once we control for observable covariates, assignment into the treatment is as good as random.

Effect on Exports of CISE-listed Products Sold in the Rest of the World

We now discuss the magnitude of the effect of the export subsidy on export outcomes of product-destination combinations targeted by the CISE scheme. The sample we use in our estimation consists of 912 firms which conducted at least one export transaction involving a CISE-listed product sold in the rest of the world in 2011; out of these, 141 received the subsidy at least once between 2012 and 2014. It is also worth noting that since the distributions of propensity scores of treated and control firms exhibit full overlap, we use all treated firms for our analysis.

Table 7 presents our estimates of the average treatment effect of the export subsidy on treated firms' exports of CISE products sold to the rest of the world. First, note that the OLS estimates understate the impact of the subsidy relative to our matching estimates for the extensive margin and indicate a negative effect of the subsidy both on the intensive margin of exports and on total export sales. As we discussed before, these estimates compare firms that received the subsidy with those that did not, only controlling for time-invariant firm-level characteristics that determine export performance and aggregate shocks; unsubsidized firms, however, are systematically different from firms that actually received the treatment in terms of observable characteristics that determine their likelihood to obtain the subsidy.

Table 7: Average Effect of Export Subsidy—CISE Products sold in the Rest of the World

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.079**	0.086**	0.061**	-0.205**	-0.203**	-0.136	-0.088
	(0.037)	(0.033)	(0.030)	(0.081)	(0.103)	(0.095)	(0.090)
Inverse probability	0.101***	0.108***	0.061**	0.026	-0.051	0.027	0.152*
(IPW)	(0.036)	(0.032)	(0.030)	(0.083)	(0.106)	(0.095)	(0.091)
Propensity score	0.112***	0.119***	0.077**	0.038	-0.040	0.043	0.181*
(PSM)	(0.041)	(0.037)	(0.033)	(0.095)	(0.118)	(0.106)	(0.104)
Mahalanobis matching	0.102***	0.093***	0.058*	-0.036	-0.070	0.001	0.100
(NNM)	(0.038)	(0.035)	(0.033)	(0.086)	(0.112)	(0.101)	(0.095)

Entries in the table are the average effect of the CISE export subsidy on the log export outcome in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Products are defined at the HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

Our matching-based estimates control for selection-into-treatment based on observable characteristics. The use of different weights when we estimate (1) ensures that our results are robust with respect to the choice of counterfactuals. All these estimates paint a similar picture which supports the predictions we derive from our theoretical framework. We find a robust, positive and significant effect of the subsidy on the extensive margin of exports, as Prediction 4 establishes. More precisely, our estimates indicate that receiving the subsidy led firms to increase the number of product (defined at the HS 6-digit level)-destination combinations they export by 11-12% in the year they received the incentive relative to the control group. The two dimensions of the extensive margin—the number of destinations reached and the number of products exported—increase significantly when firms receive the subsidy, but the impact on the former margin is stronger: the number of destinations served by a subsidized firm increases by 10-12%, while the number of eligible products exported rises by 6-7% relative to the control group.

Consistent with Prediction 5, we do not find a statistically significant effect of the subsidy on firms' average exports per product, destination or product-destination—i.e. the intensive margin of exports. While our estimates of the average treatment effect of the subsidy on total export sales are all positive—as Prediction 3 states—they are not very robust. The range of the effect is quite

broad and the estimates are only marginally significant at the 10% level in two out of three of our specifications.[19]

To put our benchmark results in context, we compare our estimates with those from the literature evaluating the impact of export promotion agencies (EPA). Our findings are consistent with the work that focuses on export promotion in developing countries, e.g. Volpe Martincus and Carballo (2008) (Peru), Álvarez and Crespi (2000), Volpe Martincus and Carballo (2010a) (Chile), and Cadot et al. (2015) (Tunisia). These studies have consistently found a positive and significant effect of promotion efforts on the extensive margin of exports (number of products exported and destinations served) in the range of 5 to 16%. Our estimates for the effect of the CISE export subsidy fall right in the middle of this interval. This result is interesting in light of the fact that the specific instruments that EPA rely upon to foster exports vary tremendously in scope (e.g. co-financing of export business plans, logistic help in meeting foreign buyers, advertising and promotion) and are very different from the ad-valorem cash subsidy we study. Our finding of a lack of response of the intensive margin of exports to the CISE subsidy also echoes the overwhelming majority of evidence gathered from the literature evaluating the impact of EPAs in developing countries.[20]

Mechanisms

Our model predicts that conditional on participating in the CISE scheme, the marginal revenue that subsidized firms accrue on listed products sold in the rest of the world increases. Subsidized firms start to export new products, reach new markets or both, when the additional profit from doing so exceeds the fixed cost of exporting. We now move to investigate if there are any systematic patterns in the way in which subsidized firms increase the number of products they export and the markets they sell to.

Let us examine first the product dimension (these results are reported in columns (1)-(3) of Table C.1 in Appendix C.1). Our benchmark specification shows a robust and significant increase in the number of HS 6-digit products sold outside India among treated firms. However, if instead

[19]The results reported in Table 7 remain unchanged when we add a measure of the intensity of treatment (the log of subsidy payments) to regression (1) following Van Biesebroeck et al. (2015). In most specifications the point estimate of the treatment intensity variable is not statistically significant.

[20]Almost all instances in which export promotion instruments have been found to have a significant impact on the intensive margin of exports take place in developed countries like Ireland and Canada (Görg et al., 2008; Van Biesebroeck et al., 2015).

we define products at a more aggregate level (namely, at the HS 2-digit), we do not find any significant effect of the CISE scheme on the product extensive margin. Aggregating our data at the firm-HS 2 digit-year level, we next estimate the outcome regression using the number of HS 6-digit products exported by a firm *within an HS 2-digit sector* as the dependent variable (including HS 2-digit fixed effects in addition to the firm and year fixed effects in our benchmark specification).[21] These results show that most of the increase in the number of products exported by treated firms is accounted for by products that are similar to the ones these firms exported before they received the subsidy. This finding is consistent with the literature on multi-product exporters showing that firms add or drop products close to their core competence in response to changes in accessability to foreign markets.

