Centre for Economic Performance

Discussion Paper ISSN 2042-2695

No.1783
July 2021

# Firm export responses to tariff hikes

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30 YEARS CEP

UKRI Economic and Social Research Council

**Abstract**
We study how firms react to unexpected increases in import tariffs. We identify our results from a sudden removal of American preferential tariffs applied on Argentine imports under the Generalized System of Preferences, which reflected American retaliation to a dispute over intellectual property between the two countries. Critical for identification, the tariff hike affected a third of Argentine exports enjoying preferential access in the American market, but did nothing to the other two thirds. We find that the higher tariffs reduced export participation of affected Argentine firms in the U.S. market, whereas resilient exporters dealt with the cost increase by reshuffling their export baskets away from the products whose tariffs increased. In fact, affected firms were more likely both to drop suspended products from their export basket and to start exporting new (non-suspended) products to the U.S. Interestingly, the extensive margin effects carry over to third markets, where policy did not change: after the policy shock, affected firms selling to the U.S. were less likely to export to other markets. This happened, however, only for firms that also exited the American market. We develop a framework that rationalizes the observed export interdependencies: while the extensive margin and third-country effects require country and product specific fixed costs, the effect on the sub-extensive and sub-intensive margins require diseconomies of scope, where exporting a product increases the marginal cost of exporting the rest of products in the export mix.

Key words: tariffs, export interdependence, GSP, exporting firms, multi-product firms, third-market effects
JEL codes: F10; F14; F55; F63; O19; O24

This paper was produced as part of the Centre's Trade Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

We thank Ingo Borchert, Lorenzo Caliendo, Giacomo de Giorgi, Amit Khandelwal, David Kohn, Steve Redding, Feodora Teti, seminar participants at CAF, ESSEC, Inter-American Development Bank, PUC-Chile, University of Geneva, University of Georgia, University of Melbourne, Monash University, 2019 LACEA-LAMES Conference, 2019 SBE Conference, 2018 Moscow International Economics Workshop, 2020 Villars Workshop on "Challenges to the Global Trading System," and especially Eduardo Morales and Andrćs Rodriguez-Clare for very helpful comments and suggestions. Diana Beltekian and David Contreras provided out-standing research assistance.

Facundo Albornoz, University of Nottingham, CEPR and CONICET-IIEO. Irene Brambilla, UNLP and CONICET. Emanuel Ornelas, Sao Paulo School of Economics, CEPR, CESifo and Centre for Economic Performance, London School of Economics..

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

# 1 Introduction

How do sudden increases in import tariffs affect firm export behavior? Do firms avoid the market where tariffs increased? Do they change their export basket composition? Does the tariff change in one market influence firm export participation in other markets? Answering those questions is important for understanding the consequences of trade policies, and also to shed light on how multi-product firms operating across different markets respond to an increase in the variable cost of selling some goods in a specific market.

We carry out the analysis in a context that allows us to credibly identify those effects. We find that tariff hikes on specific products reduce firm export participation but have little effect on the aggregate foreign sales of resilient exporters. This happens because of the reshuffling of products within firms. Interestingly, firms affected by the tariff hike, if sufficiently exposed to the affected market, are also likely to exit other markets, even though tariffs did not change there.

Our institutional context is that of the General System of Preferences (GSP). Since the 1970's, all signatories of the General Agreement on Tariffs and Trade (GATT, which in 1995 became the World Trade Organization) have been formally allowed to offer nonreciprocal trade preferences to developing countries. Whilst those preferences represent a blatant exception to GATT's principle of nondiscrimination,[1] they have become pervasive; currently, all developed countries have their own GSP program.

In this paper, we exploit a dispute between the U.S. and Argentina in the mid-1990s over the rules and the enforcement of foreign intellectual property rights in Argentina—in particular, the application of a patent law to pharmaceuticals. The conflict led the U.S. to suspend preferences on around a third of Argentina's exports that benefited from GSP on over 100 different non-pharmaceutical products in 1997. As a result, some Argentinian products previously enjoying duty-free entry in the American market started to face higher export costs associated with the (most-favored-nation) import tariffs. On average, import tariffs on the affected goods increased by almost 4 percentage points for Argentinian exporters. That exogenous increase in tariffs (from the perspective of the Argentinian firms) provides a rare opportunity to identify the causal effect of country-specific tariff hikes on export outcomes at the firm level.

Before getting to the firm-level analysis, we confirm that, at the product-level, the policy shock had a significant impact on trade flows. Specifically, we find that exports of suspended goods from

[1] Specifically, GATT's Article I states that members cannot discriminate across sources of imports. Article XXIV permits discrimination but only under reciprocal liberalization in the context of free trade areas and customs unions.

Argentina to the U.S. fell after the shock both relative to non-suspended goods and in absolute terms. In fact, we estimate a trade elasticity of 10 at the 8-digit level. Interestingly, at higher levels of aggregation the estimated elasticity drops considerably (to 5 and to 1.8 at the 6- and 4-digit levels, respectively), consistent with the tariff change causing substitution across related products.

When we move to the firm-level analysis, comparing the reactions of firms more and less exposed to the suspension, we find that the tariff increases induced some firms to stop exporting to the American market altogether. Among those that continued to serve the U.S., there is no clear evidence that the total volume of their exports fell. This is explained by a rearrangement of products within firms, away from suspended goods and toward non-suspended ones. Importantly, the reshuffling process involved both the "sub-extensive" and the "sub-intensive" margins: the probability of being exported falls for suspended products and increases for those not suspended, and export volumes react in a similar way. Perhaps even more surprising is our finding that the extensive margin results obtained for the American market carry through to third markets, where there was no policy change regarding imports from Argentina.

Our findings show, on the one hand, that tariffs can be a deterrent of firms' foreign market participation. The exit of multi-product exporters that included non-suspended products in their mix suggests fixed cost of exporting at the firm level. The fact that this effect carries over other markets suggests the existence of firm-level *product complementarity across markets*—implying that, if the variable cost of exporting a certain product to a market rises, firms will cut down exports of that product not only to that market but also to markets where export costs did not change. On the other hand, more resilient exporters are able to partially circumvent heterogeneous tariff increases through (potentially inefficient) shift of resources across products. Effectively, this indicates firm-level *product substitutability within a market*—implying that, to increase exports of a product, a firm may need to decrease its foreign sales of other products. Taken together, these results reveal how interdependencies are a prevalent feature of export decisions.

To understand export interdependencies better, we develop a partial-equilibrium framework that features diseconomies of scope and economies of scale at the firm level, where different interdependencies emerge according to their intensity. We show how product complementarity coming from market fixed costs explains the exit of multi-product firms with non-suspended products in their export mix. We also clarify how our findings at the sub-extensive and sub-intensive margins require diseconomies of scope affecting firm-product specific marginal costs of exporting.

When we extend our framework to more markets, we show how developing the logical conse-

quences of increasing returns at the firm-product level implies third-market interdependence, which explains why firms leaving a market because of changes in variable exporting costs there may also exit other markets. In our context, we confirm that this is indeed the case: the extensive margin result in third markets is restricted to firms that exit the U.S., and to firms for which sales of suspended products in the U.S. were relatively important in their overall exports. Overall, these results reveal important evidence about how firms define their global export strategies.

To our knowledge, our findings are new not only in the literature exploring the effects of GSP, but also in the broader literature on the export behavior of multi-product firms. Of course, they are drawn from a specific trade policy change, and one needs to be cautious before generalizing the conclusions to other settings. Nevertheless, it is worth stressing that our environment provides a rather clean opportunity to infer the causal effects of tariff changes on firm behavior. Most existing studies rely either on across-the-board programs of unilateral liberalization or sweeping liberalization in the context of free trade agreements.[2] By design, those tariff changes are endogenous. Moreover, they usually shift the whole spectrum of tariffs. Both features impose a series of identification challenges. In our case, one can reasonably claim that the tariff increase in the American market was exogenous for the affected Argentinian firms. And while the products were surely chosen non-randomly by the U.S. government, we find no evidence that the product selection reflected pre-shock import levels or import growth from Argentina. In fact, while some products were relatively important in the context of Argentina's GSP, others were not—some were not even exported by Argentina to the U.S. right before the shock. The finding that pre-shock Argentinian export levels and growth do not explain the product selection may reflect the fact that American imports from Argentina under GSP are tiny from the U.S.'s perspective.

The policy shock we exploit also shares some interesting resemblances to recent American tariff changes. First, and most obviously, the market affected directly is the same: the U.S. Second, unlikely what is commonly observed in most related studies, tariffs increase rather than decrease. Additionally, the tariff hikes happen on a discriminatory basis, being targeted at specific countries (in our paper, just Argentina; recently, mainly China but also other countries). Fourth, only a set of products are affected; that is, it is not an across-the-board change in tariffs, as it happens when countries sign free trade agreements. Finally, in both cases the policy shock was relatively sudden and unanticipated (or at least not fully anticipated, in the case of Trump's tariffs). On the other hand, the policy shock we study and the recent trade policy changes in the U.S. differ significantly

[2]See, for example, the survey by Goldberg and Pavcnik (2016).

in their magnitudes and their time frame. The former is tiny for the U.S. and its consequences have already been fully developed. By contrast, the latter is sizeable and its consequences are still ongoing. The advantage of observing the whole aftermath of the shock is obvious. There is also a methodological advantage from the "smallness" of the shock; as we argue, it makes the econometric identification of the implications for the affected firms particularly transparent.