We follow a similar approach to investigate the impact of the CISE scheme with respect to geographic diversification. We first examine whether subsidized firms increase the number of continents they export. Next, we aggregate the data at the firm-continent-year level and use the number of countries a firm exports to within a given continent as the dependent variable, controlling for firm, continent and year fixed effects. These results are reported in columns (5) and (6) of Table C.1. This exercise reveals that the CISE scheme has been relatively more effective in fostering export diversification along the geographic dimension than by expanding the range of products that subsidized firms export.[22]

The positive effect we find for the subsidy on the extensive margin of exports could arise from either treated firms adding new products and/or destinations to their export portfolios, from a lower exit rate of existing export transactions or a combination of both effects. To investigate which one of these dominates, we examine the impact of the subsidy on within-firm exit rates of products, destinations, product-destination combinations as well as on firms' decision of stopping exporting altogether. These results are reported in columns (1)-(4) of Table C.2 of Appendix C.2. While we find a negative impact of the subsidy on exit rates across the board, these effects are not precisely estimated. This results suggests that the positive impact of the subsidy on the net number of products, destinations and product-destinations exported by treated firms is driven more

[21] Note that we apply the same weighting schemes we used in our benchmark outcome regressions to implement the matching estimators.

[22] In Table C.2 of Appendix C.2 we show that the subsidy has led to an increase in the within-firm dispersion of sales across destinations, which also supports this conclusion.

by higher entry than lower exit in the export transactions of treated firms.

Informational frictions are pervasive in international trade—and are particularly severe for exporters from developing countries (Allen, 2014; Chaney, 2014). Having shown that the CISE scheme encouraged firms to export to new countries, we ask whether this expansion was more likely to occur in places where exporters are more likely to already know foreign buyers. More specifically, we examine whether the subsidy had a stronger impact on firms' export performance in destinations where they imported from in 2011—before receiving the treatment. These results are reported in Table C.3 in Appendix C.3. Our results, however, do not indicate that previous experience importing from a given destination is a key factor mediating the effectiveness of the subsidy; if anything, the extensive margin estimates are more precisely estimated for markets from which treated firms had not imported before receiving the subsidy.

Our benchmark specification identifies the impact of the subsidy by relying on the within-firm time variation in export performance when a firm's treatment status changes. Thus, it does not address the fact that some exporters receive the CISE subsidy each year, others receive it intermittingly, and the vast majority only obtains it once throughout our period of analysis (see column (5) of Table 4). To investigate the potential for heterogeneous effects in terms of the number of times an exporter receives the subsidy, we re-estimate our benchmark model separately for two subsamples of exporters: those that received the subsidy only once and a second group that received the subsidy every year between 2012 and 2014.[23] These results are presented in Appendix C.4 in Table C.4.

Since most firms that receive the CISE subsidy obtain it only once throughout our period of analysis, it is not surprising that the results for this subsample are very similar to our benchmark results reported in Table 7, although the effect of the subsidy on total export sales is now statistically insignificant across all the specifications. When we look at firms who received the subsidy every year between 2012 and 2014, the impact of the subsidy on all dimensions of the extensive margin is approximately three times as large than in our benchmark. Most notably, however, the effect of the subsidy on total export sales also trebles in magnitude and is consistently significant regardless of the weighting scheme.

Our findings suggest that firms that receive the subsidy repeatedly experience a substantial

[23]There are only a handful of of firms that receive the subsidy in two out of the three years in our sample.

improvement in their export performance over and above that of firms which only receive the subsidy once. Volpe Martincus and Carballo (2010b) and Van Biesebroeck et al. (2015) find similar results for Colombian and Canadian exporters utilizing the services of export promotion agencies. It is important, nevertheless, to interpret the results in Table C.4 with caution for two reasons: first, these are based on a small number of treated firms. Second, as pointed out by Van Biesebroeck et al. (2015), instances of multiple treatment cannot be considered as independent events. The decision of firms to continue to apply for the subsidy is strongly driven by their previous experience with the scheme. Given the very short time span of our data and the few instances of multiple treatment it is not possible to apply multiple treatment matching techniques, as for instance Volpe Martincus and Carballo (2010b) do.

Sectoral Heterogeneity

One potential concern is that the CISE scheme groups very different products (rugs, pashminas, foodstuffs, metalwork ornaments and even ballpoint pens), and therefore that our benchmark results might mask substantial heterogeneity in the response of exporters to the subsidy. We carry out two robustness checks to address this issue.

First, we re-estimate the outcome regressions aggregating the data at the firm-HS 2-digit product-year level (instead than at the firm-year level as in the benchmark specification) and include firm, HS 2-digit product and year fixed effects. Besides controlling for more sources of heterogeneity in estimating the impact of the subsidy on export performance, doing this allows us to cluster standard errors at the firm and HS 2-digit level, accommodating the potential correlation in standard errors not only within firms across time, but also across firms within HS 2-digit sectors. The results of this exercise are reported in Table D.1 and are both qualitatively and quantitatively very similar to our benchmark results. Interestingly, the positive effects on firms' total export value become significant at the 5% level in all the different weighting schemes.

While the inclusion of sectoral fixed effects reduces heterogeneity in the outcome regressions, we also re-estimate both the probability of receiving the subsidy and the export performance regressions at the sectoral level. Doing so strengthens our identification strategy by ensuring that treated and control firms belong to the same industry and allows us to investigate whether there is a differential impact of the subsidy depending on the sector in which subsidized firms operate.

In order to operationalize this approach we group exporters in two broad sectors: textiles and clothing (i.e. products belonging to HS 2-digit sectors 50 to 63) and agricultural products (products in HS 2-digit sectors 00 to 24).[24] The inclusion of year fixed effects in the outcome regression allows us to control for the potential confounding effect of changes in the European Union's 'Everything but Arms' (EbA) initiative that took place in 2011 which affected primarily the exports of textiles.[25][26]

The estimates of the subsidy's impact on textiles and clothing and agricultural products are reported in Tables D.2 and D.2 in Appendix D respectively. The findings for textiles and clothing are very similar to the ones we obtain from our benchmark—this is not surprising given that more than half of subsidized firms belong to this sector. On the other hand, we do not find any significant impact of the subsidy on export performance for agricultural products. One possible explanation for the lack of response of agricultural exports to the subsidy is that the CISE scheme is not effective in dealing with the main bottleneck faced by Nepalese agricultural exporters—namely, a high incidence of rejections due to products not meeting international standards and technical requirements (WTO, 2012).

Effect on Exports of Non-Targeted Product-Destinations

Previously we have shown that the lack of a robust positive effect of the subsidy on total export sales can be explained in part, by the high administrative barriers that firms face to obtain the subsidy, the limited magnitude of the incentive and the broad scope of the scheme in terms of the products it covers. An alternative possibility is that a significant number of exporters face capacity constraints that prevent them from expanding their sales in response to the subsidy.