### 1.1 Related literature

We contribute to two broad research agendas. One studies interdependencies across markets. Most papers explore demand shocks to investigate firms' choices between serving the domestic market and exporting. Blum, Claro and Horstman (2013) provide initial evidence supporting the existence of substitutability between domestic sales and exports. More recently, Almunia, Antràs, Lopez-Rodriguez and Morales (2021) study the reaction of Spanish firms to the Great Recession and find that, due to increasing marginal costs, firms redirected sales to foreign markets as a reaction to the slump in the domestic market. Medina (2020) finds similar results when examining how Peruvian apparel producers reacted to rising domestic competition from China, exporting more and better products. Those results contrast with the findings of Berman, Berthou and Heriocut (2015); identifying foreign demand shocks at the firm-level, they show that exogenous positive demand shocks in export markets induce French firms to increase their sales in the domestic market too, suggesting complementarity between domestic and foreign sales. Our analysis relates to those papers in that we also explore market interdependencies, but rather than considering the relationship between domestic and foreign sales, we explore how a (policy) shock to one foreign market affects firm sales to other foreign markets.[3] In this sense, our paper also relates to a branch of the literature that studies how export interdependencies emerge from the accumulation of experience in foreign markets—see, for example, Albornoz, Calvo-Pardo, Corcos and Ornelas (2012, 2021), Albornoz, Fanelli and Hallak (2016), Morales, Sheu and Zahler (2019), and Alfaro-Urena, Fanelli, Morales and Vincenzi (2021).[4] We complement this view by showing how an arguably exogenous export shock in a destination affects firms' entry decisions across markets. More generally, an important message from this growing literature is that the consequences of a policy (or demand) shock are best viewed at the *firm*, and not at the firm-market, level. Our results,

[3] Defever and Ornelas (2019) study how the elimination of quotas on some textile and clothing products in the U.S. and the E.U. in 2005 affected Chinese exports of those products to other markets. Despite their completely different context, they also find a positive third-market effect at the extensive margin, but not at the intensive margin.

[4] Alessandria, Arkolakis, and Ruhl (2021) offer an insightful recent survey on firm export dynamics, where they stress that a better understanding of firms' decisions across multiple destinations is needed.

showing that a tariff increase can compel firms to stop exporting to third markets, corroborate that message, providing well-identified evidence consistent with complementarities of export activities across foreign markets.

Interdependencies across products within a firm have been less studied. The reason is that, in much of the literature on multi-product exporters, a change in the trade cost of a product typically affects the sales of that product, but not of others sold by a firm. This follows from the usual modeling of cost functions as a pre-determined collection of varying constant marginal costs, possibly dependent on the destination.[5] When product interdependencies arise, it is usually due to demand-side effects, often triggered by cannibalization effects within the firm, as for example in Eckel and Neary (2010) and Dhingra (2013). While important in some contexts, where firms are large in a market, this is unlikely to play a meaningful role in our context, where Argentinian firms selling to the U.S. are very small and fit best the "atomistic" assumption adopted, for example, by Bernard, Redding and Schott (2011) and Mayer, Melitz and Ottaviano (2014, 2021). In contrast, our results show that increasing the variable cost of exporting a product positively affects the profitability of exporting other products. This suggests the presence of decreasing returns to scope at the firm-market level: fewer exports of a product to a market make it worthwhile to export other products to that market.[6] Overall, our results on the sub-extensive and sub-intensive margins reveal novel and subtle channels through which tariffs can affect firms' product scope within a market, as well as their presence in different markets.[7]

The second broad research agenda to which our paper contributes is on the impacts of trade policy. Within that extensive literature, we contribute primarily to the understanding of the effects of nonreciprocal preferences. The formal goal of GSP is to foster export-led growth in developing economies through preferential access to large, high-income markets. Despite the apparent benefit of such preferences for poorer countries, there are numerous criticisms to the institutional design of

[5] Arkolakis, Ganapati and Muendler (2021) add a market-access cost schedule to that setup, which affects the market-specific profitability of products away from a firm's core. Qiu and Zhou (2013) develop a related analysis.

[6] Diseconomies (or economies) of scope could potentially manifest in different parts of the production/exporting process. Diseconomies of scope at the firm level naturally emerge if products are ranked in terms of marginal production costs. As shown by Arkolakis, Ganapati and Muendler (2021), expanding the export mix by introducing products for which the firm has relatively lower production competence reduces overall efficiency. With a focus on export entry, they introduce economies of scope by assuming that fixed (market access) costs decrease with the the number of exported products. We complement their view by introducing diseconomies of scope that affect variable export costs.

[7] Such interdependencies across markets and products within a firm are highlighted in the broad model developed by Bernard, Jensen, Redding, and Schott (2018). In their setting, "global firms"choose the markets to serve, the products to sell in each of those markets, the markets where to source inputs, and the inputs to source in each of those markets. Indirect cross-cost effects arise through the firms' sourcing strategies, potentially generating economies of scope. Our findings indicate that cross-cost effects can arise even for firms that are small in foreign markets.

the system, which make it difficult to establish how important GSP is as a springboard for growth in developing countries (Bagwell and Staiger, 2014; Ornelas, 2016). The verdict is necessarily empirical. However, most existing empirical studies are at aggregate levels and yield inconclusive results.[8] In fact, as pointed out by Ornelas (2016), there has not been yet any estimate of how nonreciprocal preferences affect firm-level behavior.[9] Furthermore, to infer causality one needs plausibly exogenous variation in GSP status. This is what we offer in this paper. Our results indicate that nonreciprocal preferences can be an effective policy instrument to stimulate entry in high-income markets, in line with the goals of GSP. However, firms also exploit variation in preferential tariff rates to acquire export rents through changes in their export basket composition, possibly mitigating aggregate effects for their economies through that adjustment.

The policy shock we study also shares several features observed in the recent tariff changes in the United States. A first wave of studies has focused on the short-run effects of those tariff increases (and of the subsequent retaliation of its affected trade partners) on prices and the associated welfare consequences (Amiti, Redding and Weinstein, 2019 and 2020; Cavallo, Gopinath, Neiman and Tang, 2021; Fajgelbaum, Goldberg, Kennedy and Khandelwal, 2020; Flaaen, Hortaçu and Tintelnot, 2020). We provide a complementary analysis of how tariff hikes affect exporters, focusing instead on how they adjust to the tariff shock, with emphasis on product substitutability within markets and on third-market effects.[10]

In the next section, we detail the institutional setting of the policy shock and provide evidence that it affected exports at the product level. In section 3, we develop the firm-level empirical analysis toward the United States. We develop a framework to rationalize those results in section 4. In section 5, we explore the consequences of the policy shock for the behavior of affected firms

[8]There are mainly two branches of the literature estimating the trade effects of nonreciprocal preferences. One relies on country-level gravity estimations to evaluate the aggregate effect of the preferences—e.g., Herz and Wagner (2011), Gil-Pareja, Llorca-Vivero and Martínez-Serrano (2014) and Ornelas and Ritel (2020)—with conflicting results due to data and methodological issues, as well as the treatment of heterogeneity. The other estimates the trade effects of specific nonreciprocal agreements at the product level—e.g., Frazer and Van Biesebroeck (2010) study the African Growth and Opportunity Act; Hakobyan (2017, 2020) exploits, respectively, the suspension of country-product pairs from the program when exports to the U.S. increased "too much" and periods in which the American GSP program expired (to be later reinstated); Gnutzmann and Gnutzmann-Mkrtchyan (2017) study the E.U.'s withdrawal of GSP preferences from Belarus in 2007; Garred and Kwon (2017) assess the expansion of unilateral preferences in OECD economies since the late 1990s. Those studies generally find positive, but relatively small, effects of preferences on the exports of beneficiaries.

[9]In independent work in progress, Teti (2020) studies how the Andean Trade Preferences Act—a program that gives better access to the American market for firms from Bolivia, Colombia, Ecuador and Peru—affected firm-level exports to the U.S. and find finds positive effects for Peruvian firms.

[10]Flaaen, Hortaçu and Tintelnot (2020) look at related dimensions, but from a very different angle: the price effects on complementary products within a market, and third-market effects due to changes in production patterns within multinational firms.

toward third countries. We conclude in section 6.

# 2 The policy shock and its product-level impact

## 2.1 The policy shock

The American GSP has been in place since January 1976. It currently offers duty-free access on over 3,500 tariff lines to 121 countries. Although often significant for the exporting countries, the imports entering the U.S. under GSP ($20.9 billion in 2019, https://ustr.gov/sites/default/files/gsp/GSPbynumbers2019data.pdf) correspond to less than one percent of total American imports. The program specifies 15 criteria that a developing country must meet to qualify (e.g. respecting internationally recognized worker rights, providing intellectual property protection or combating child labor). Countries that do not meet those criteria may be taken out, permanently or provisionally, fully or partially, from the recipients' list. The trade policy shock we exploit is one of such partial suspensions.

Specifically, on April 15, 1997, the U.S. government partially withdrew duty-free treatment offered to Argentina under GSP. The decision followed a conflict between the two countries regarding the application of patent laws to pharmaceutical production in Argentina. As a consequence, several products exported from Argentina to the U.S., which had previously benefited from free entry under GSP, lost the preferential treatment and began to incur import tariffs.[11] That unilateral change in trade policy provides a sizeable variation in export variable costs, exogenous from the perspective of the affected Argentinian firms, which saw the duties on some of their products rise from zero to the Most Favored Nation (MFN) tariff in the American market.

Table 1 clarifies the importance of the suspended products for Argentina. It shows exports from Argentina to the U.S. in 1996, the year before the suspension. Out of 1340 8-digit products that were exported, 595 were eligible for the American GSP program, amounting to US$388 million of exports entering the U.S. free of duty. That value corresponds to 17 percent of total Argentinian exports to the U.S. in that year. The average MFN tariff of the eligible products, weighted by import share in 1996, was 3.7 percent. The tariff preference was claimed in 90% of the eligible exports. The vast majority of those exports were in manufacturing (the bottom panel of the table).