[24] Ideally we would have liked to carry out this analysis at more disaggregated level. The binding constraint is that we only observe a few subsidized firms for most of the products included in CISE. There are only 141 subsidized exporters, which we also observe in 2011 (the pre-treatment period used to carry out the matching) across the 31 products included in CISE. This is further compounded by the fact that subsidized exporters are highly concentrated in a handful of sectors (recall Table 5). Relatedly, note that there are a few products such as jewelry, ornaments and ballpoint pens that do not belong to neither the textiles and clothing nor the agricultural sectors. Unfortunately, there are very few subsidized firms in the residual group of products, which prevent us from estimating the impact of the subsidy for these exporters separately.

[25] The EbA grants duty- and quota-free access for all LDC exports with the exceptions of arms and armaments to the EU. In 2011 the rules of origin made it easier to classify a product as originating from an LDC. For textiles and clothing products the policy change lowered the number of processing steps needed to be carried out in an LDC from two (yarn to fabric to cloth) to just one. On the other hand, it is unlikely that the reform would affect the exports of agricultural products incorporating little or no foreign value added.

[26] Also in 2011, Afghanistan joined the South Asia Free Trade Agreement, of which Nepal is also member. Our results are virtually unchanged if we exclude exports to Afghanistan from our data. We would like to thank an anonymous referee for bringing this policy change to our attention.

In our theoretical framework we have assumed that the cost of production and market access is independent across all product-destination combinations that a firm exports. This, in turn, gives us the prediction that the subsidy should only impact the exports of CISE products sold outside India. If, however, exporters face capacity constraints, or if the marginal cost for different product varieties is affected by the product scope that a firm chooses, then the subsidy could affect the exports of non-targeted product-destinations.

Since most firms in our sample are multi-product exporters operating in several different markets, we explore the possibility that the export subsidy had any within-firm effects on exports of products and destinations not directly targeted by the scheme. To do so, we estimate a regression analogous to (1) where we aggregate firm i's exports of: (i) non-CISE products sold in the rest of the world, (ii) CISE products sold in India and (iii) products not included in CISE sold in India in a given year t. We estimate the effect of the subsidy on total export sales and the extensive and intensive margin in the same way as in our benchmark regressions. Naturally, for firms' exports of both CISE and non-CISE products to India, we only assess whether the subsidy led firms to increase the number of products they export.

Table 8 reports the estimates of the average treatment effect for export outcomes related to sales of non-eligible products in the rest of the world, eligible products shipped to India and non-eligible products sold in India. We do not find any significant effects of the subsidy on the export margins of non-targeted product-destination combinations.

Table 8: Average Effect of Export Subsidy—Non-Targeted Product-Destinations

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS							
Non-eligible in ROW	0.028	0.015	0.068	-0.072	-0.040	-0.098	-0.046
	(0.063)	(0.045)	(0.063)	(0.119)	(0.131)	(0.135)	(0.141)
Eligible in India			0.040	0.049	0.049	-0.061	0.148
			(0.056)	(0.184)	(0.184)	(0.197)	(0.206)
Non-eligible in India			0.021	0.194	0.194	0.079	0.162
			(0.080)	(0.250)	(0.250)	(0.264)	(0.298)
Inverse probability (IPW)							
Non-eligible in ROW	0.089	0.061	0.094	0.125	0.121	0.079	0.223
	(0.066)	(0.044)	(0.066)	(0.119)	(0.132)	(0.134)	(0.140)
Eligible in India			0.041	0.109	0.109	-0.092	0.235
			(0.056)	(0.209)	(0.209)	(0.230)	(0.236)
Non-eligible in India			0.069	0.156	0.156	-0.032	0.189
			(0.083)	(0.277)	(0.277)	(0.265)	(0.322)
Propensity score (PSM)							
Non-eligible in ROW	0.083	0.044	0.091	0.068	0.064	0.033	0.156
	(0.072)	(0.050)	(0.068)	(0.144)	(0.148)	(0.148)	(0.170)
Eligible in India			0.089	0.365	0.365	0.179	0.549*
			(0.064)	(0.270)	(0.270)	(0.282)	(0.306)
Non-eligible in India			0.003	0.186	0.186	0.067	0.134
			(0.085)	(0.308)	(0.308)	(0.320)	(0.339)
Mahalanobis matching (NNM)							
Non-eligible in ROW	0.071	0.058	0.078	0.061	0.045	0.056	0.146
	(0.074)	(0.052)	(0.071)	(0.147)	(0.161)	(0.159)	(0.161)
Eligible in India			0.019	0.213	0.213	0.111	0.278
			(0.058)	(0.230)	(0.230)	(0.230)	(0.252)
Non-eligible in India			0.021	-0.004	-0.004	-0.162	0.003
			(0.079)	(0.353)	(0.353)	(0.339)	(0.398)

Entries in the table are the average effect of the CISE export subsidy on the log export outcome in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Products are defined at the HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

Has CISE Encouraged Export 'Round Tripping'?

In Section 2 we noted that one of the reasons why the CISE scheme excludes exports to India is to curtail the incentive for exporters to engage in 'round-tripping' to receive the subsidy for domestic sales. However, this outcome can still occur if the costs of exporting and re-importing from the rest of the world are lower than the subsidy a firm obtains. A straightforward way to verify that this phenomenon has taken place during our period of analysis is to determine whether imports of CISE products originating from the rest of the world also increased among subsidized firms.

To do so, we estimate the impact of the subsidy on import outcomes, namely, the number of import transactions of CISE products originating from the rest of the world; the number of CISE products imported; the number of countries from which a firm imports; average imports per transaction, product and country of origin and the total value of imports. In the same way to our benchmark specification, we use different weighting schemes to implement a matching strategy based on the probability that a firm receives the CISE subsidy between 2012 and 2014 given its pre-treatment characteristics and include both firm and year fixed effects. These estimates are reported in Table C.5 of Appendix C.5. We do not find any evidence that firms receiving the subsidy have increased their imports of CISE products. Thus, it does not appear that round-tripping intended to take advantage of the subsidy is a major problem in the implementation of the CISE scheme.

6 Conclusion and Policy Implications

In this paper we estimate the impact of Nepal's Cash Incentive Scheme for Exports export subsidy on firm-level export performance. The scheme offers firms an ad-valorem subsidy of 1 or 2% of the value of their exports of a select group of 31 products, as long as these are sold in countries other than India. This is the first paper that evaluates the effect of a 'textbook' ad-valorem cash subsidy to export on firm-level export performance, and is also the first to assess the effect of an export promotion policy in a Least-Developed Country.