In 1997, 123 products were suspended from GSP (120 of them in manufacturing). Of those

[11] See Blanchard and Hakobyan (2015) for a rich account of the potential and the observed discretion exercised by the U.S. government when deciding eligibility of countries, products and country-product pairs. As they stress, the system is far from a 'generalized' system.

products, 91 recorded positive exports in 1996; the remaining suspended products were not exported by Argentina to the U.S. in 1996. In Table A1 (Appendix A.3), we provide the list of suspended products. Importantly, in the list there are no pharmaceutical goods. That was not a choice; pharmaceutical goods were not eligible for GSP in the first place, and therefore could not be suspended. The list has products from related industries, like chemicals, but also many other goods from entirely different industries, like agriculture, apparel and furniture. In terms of export value, products suspended in 1997 account for 5.5% of total exports and for 32.5% of GSP exports from Argentina to the U.S. in 1996. The average MFN tariff of the suspended products was 3.6 percent, very close to the average MFN tariff of all products eligible for preferences. The figures are very similar if we consider only manufacturing products.

Importantly, the policy shock was largely unanticipated by the Argentinian firms. To recover the timeline of the patent dispute and its escalation to the partial GSP suspension, we have searched, using a variety of key terms, through the main daily newspaper in Argentina, *La Nacion*. The controversy started in December 1995, but at that moment it was restricted to the suitability of Argentina's new patent law, which was challenged by U.S. authorities—apparently under the pressure of American pharmaceutical multinationals. The U.S. government raised the possibility of taking the case to the World Trade Organization but never did (according to some Argentinian authorities, because the U.S. anticipated losing it). Without the backing of a favorable WTO resolution, the options for trade sanctions were limited. The possibility of suspending Argentina from GSP was then publicly raised on January 1997. At first, the U.S. indicated a suspension of 50% of the products, but ended up including fewer products than that. On the other hand, there was no presumption that the suspension would be revoked any time soon. In fact, the suspended products were never granted preferential treatment in the American market again. In Appendix A.1, we provide a more detailed account of the events leading to the policy shock.

### 2.2 Selection of products

The rationale for the choice of products was not made public and remains unclear. First, we note that, while exports under GSP were significant for Argentina (17% of their total exports to the U.S.), from the American perspective they were very small, corresponding to 0.05 percent of its total imports in 1996. If we consider only the products suspended, their share in American total imports in 1996 was less than 0.02 percent. Since those shares are tiny, it is plausible that the choice of products to suspend by the American government was not directly linked to their importance in

the American market.

To verify whether that was indeed the case, we use USITC data to 'predict' which products were suspended based on pre-1997 import levels and import growth. We also include the level of the MFN tariff in our estimation, since it is a variable that the American policymakers may plausibly consider when deciding which products should have their tariff reversed to the MFN rates. The equation we estimate is

$$SUSP_i = \beta_1 M96_i + \beta_2 \Delta M(96/93)_i + \beta_3 MFN_i + \varepsilon_i, \quad (1)$$

where $SUSP_i$ is an indicator variable that takes the value of one if product $i$ was suspended and zero otherwise; $M96_i$ denotes American imports of good $i$ in 1996, $\Delta M(96/93)_i$ represents the growth of imports of good $i$ between 1993 and 1996, defined as the log difference between the sum of imports in 1995 and 1996 and the sum of imports in 1993 and 1994[12]; and $MFN_i$ indicates good $i$'s MFN tariff rate. The sample is composed of all products exported by Argentina under GSP in 1996. We estimate equation (1) as a linear probability model.

Table 2 shows the results. Since in principle the decision to include a product can be based on overall imports or on imports from Argentina alone, columns 1-3 consider only imports from Argentina, whereas columns 4-5 include imports from the rest of the world (ROW). Column 1 reports the estimation on the import level and MFN tariff only; column 2 replicates that estimation, but in a restricted sample of product observations for which growth can be computed. Column 3 adds import growth; column 4 includes import level and growth from the rest of the world. Finally, column 5 adds industry-fixed effects at the 4-digit level. The results do not indicate that previous trends or levels in imports from Argentina or from ROW, or the MFN tariff level, were key factors in the decision to suspend a product. Hence, the rationale for the selection of products seems to have been based on factors unrelated to the economic variables on which we focus in our analysis.

### 2.3 The product-level impact

Before getting to the firm-level analysis, we investigate the impact of the policy shock on product-level exports from Argentina to the U.S. To do so, we use USITC data from 1996 to 1999, leaving aside 1997, the year where the suspension was implemented. We calculate product-level shares of goods exported to the U.S. from Argentina and investigate how the suspension affected them.

[12]We generate 2 two-year periods to be more flexible and mitigate problems with missing values generated by the sparsity of imports at the HS8-digit level.

Specifically, we estimate the following regression specification:

$$sh_{it} = \alpha SUSP_i \times POST_t + \phi_i + \phi_t + \epsilon_{it}, \tag{2}$$

where $i$ indexes products and $t = 1996, 1998\text{-}1999$ indexes period and where we aggregate the post-suspension years to have a single period both before and after the shock. The dependent variable $sh_{it}$ corresponds to the share of 8-digit product $i$ in total exports from Argentina to the U.S. in period $t$: $sh_{it} \equiv M_{it}/M_{Arg,t}$, where $M_{it}$ denotes American imports of product $i$ from Argentina in period $t$ and $M_{Arg,t}$ indicates total American imports from Argentina in period $t$. In turn, $SUSP_i$ is an indicator taking the value of one for suspended products and zero otherwise, while $POST_t$ is an indicator taking the value of one when $t = 1998\text{-}1999$. The $\{\phi\}$ variables correspond to product and year fixed effects.