We find that the CISE scheme has had a positive impact on the extensive margin of exports of firms receiving the subsidy—particularly encouraging firms to export CISE products to new markets. The impact of the subsidy on the total value of exports, while positive appears less robust. We have explored several potential explanations for this finding in this paper. To begin

with, even three years after its implementation, participation of eligible exporters in the scheme is quite low. Our results show that the subsidy only has a discernable effect on firms' export sales when they receive it for several years. The scheme's scope is also quite broad—for several products included in CISE only very few firms receive the subsidy. We find that spreading the subsidy budget across so many products hinders the scheme's effectiveness. Our results show that the subsidy is primarily effective in improving the performance of textiles and clothing exporters—a relatively more homogeneous group of firms that are more successful in accessing the scheme.

We have also shown that the firms that received the subsidy were predominantly large exporters that were already engaged in the activity the CISE scheme sought to encourage—exporting CISE products to the rest of the world. This outcome might have been facilitated by the allocation of the subsidy on a first-come, first-served basis rather than through a more targeted way. It appears that the CISE scheme in its current version does not provide a strong enough incentive for firms to increase substantially the value of their exports and has instead rewarded firms for doing something that they would have done even if they were not subsidized. Perhaps cash subsidies could be more effective in increasing exports if they were supplemented with other interventions—e.g. providing training to reduce export rejections or improving the connectivity with Indian customs to avoid delays in the their ports—that would help Nepalese exporters to increase the scale of their operations.

A crucial aspect in the evaluation of the CISE scheme is how expensive it is. The program's annual outlay—approximately 3.2 million US dollars in 2014 (see Table 4)—is larger than the entire budget of export promotion agencies in countries such as Bolivia, El Salvador, Guatemala, Honduras, Paraguay, and the Philippines (see Table 2.5 in Volpe Martincus, 2010)—all of which are at least three times as rich as Nepal in terms of their GDP per capita.

Thus, while we find that the CISE scheme has induced treated firms to diversify their exports, the lack of a robust effect on export sales combined with the high fiscal cost of the program raises questions about how effective the scheme has been in achieving its stated objectives.

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Appendix

A Proofs

In this section we present the problem of an individual firm which produces multiple products to be exported to different foreign markets, following closely the model of Bernard et al. (2011). We derive predictions about how a subsidy targeting a subset of products and destinations—like the CISE scheme—affects the firm's exports along the intensive and extensive margins.

There are three differences between our formulation and the original model of Bernard et al. (2011). First, their model features a continuum of products while ours has a discrete number of products. This distinction is immaterial in the context of the problem an individual firm; the continuum of products assumption matters to calculate price indices and other aggregate variables in general equilibrium. Second, the model in Bernard et al. (2011) has two sources of firm heterogeneity: productivity, which is firm specific, and what they call "product attributes" which vary at the product-destination level; our model only features the latter. Since the demand function we assume is isoelastic (as would be the case when consumers have CES preferences), both productivity and product attributes enter the firm's revenue in the same way. Thus, a revenue shifter that varies across products and destinations encompasses both sources of heterogeneity. Third, with the view of being of emulating the practical implementation of the CISE scheme, as described in Section 2, we assume that firms face a fixed administrative cost F^a (denominated in units of labor) in order to obtain the subsidy. This fixed cost corresponds to the cost of filing an application to the CISE scheme.

Consider the problem of a firm based in Nepal, which can export its products to $C+1$ foreign destinations: India ($c=0$) and the rest of the world, $c \in \{1,\ldots,C\}$. In each country, individuals consume K products indexed by $k \in \{1,\ldots,K\}$. Nepalese firms have the option to produce a unique, horizontally-differentiated variety of each product. The demand faced by a firm selling a variety of product k in country c is:

$$q_{kc} = A_c z_{kc} p_{kc}^{-\sigma}, \tag{A.1}$$

where A_c denotes country i's size, z_{kc} is a product-destination-specific revenue shifter, p_{kc} is the price that the firm charges for product k in country c and $\sigma > 1$ is the elasticity of demand. The firm draws the revenue shifter it faces in a given product-country pair from a Pareto distribution with probability density function $g(z) = az^{-(a+1)}$ and cumulative density function $G(z) = 1 - z^{-a}$, with $a > 1$ and $z \geqslant 1$. We assume that the distributions from which the firm draws revenue shifters are independent across products and countries.

The firm produces all varieties using a linear technology that requires one unit of labor to produce one unit of output. Given the isoelastic demand function (A.1), being more productive is equivalent, from the point of view of the firm's revenue, to face a higher demand across all product-destination pairs. The firm incurs two costs if it chooses to export to country c: a fixed cost of $f_c > 0$ units of labor per product (this means that the fixed cost is the same for the products that a firm exports to a given destination c) and an iceberg transportation cost $\tau_c \geqslant 1$. Thus, the marginal cost of producing a product variety to be sold in country c is $w\tau_c$, where w denotes the wage the firm pays its employees.

The CISE scheme offers a (gross) ad-valorem subsidy $S > 1$ to the firm based on its sales of targeted products to the rest of the world. Without loss of generality, we assume that only products $k = 1, 2, \ldots, \underline{k} < K$ receive the subsidy. As we discussed above, a firm that is eligible to participate

in the scheme needs to submit an application, which entails incurring a fixed cost F^a.[27]

The profit maximization of the firm (conditional on having incurred the fixed cost of applying to the scheme) can be written as follows:

$$\max_{\{p_{kc}\}} \quad \Pi = \sum_{k=1}^{K} \left[\left(p_{k0} - w\tau_0\right) A_0 z_{k0} p_{k0}^{-\sigma} - w f_0 \right] + \sum_{c=1}^{C} \left\{ \sum_{k=1}^{\underline{k}} \left[\left(S p_{kc} - w\tau_c\right) A_c z_{kc} p_{kc}^{-\sigma} - w f_c \right] + \sum_{k=\underline{k}+1}^{K} \left[\left(p_{kc} - w\tau_c\right) A_c z_{kc} p_{kc}^{-\sigma} - w f_c \right] \right\}. \quad \text{(A.2)}$$

The first term of (A.2) is the firm's profit from selling in India, while the second and third terms denote profits that the firm accrues respectively from exporting targeted and non-targeted products to the rest of the world.

Since the marginal cost for all product varieties is constant, this implies that there are no complementarities between product varieties. The firm, therefore, chooses the price of each product variety to maximize the profit it obtains from each product-destination pair in isolation.

Optimal prices are given by:

$$p_{kc} = \begin{cases} \frac{\sigma}{\sigma-1} \cdot \frac{\tau_c w}{S} & \text{if} \quad c \in \{1,\ldots,C\} \quad \text{and} \quad k \in \{1,\ldots,\underline{k}\} \\ \\ \frac{\sigma}{\sigma-1} \cdot \tau_c w & \text{if} \quad c = 0 \quad \text{or} \quad k \in \{\underline{k}+1,\ldots,K\}, \end{cases} \quad \text{(A.3)}$$

and sales of product k in country c before the subsidy and conditional on exporting, r_{kc}, are given by:

$$r_{kc} = \begin{cases} S^{\sigma-1} \left(\frac{\sigma-1}{\sigma}\right)^{\sigma-1} A_c z_{kc} \left(\tau_c w\right)^{1-\sigma} & \text{if} \quad c \in \{1,\ldots,C\} \quad \text{and} \quad k \in \{1,\ldots,\underline{k}\} \\ \\ \left(\frac{\sigma-1}{\sigma}\right)^{\sigma-1} A_c z_{kc} \left(\tau_c w\right)^{1-\sigma} & \text{if} \quad c = 0 \quad \text{or} \quad k \in \{\underline{k}+1,\ldots,K\}. \end{cases} \quad \text{(A.4)}$$

The subsidy does not affect the firm's exports to India nor its sales of non-targeted products to the rest of the world. The subsidy does not affect the probability of starting to export new product varieties within the set of products and destinations not directly targeted by the scheme either.[28] This establishes our first prediction:

Prediction 1 *Conditional on participating in the CISE scheme, the subsidy only affects a firm's exports of targeted products to the rest of the world.*

Given Prediction 1, we now focus on the effect of the subsidy on targeted products sold in the rest of the world. From (A.3) and (A.4), it follows that conditional on exporting, the CISE subsidy lowers the price of targeted product varieties and increases their export sales (given that the elasticity of demand is greater than 1).

The firm will produce product variety k to be sold in country c if the profit it obtains from selling it exceeds the fixed cost wf_c. This defines a zero-profit cutoff for the revenue shifter for

[27] The use of a capital F to denote the administrative cost intends to emphasize the fact that once the firm pays this cost it receives the subsidy in all its eligible export transactions.

[28] This result follows directly from the fact that the zero-profit revenue shifter cutoff for non-targeted products and exports to India does not depend on S.

targeted product-destination combinations given by:

$$z_{kc}^{*} = \frac{(\sigma w)^{\sigma}}{(\sigma-1)^{\sigma-1}} \cdot \frac{f_c}{A_c} \cdot \left(\frac{\tau_c}{S}\right)^{\sigma-1}. \tag{A.5}$$

Total exports of eligible product-destination combinations for the firm (conditional on filing for the subsidy), $R^{E,S}$, are given by:

$$R^{E,S} = \sum_{c=1}^{C} \sum_{k=1}^{\underline{k}} \left[\int_{z_{kc}^{*}}^{\infty} r_{kc}(z_{kc}) g(z_{kc}) \mathrm{d}z_{kc} \right]. \tag{A.6}$$

Firm sales for a given product-destination pair can in turn be decomposed as the product of the probability that a firm exports a given product variety, ϕ_{kc}^{S}—the extensive margin—and the average export sales per product-destination pair, $\overline{r}_{kc}^{S}$—the intensive margin:

$$R^{E,S} = \sum_{c=1}^{C} \sum_{k=1}^{\underline{k}} \phi_{kc}^{S} \times \overline{r}_{kc}^{S}. \tag{A.7}$$

The probability that the firm exports targeted product k to country c, ϕ_{kc}, is given by:

$$\phi_{kc}^{S} = 1 - G\left(z_{kc}^{*}\right) = \left(z_{kc}^{*}\right)^{-a} = \frac{(\sigma-1)^{a(\sigma-1)}}{(\sigma w)^{\sigma a}} \cdot \left(\frac{A_c}{f_c}\right)^{a} \cdot \left(\frac{S}{\tau_c}\right)^{a(\sigma-1)}, \tag{A.8}$$

which is increasing in the subsidy S. Average exports per product-destination, $\overline{r}_{kc}$, are given by:

$$\overline{r}_{kc}^{S} = \frac{1}{1 - G(z_{kc}^{*})} \int_{z_{kc}^{*}}^{\infty} r_{kc}(z_{kc}) g(z_{kc}) \mathrm{d}z_{kc} = \frac{a\sigma w}{a-1} \cdot \left(\frac{f_c}{A_c}\right), \tag{A.9}$$

which are independent of the subsidy.

Plugging back (A.8) and (A.9) into (A.7) yields:

$$R^{E,S} = S^{a(\sigma-1)} \cdot \frac{a\underline{k}}{a-1} \cdot \frac{(\sigma-1)^{a(\sigma-1)}}{(\sigma w)^{\sigma a-1}} \cdot \sum_{c=1}^{C} \left[\left(\frac{f_c}{A_c}\right) \tau_c^{\sigma-1} \right]^{1-a}. \tag{A.10}$$

The expected number of targeted product-destination combinations sold by a firm, $\overline{N}_{ck}^{E,S}$, is in turn given by:

$$\overline{N}_{ck}^{E,S} = \frac{1}{\underline{k}C} \sum_{c=1}^{C} \sum_{k=1}^{\underline{k}} \phi_{kc} = \frac{1}{C} \cdot \frac{(\sigma-1)^{a(\sigma-1)}}{(\sigma w)^{\sigma a}} \cdot S^{a(\sigma-1)} \sum_{c=1}^{C} \left(\frac{A_c}{f_c \tau_c^{1-\sigma}}\right)^{a}. \tag{A.11}$$

We now investigate the firm's decision to participate in the CISE scheme or not. From Prediction 1 it follows that a firm would find it profitable to apply to CISE if the increase in operational profits of targeted products sold in the rest of the world brought about by the subsidy exceeds the administrative cost of applying to the scheme, i.e. if

$$\pi^{E,S} - \pi^{E,\neg S} = \frac{SR^{E,S}}{\sigma} - \frac{R^{E,\neg S}}{\sigma} \geqslant wF^{a}, \tag{A.12}$$

where the first term after the equality denotes after-subsidy operational profits from exporting

eligible product-destination combinations, and the second term is the profit that the firm would earn if it did not participate in CISE (the term $R^{E,\neg S}$ is identical to equation (A.10) without the subsidy term in the front).