Now, one concern with specification (2) is that there may be shocks that affect all foreign sales of suspended products in the American market. For that reason, it is useful to also consider imports from markets other than Argentina in the regression. We therefore estimate as well the following triple-difference specification:

$$sh_{imt} = \alpha SUSP_{im} \times POST_t + \phi_{im} + \phi_{it} + \phi_{mt} + \epsilon_{imt}, \tag{3}$$

where we keep the same definitions as in (2) but add a third dimension by considering exports from the rest of the world to the U.S. Specifically, the dependent variable $sh_{imt}$ now corresponds to the share of 8-digit product $i$ in total exports of market $m$ to the U.S. in period $t$: $sh_{imt} \equiv M_{imt}/M_{mt}$, where $M_{imt}$ denotes American imports of product $i$ from market $m$ in period $t$ and $M_{mt}$ indicates total American imports from $m$ in period $t$, where $m = \textit{Argentina, ROW}$. The indicator $SUSP_{im}$ takes the value of one for suspended products when $m = \textit{Argentina}$ and zero otherwise. In turn, the $\{\phi\}$ variables now correspond to product-origin, product-year and origin-year fixed effects.

Under the assumption that ROW exports to the U.S. are not directly affected by the GSP suspension of Argentina's preferences in the American market, the triple-difference coefficient $\alpha$ gives us the effect of the suspension on the relative Argentinian sales of those products to the U.S. Or put differently, it gives us the extent of the relative loss of importance (if $\alpha < 0$) of those products in Argentina's exports to the American market. It has an analogous interpretation in the double-differences specification.

Table 3 shows the results. We consider four samples: only imports from Argentina (columns

1 and 2), following regression equation (2), and imports from both Argentina and ROW (columns 3 and 4), following regression equation (3). Columns 1 and 3 consider all products with strictly positive imports from Argentina before and after 1997. Columns 2 and 4 restrict the sample to products granted GSP to Argentina in 1996 and redefine the dependent variable as the share of each product over total imports of GSP products from Argentina and from ROW.

The results indicate that the suspension of GSP preferences reduced the importance of the affected products in Argentina's export basket to the U.S. Specifically, on average the suspension reduced the share of a product in Argentina's exports by 43, 54 , 34 and 43 percent across the four specifications.[13] Thus, although the average share of a single suspended product in Argentina's exports pre-1997 is obviously small (0.058%), in relative terms the changes are large. Naturally, the impact is higher when we consider only GSP products. Those findings are broadly consistent with the results of other detailed product-level analyses of the concession of nonreciprocal preferences, as discussed in the Introduction.

The purpose of the triple-difference (relative to the double-difference) is to control for product-specific American import demand shocks. Since the results with the double and triple differences are very similar, they suggest that on average the suspended products were subject to about the same type of demand shocks as other products, so that is not what drives the changes in Argentina's exports basket.

### 2.3.1 Product-level trade elasticity

Another way to evaluate the impact of the suspension at the product level is to estimate by how much imports from Argentina were affected by the resulting tariff changes. That is, to take advantage of our specific but well-identified trade shock to estimate a reduced-form trade elasticity at the product-level. To do so, we run the following regression specification:

$$\log M_{it} = \gamma \tau_{it} + \phi_i + \phi_t + \epsilon_{it}, \tag{4}$$

where $\tau_{it}$ represents the ad valorem tariff faced by Argentinian exporters of good $i$ in the U.S. in year $t$, $t = 1996, 1998$. For suspended goods, $\tau_{it}$ is zero in 1996 and equal to the U.S. MFN tariff in 1998; for other GSP goods, $\tau_{it}$ is zero in both years; for non-GSP goods, $\tau_{it}$ is the U.S. MFN tariff in both years.

[13] When we consider the double-differences specification in column 1, the percentage impact is computed as $\hat{\alpha}/\textit{average share} = -.025/.058 \sim -43\%$. Percentage impacts for columns 2 to 4 are computed analogously.

We estimate equation (4) at the 8-digit, 6-digit and 4-digit levels. In the last two cases, the average tariff is weighted using the share in total U.S. imports from Argentina in 1996. Comparing the estimates at different levels of aggregation is useful to understand the degree of substitutability across products.

Table 4 shows the results. At the 8-digit level, we obtain a relatively high trade elasticity of 10. As we move to more aggregated estimates, the elasticity drops considerably, to 5 (6 digits) and to 1.8 (4 digits). This provides a first indication that there is potential for significant substitutability across products. As we will see, such a substitution is present at the firm level.