Using (A.12) we define a cutoff for the gross subsidy, $\underline{S}$, such that a firm would choose to participate in CISE if the gross subsidy it obtains exceeds this lower bound:

$$\underline{S}^{a(\sigma-1)+1} = 1 + \left[\frac{\sigma^{\sigma a}}{(\sigma-1)^{a(\sigma-1)}}\right] \cdot \left[\frac{a-1}{a\underline{k}}\right] \cdot \frac{w^{\sigma a} F^a}{\mathcal{A}^E}, \tag{A.13}$$

where $\mathcal{A}^E \equiv \sum_{c=1}^{C} \left[(f_c/A_c)\tau_c^{\sigma-1}\right]^{1-a}$ is a measure of the effective demand that the firm faces for eligible products in the rest of the world. It follows directly from (A.13) that the subsidy cutoff is lower when $\mathcal{A}^E$ or $\underline{k}$ are higher. That is, a firm is more likely to participate in CISE the higher its before-subsidy sales of eligible product-destination combinations are.

Using Equations (A.13), (A.8), (A.9), (A.10) and (A.11), we establish the following predictions:

Prediction 2 *An exporter is more likely to participate in the CISE scheme the higher its exports of targeted products to the rest of the world are before the subsidy is in place.*

Prediction 3 *Conditional on participating in the CISE scheme, the subsidy increases firms' exports of targeted products to the rest of the world.*

Prediction 4 *Conditional on participating in the CISE scheme, the subsidy has a positive effect on the extensive margin of exports of subsidized product-destination pairs. That is, a subsidized firm increases the number of targeted products it sells in the rest of the world.*

Prediction 5 *Conditional on participating in the CISE scheme, the subsidy does not affect average exports per product-destination—the intensive margin of exports—of targeted products sold in the rest of the world.*

B Matching Diagnostics

Table B.1: Indicators of Matching Quality

Variable	Standardized differences				Variance ratio			
	Raw	Weighted			Raw	Weighted		
		IPW	PSM	NNM		IPW	PSM	NNM
Log export value	1.242	-0.056	-0.009	0.255	0.449	0.852	1.083	1.171
Shr. exports to ROW	0.288	0.070	0.006	-0.010	0.441	0.633	0.721	0.789
Shr. exports eligible products	0.473	0.050	-0.026	-0.010	0.608	1.155	1.242	0.962
Domestic VA $\geqslant$ 30% dummy	0.563	-0.032	0.057	0.000	1.692	0.992	1.021	1.000
Importer dummy	0.133	0.007	0.000	0.000	0.311	0.928	1.000	1.000
Product-level Herfindahl	-0.168	-0.01	0.1621	0.063	0.862	1.011	1.947	1.182
Physical capital intensity	-0.134	0.112	-0.154	0.011	0.425	0.947	0.533	1.001
Human capital intensity	0.565	0.001	0.055	0.009	0.958	1.041	1.576	1.024
Imai-Ratkovic overidentification test p-value (H_0: covariates are balanced): 0.258								

IPW stands for inverse probability weighting, PSM stands for propensity score matching weighting and NNM for Mahalanobis matching weighting.

Table B.2: Joint Significance and Pseudo R-squared of Treatment Status Model

	Raw data	Weighted data		
		IPW	PSM	NNM
Pseudo R-squared	0.329	0.004	0.015	0.017
χ^2 test (p-value)	0.000	0.983	0.745	0.763

The table reports the pseudo R-squared and p-value of the χ^2 joint significance test from running the probit model of the probability of receiving the CISE export subsidy (column (6) of Table 6) and the same statistics when the model is estimated using only the treated and matched control firms. IPW stands for inverse probability weighting, PSM stands for propensity score matching weighting and NNM for Mahalanobis matching weighting.

C Mechanisms

C.1 Effects on Product and Geographic Diversification

Our benchmark specification (estimated at the firm-year level and reproduced in column (1) of Table C.1 for convenience) shows that subsidized firms significantly increase the number of HS 6-digit products they export. Next we aggregate the data at the firm-HS 2-digit product-year level and estimate an outcome regression similar to (1) in which the dependent variable is the number of HS 6-digit products that a firm exports *within a given HS 2-digit sector*. While we still use the same weighting schemes as in our benchmark regressions, we now include firm, year and HS 2-digit fixed effects.

We follow a similar approach to investigate the extent of geographic diversification engendered by the CISE subsidy. Column (4) of Table C.1 reproduces our benchmark results (column (2) of Table 7). Column (5) uses data aggregated at the firm-level and uses the number of continents that a firm exports to—instead of the number of countries as in column (4)—to measure diversification. Column (6) aggregates the data at the firm-continent-year level and uses the *number of countries a firm exports to within a given continent* as the dependent variable. This specification includes firm, year and continent fixed effects.

Table C.1: Extent of Product and Geographic Diversification Effects of the CISE Subsidy

	# of Products			# of Markets		
	HS6	HS2	HS6 within HS2	Countries	Continents	Countries within a continent
	(1)	(2)	(3)	(4)	(5)	(6)
OLS	0.061**	0.025	0.048*	0.086**	0.055**	0.090**
	(0.030)	(0.022)	(0.026)	(0.033)	(0.023)	(0.028)
Inverse probability	0.061**	0.024	0.053**	0.108***	0.065***	0.109**
(IPW)	(0.030)	(0.024)	(0.027)	(0.032)	(0.024)	(0.029)
Propensity score	0.077**	0.033	0.061***	0.119***	0.069***	0.117**
(PSM)	(0.033)	(0.025)	(0.021)	(0.037)	(0.025)	(0.034)
Mahalanobis matching	0.058*	0.013	0.057**	0.093***	0.058**	0.074*
(NNM)	(0.033)	(0.024)	(0.026)	(0.035)	(0.026)	(0.032)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
HS 2-digit FE	N	N	Y	N	N	N
Continent FE	N	N	N	N	N	Y

Entries in the table are the average effect of the CISE export subsidy on the log export outcome in the corresponding column among firms that received the subsidy. Standard errors are clustered at the firm-level in parenthesis, except in column (2) where two-way clustering is used at the firm and HS 2-digit level and in column (5) where two-way clustering is used at the firm and continent level. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

C.2 Impact on Within-Firm Exit Rate and Sales Dispersion

In the first set of regressions reported in Table C.2 we investigate how the subsidy affects exit at the product, destination, product-destination and firm levels. The outcome variable in this analysis is is a dummy that equals one if a firm exported a given product or destination or product-destination in year t but does not export the same in year $t+1$. The outcome variable in the regression in column (4) is firm exit—i.e. the dependent variable equals 1 if the firm exports anything in year t but does not export at all in year $t+1$. The data is aggregated at the firm-year level and the estimating equations are analogous to our benchmark specification: we use different weighting schemes to conduct the matching and both firm and year fixed effects are included.

The dependent variables in the regressions reported in columns (5)-(7) of Table C.2 are respectively the standard deviation of the logarithm of firms' export sales across product-destinations, destinations and products respectively. The estimating equations are analogous to our benchmark specification: we use different weighting schemes to conduct the matching and both firm and year fixed effects are included.

Table C.2: Average Effect of Export Subsidy on CISE Products Sold in the Rest of the World: Impact on Exit and Sales Dispersion

	Within-Firm Exit			Firm Exit	Within-Firm Sales Dispersion		
	prod.-dest.	dest.	prod.		prod.-dest.	dest.	prod.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	-0.022	-0.025	-0.029	-0.076	-0.056	0.082	-0.140
	(0.042)	(0.045)	(0.047)	(0.064)	(0.068)	(0.066)	(0.105)
Inverse probability	-0.024	-0.040	-0.035	-0.055	0.007	0.128*	-0.072
(IPW)	(0.042)	(0.045)	(0.048)	(0.069)	(0.073)	(0.071)	(0.110)
Propensity score	-0.028	-0.039	-0.039	-0.080	0.018	0.167**	-0.075
(PSM)	(0.044)	(0.046)	(0.050)	(0.071)	(0.077)	(0.073)	(0.115)
Mahalanobis matching	-0.037	-0.065	-0.030	-0.057	-0.085	0.040	-0.115
(NNM)	(0.044)	(0.047)	(0.052)	(0.073)	(0.083)	(0.078)	(0.114)

Entries in the table are the average effect of the CISE export subsidy on the log export outcome at the firm level in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Number of products are defined at the number of HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

C.3 Does the Subsidy Encourages More Exports to Countries where Treated Firms Have Imported From Before?

To answer this question, we identify the countries from which the firms in our data import from in 2011. We then run the same weighted outcome regressions as in our benchmark specification for two sub-samples: (i) countries from which firms imported in 2011, and (ii) countries from which they did not. The objective is to investigate whether the CISE subsidy is more effective in improving firms' export performance in markets in which they had an existing import relationship.

Table C.3: Average Effect of Export Subsidy on CISE Products

Panel A: Sold in Countries (Other than India) from Which Firms have Imported From in 2011

	Extensive Margin			Intensive Margin			Total
	Number of import			average import sales per			import
	prod.-origin.	origin.	prod.	prod.-origin.	origin.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.104**	0.083***	0.076	-0.058	-0.185	-0.019	0.085
	(0.050)	(0.032)	(0.048)	(0.139)	(0.162)	(0.170)	(0.145)
Inverse probability	0.125**	0.084**	0.086	0.088	-0.029	0.104	0.253*
(IPW)	(0.055)	(0.033)	(0.054)	(0.142)	(0.164)	(0.173)	(0.149)
Propensity score	0.089	0.063	0.073	0.108	-0.001	0.138	0.216
(PSM)	(0.061)	(0.039)	(0.057)	(0.173)	(0.192)	(0.211)	(0.184)
Mahalanobis matching	0.100	0.056	0.086	0.001	-0.085	0.022	0.130
(NNM)	(0.061)	(0.035)	(0.060)	(0.137)	(0.175)	(0.166)	(0.150)

Panel B: Sold in Countries (Other than India) From Which Firms have Not Imported From in 2011

	Extensive Margin			Intensive Margin			Total
	Number of import			average import sales per			import
	prod.-origin.	origin.	prod.	prod.-origin.	origin.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.062	0.047	0.062**	-0.149*	-0.095	-0.100	-0.057
	(0.039)	(0.035)	(0.028)	(0.090)	(0.111)	(0.097)	(0.097)
Inverse probability	0.077**	0.067*	0.059**	0.027	0.014	0.023	0.122
(IPW)	(0.039)	(0.035)	(0.029)	(0.097)	(0.120)	(0.105)	(0.102)
Propensity score	0.097**	0.088**	0.083***	0.116	0.068	0.092	0.238*
(PSM)	(0.043)	(0.040)	(0.032)	(0.131)	(0.133)	(0.120)	(0.139)
Mahalanobis matching	0.078*	0.057	0.054*	0.004	0.029	0.033	0.107
(NNM)	(0.040)	(0.037)	(0.030)	(0.098)	(0.122)	(0.107)	(0.106)

Entries in the tables are the average effect of the CISE export subsidy on the log export outcome at the firm level in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Number of products are defined at the number of HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

C.4 Number of Times a Firm Receives the Subsidy

In this section we investigate whether the average treatment effect of the CISE scheme varies according to the number of years a firm has received the subsidy over our period of analysis. To do so, we re-estimate our benchmark specification for two sub-samples of exporters: those that receive the subsidy only once and those that receive it for the three years we observe in our data.

Table C.4: Average Effect of the Export Subsidy —CISE Products Sold in the Rest of the World

Panel A: For Firms Receiving the Subsidy in Only One Year

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.104**	0.117***	0.084**	-0.226**	-0.300**	-0.244**	-0.096
	(0.046)	(0.039)	(0.038)	(0.109)	(0.124)	(0.121)	(0.115)
Inverse probability	0.133***	0.145***	0.085**	-0.013	-0.162	-0.094	0.142
(IPW)	(0.044)	(0.038)	(0.040)	(0.110)	(0.126)	(0.121)	(0.118)
Propensity score	0.140***	0.155***	0.090**	-0.008	-0.155	-0.071	0.162
(PSM)	(0.050)	(0.043)	(0.044)	(0.121)	(0.136)	(0.129)	(0.129)
Mahalanobis matching	0.135***	0.126***	0.086**	-0.079	-0.173	-0.120	0.089
(NNM)	(0.046)	(0.040)	(0.043)	(0.117)	(0.134)	(0.128)	(0.125)

Panel B: For Firms Receiving the Subsidy for Three Years

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.270**	0.240**	0.142***	-0.408*	-0.581	-0.189	0.049
	(0.133)	(0.112)	(0.050)	(0.234)	(0.548)	(0.314)	(0.182)
Inverse probability	0.336**	0.287**	0.191***	-0.028	-0.362	0.010	0.499**
(IPW)	(0.135)	(0.114)	(0.054)	(0.248)	(0.553)	(0.321)	(0.201)
Propensity score	0.392***	0.302**	0.228***	0.027	-0.341	0.006	0.634**
(PSM)	(0.143)	(0.121)	(0.064)	(0.292)	(0.582)	(0.365)	(0.251)
Mahalanobis matching	0.360**	0.264**	0.177***	-0.141	-0.434	-0.050	0.435**
(NNM)	(0.145)	(0.123)	(0.064)	(0.250)	(0.567)	(0.332)	(0.205)

Entries in the tables are the average effect of the CISE export subsidy on the log export outcome in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Products are defined at the HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

C.5 Has CISE Encouraged Export Round Tripping?