# 3 Firm-level analysis

## 3.1 Data and descriptive statistics

The analysis in section 2 shows that the suspension from the American GSP program reduced Argentinian exports of the affected products to the U.S. However, even if exports fall at the product level, they may not change as much at the firm level. This could happen, for example, if firms could easily substitute exports across products or markets. Moreover, changes may occur at the intensive and/or the extensive margins. To investigate more generally how firms react to the tariff change, we now move to the firm-level analysis.

Our primary source of data is Argentina's customs data, which contain information on the universe of Argentinian export transactions. The dataset covers every firm-product-destination export combination. Each record contains the firm's unique tax code; the exported good, identified at the 8-digit level using the Nomenclatura Comun del Mercosur (NCM); the destination; and the value and quantities exported. From the United States International Trade Commission (USITC) we have information on preferences granted to Argentina in the American market at the 8-digit level using the Harmonized Tariff Schedule of the United States (HTSUS); on claimed GSP imports; and on American MFN tariffs.

One difficulty is that the NCM and HTSUS product classifications do not match at the 8-digit level. For that reason, we work at the 6-digit level, since at that level of aggregation both systems adopt the harmonized system (HS) of classification.[14] Another difficulty is that there was a change in the HS classification in 1996. We follow the concordance methodology used by the United Nations

[14]We define a product at the 6-digit level as "suspended" if at least one HS8 product within the HS6 product is suspended. We define "GSP products" at the 6-digit level as a continuous variable between 0 and 1. It is computed from USITC data by calculating the share in export value of HS8 GSP products within an HS6 product.

Trade Statistics to make the correspondence.[15] Overall, 24 percent of the products suspended were affected by the reclassification in one way or another.

The dataset spans 1994 to 2001, so it allows us to observe Argentinian firm-level exports both before and after the partial cancellation of GSP in the American market. Since the policy took place in the middle of 1997, we eliminate 1997 from the analysis, so that the periods before and after the shock are clearly defined.

Table 5 shows the number of Argentinian firms exporting to the U.S. in the years prior to the shock (3,267) and, among them, the number that served the American market in the years after the shock (2,036). On average, the surviving exporters to the U.S. served more destinations and exported more products than the exiters. The table also shows the average share of suspended, GSP and non-GSP products in the export baskets of Argentinian firms selling to the U.S. before and after the policy shock. We observe that suspended goods lose importance in the export baskets of Argentinian firms after 1997, whereas non-GSP goods become more relevant. That pattern is most visible when we consider the firms that sold at least one suspended product before 1997. We can interpret Table 5 as a first indication that the policy shock induced Argentinian firms to change their export behavior toward the U.S.

Now, before we start the formal firm-level analysis, a natural concern is whether the firms affected by the suspension were growing at a different pace relative to other Argentinian exporters. If that were the case, our results could capture a pre-suspension trend that persisted after the suspension.

We answer that question in Table 6. We look at pre-1997 export growth (between 1995 to 1996 and between 1994 to 1996). In the table, "suspended firms" are defined as those that exported at least one suspended product to the U.S. in 1996, whereas "non-suspended GSP firms" are those that exported GSP-eligible goods but not suspended ones to the U.S. in 1996. As the t-test on the equality of means indicates, there is no statistical difference between the export growth of firms affected and unaffected by the suspension. Those results indicate that our findings do not reflect pre-shock trends in the affected firms.

[15] The concordance is available at https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp.

### 3.2 Benchmark specification

Our benchmark specification has the following form:

$$y_{jt} = \beta_1 \left( SUSP_j \times POST_t \right) + \phi_j + \phi_t + \{D_{jt}\} + \epsilon_{jt}, \tag{5}$$

where $j$ indexes firms and $t$ indexes years. We include firm ($\phi_j$) and year ($\phi_t$) fixed effects. Since firms of different sizes may behave differently, we also include firm-year dummies for firm sizes ($\{D_{jt}\}$), distinguishing among firms below median export size, between the 50th and 75th percentiles, and above the 75th percentile. We cluster standard errors at the firm level. The dependent variable $y_{jt}$ varies across specifications, corresponding to different measures of exports.

The key independent variable is the difference-in-differences interaction $SUSP_j \times POST_t$. The variable $POST_t$ captures the timing of the policy shock, corresponding to a dummy that is one from 1998 onwards and zero otherwise. In turn, $SUSP_j$ captures firm exposure to the suspension. Its definition is not as straightforward, because a firm can export both products that had preferences suspended and products that either never had preferential treatment or had it throughout the whole sample period. Furthermore, simply looking at whether a firm exported a product that had its preferential treatment revoked disregards heterogeneity in the value of that preferential treatment. Accordingly, we use different definitions for $SUSP_j$ under different samples, as follows:

D1. The average share, from 1994 to 1996, of suspended products in total firm exports to the U.S., where the sample includes all firms that exported to the U.S. before 1997.

D2. Same definition as in D1, but restricting the sample to firms for which at least 80% of export value to the U.S. prior to 1997 was of products that received preferences under GSP; we term them "GSP firms."