In this set of regressions we investigate whether subsidized exporters also increase their imports of products included in the CISE scheme. The idea is that if the cost of exporting and re-importing a product to the rest of the world is lower than the additional profit that a firm accrues from the subsidy, the CISE scheme could in fact be subsidizing domestic sales.

Table C.5: Average Effect of Export Subsidy on Imports of CISE products from the Rest of the World

	Extensive Margin			Intensive Margin			Total
	Number of import			average import sales per			import
	prod.-origin.	origin.	prod.	prod.-origin.	origin.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.073	0.026	0.125	0.415	0.280	0.175	0.488
	(0.102)	(0.058)	(0.104)	(0.256)	(0.235)	(0.229)	(0.299)
Inverse probability	0.072	0.071	0.123	0.400	0.308	0.235	0.473
(IPW)	(0.111)	(0.063)	(0.112)	(0.287)	(0.262)	(0.255)	(0.330)
Propensity score	0.065	0.083	0.106	0.262	0.196	0.168	0.329
(PSM)	(0.119)	(0.068)	(0.119)	(0.304)	(0.275)	(0.269)	(0.344)
Mahalanobis matching	0.188	0.083	0.224	0.168	0.074	-0.032	0.361
(NNM)	(0.176)	(0.063)	(0.177)	(0.323)	(0.302)	(0.306)	(0.375)

Entries in the table are the average effect of the CISE export subsidy on the log *import* outcome at the firm level in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Number of products are defined at the number of HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

D Sectoral Heterogeneity

D.1 HS 2-digit Product Fixed-Effects and Two-way Clustering of Standard Errors

We aggregate the data at the firm-HS 2-digit product-year level and estimate our outcome regressions using the same weighting schemes as in our benchmark to implement the matching. We include firm, HS 2-digit and year fixed effects and cluster standard errors at the firm and HS 2-digit product level.

Table D.1: Average Effect of Export Subsidy at the firm-HS 2-digit product level—CISE Products sold in the Rest of the World

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.092***	0.082***	0.048*	-0.130**	-0.107*	0.000	0.143*
	(0.025)	(0.017)	(0.026)	(0.058)	(0.054)	(0.076)	(0.078)
Inverse probability	0.100***	0.093***	0.053**	0.061	-0.041	0.073	0.230***
(IPW)	(0.025)	(0.016)	(0.027)	(0.064)	(0.073)	(0.091)	(0.084)
Propensity score	0.108***	0.093***	0.061***	0.058	-0.005	0.049	0.213***
(PSM)	(0.017)	(0.010)	(0.021)	(0.065)	(0.082)	(0.074)	(0.071)
Mahalanobis matching	0.107***	0.087***	0.057**	-0.053	-0.070	0.025	0.182**
(NNM)	(0.020)	(0.008)	(0.026)	(0.070)	(0.069)	(0.090)	(0.073)
Firm FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
HS 2-digit FE	Y	Y	Y	Y	Y	Y	Y

Entries in the table are the average effect of the CISE export subsidy on the log export outcome at the firm-HS 2-digit product level in the corresponding column among firms that received the subsidy. All regressions include firm, HS-2 digit product and year fixed effects. Number of products exported are defined at the HS 6-digit level. Standard errors clustered at the firm and HS 2-digit product levels in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

D.2 Textiles and Clothing Products and Agricultural Products

We split our data across two very broad sectors: clothing and textiles (HS 2-digit sectors 50 to 63) and agricultural products (HS 2-digit sectors 00 to 24). Agricultural products encompass the goods classified as 'agricultural' in the policy (see column 3 of Table 1) in addition to other products such as coffee, tea, honey, flour, etc. that fall under the 'industrial products' of CISE (columns 1 and 2 of Table 1). For each broad sector we separately estimate a probit model like the one reported in column (6) of Table 6 and outcome regressions using the same weighting schemes as in our benchmark specification. Thus the counterfactuals for subsidized firms are now restricted to belong to the same sector.

Table D.2: Average Effect of the Export Subsidy— CISE Products Sold in the Rest of the World

Panel A: Textiles and Clothing Products

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.081*	0.071**	0.085**	-0.118	-0.143	-0.119	-0.011
	(0.042)	(0.032)	(0.038)	(0.093)	(0.105)	(0.102)	(0.110)
Inverse probability	0.107***	0.073**	0.109***	0.042	-0.020	0.018	0.169
(IPW)	(0.040)	(0.032)	(0.037)	(0.093)	(0.107)	(0.101)	(0.108)
Propensity score	0.110**	0.078**	0.101**	0.032	-0.037	-0.019	0.159
(PSM)	(0.045)	(0.034)	(0.042)	(0.100)	(0.118)	(0.107)	(0.116)
Mahalanobis matching	0.112**	0.080**	0.100**	0.075	0.018	0.034	0.217*
(NNM)	(0.044)	(0.035)	(0.039)	(0.101)	(0.117)	(0.113)	(0.119)

Panel B: Agricultural Products

	Extensive Margin			Intensive Margin			Total
	Number of export			average sales per			export
	prod.-dest.	dest.	prod.	prod.-dest.	dest.	prod.	value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OLS	0.024	-0.003	0.076	-0.362	-0.394	-0.405	-0.194
	(0.062)	(0.050)	(0.055)	(0.227)	(0.240)	(0.301)	(0.254)
Inverse probability	0.071	0.047	0.074	0.107	0.083	0.065	0.308
(IPW)	(0.063)	(0.054)	(0.060)	(0.388)	(0.394)	(0.424)	(0.388)
Propensity score	0.076	0.05	0.043	0.075	0.069	-0.144	0.308
(PSM)	(0.067)	(0.059)	(0.057)	(0.525)	(0.528)	(0.642)	(0.494)
Mahalanobis matching	0.019	-0.013	0.047	0.505	0.488	0.462	0.625
(NNM)	(0.062)	(0.046)	(0.058)	(0.470)	(0.480)	(0.507)	(0.471)

Entries in the tables are the average effect of the CISE export subsidy on the log export outcome in the corresponding column among firms that received the subsidy. All regressions include firm and year fixed effects. Products are defined at the HS 6-digit level. Standard errors clustered at the firm level in parenthesis. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

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