D3. Average tariff increase for the firm, calculated as

$$\sum_{t=1994}^{1996} \sum_{i} \left( MFN_{it} \times sh_{ijt} \times I_i \right) / 3,$$

where $MFN_{it}$ denotes the American MFN tariff rate for product $i$ in year $t$, $sh_{ijt}$ is the share of product $i$ in firm $j$'s exports to the U.S. in year $t$, and $I_i$ is an indicator for whether product $i$ was suspended in 1997.

D4. Same definition as in D3, but with the sample defined in D2.

Definition D1 is the most intuitive: the greater the share of products suspended in a firm's exports to the U.S., the more exposed to the policy shock the firm was. Definition D3 allows for different intensities of treatment even for firms that exported the same share of suspended products before 1997. It is designed to capture more accurately the value of the lost preferential treatment. For example, if a firm exported mostly products that were suspended but whose MFN tariffs were minuscule, then the loss of preferential treatment should be meaningless. Definition D3 would capture that lack of importance, unlike the simpler definition D1. Conversely, if a firm exported suspended products whose MFN tariffs were very high, then the policy shock would presumably have a meaningful impact on its behavior even if the share of those products in its total American exports were relatively small. Again, definition D3 would capture the importance of that lost preference, unlike definition D1.

Definitions D2 and D4 are analogous to definitions D1 and D3, respectively, but restrict the sample to firms that are heavy exporters of products that receive GSP treatment in the U.S. Since those GSP firms may be the most relevant with respect to the policy shock, both as treatment and as control, it is worthwhile to have specifications that focus on them.

### 3.3 Results

Considering for now only the American market, in Table 7 we consider the extensive margin at the firm level. Columns (1) to (4) correspond to definitions D1 to D4. The dependent variable is a dummy indicating whether firm $j$ exports to the U.S. in year $t$. Panel A follows the structure of regression (5), whereas Panel B splits $POST_t$ by year to identify possible differential effects over time. For both the full and the GSP samples, the suspension has a precisely estimated negative effect on the probability of exporting to the American market. In terms of magnitudes, if a firm exported only suspended products to the U.S. prior to 1997, then on average the suspension would reduce the probability that this firm would export to the U.S. after 1997 by four percentage points. This compares to a baseline probability of exporting to the U.S. after 1997 of 30.5 p.p. The effect is larger (in absolute value), the greater the tariff increase due to the suspension. When we allow for differential effects by year (Panel B), the results show that the effect is long-lasting.

Put together, the results in Table 7 indicate that the suspension of tariff preferences had an important negative effect at the extensive margin of Argentinian firms exporting to the U.S. The more exposed to the shock a firm was, as proxied by the continuous $SUSP_j$ variable, the more likely it exited the American market after the shock. Importantly, this effect is not driven by firms

that only export suspended products. We show that in Table A2, where we find that results remain qualitatively unchanged if we exclude from the sample all firms with $SUSP = 1$. We thus conclude that the suspension triggers exit even in firms that also export non-suspended goods.

In Table 8, we turn to the intensive margin. In Panel A, the dependent variable is the log of exports of firm $j$ to the U.S. We consider all firms that export in at least one year before the policy shock and one year after it, aggregating firm exports over all years before and all years after the shock. This allows for a flexible definition of intensive margin that accounts for firms that export often but not every year. In that specification, the difference-in-differences coefficient is not estimated precisely, except when we consider only GSP firms in column (2), where there is mild statistical evidence that the suspension decreased the volume of sales of exporting firms to the American market. In Table A3 (Appendix A.3) we consider variations of the specification in Panel A.[16] Results are similar: some indication of a negative effect for GSP firms, especially if they do not export every year, but otherwise no statistically significant evidence that total export volumes changed for firms that kept exporting.

In panels B and C, we then split firm sales between suspended and non-suspended goods. When we consider just the former (Panel B), we find that the policy shock did reduce exports of suspended products by firms that kept serving the U.S. market. The effect at this sub-intensive margin is sizeable. For example, considering a firm for which half of its exported value to the U.S. was composed of suspended products, the estimated coefficient is column (1) would imply a reduction of 35% in export value of suspended products to the U.S. after the shock.[17]

Interestingly, when we consider only sales of non-suspended goods (Panel C), we obtain the opposite result: the shock induced an *increase* in the exports of those goods to the U.S. by the firms that kept serving that market. The effect is sizeable as well. Again, considering a firm for which half of its exported value to the U.S. was composed of suspended products, the estimated coefficient is column (1) would imply an increase of 66% in export value to the U.S. after the shock.[18] The results from panels B and C reveal that the imprecise estimates for the intensive margin effects in Panel A reflect intra-firm product reallocation, to which we now turn in more

[16] Specifically, Table A3 shows results when we consider every year of the sample (except 1997) and keep a balanced panel that includes only firms that export every year; a specification similar to Panel A but further conditioning on positive exports in 1996; and one like Panel A but distinguishing between perennial and occasional exporters.

[17] For that firm, $SUSP \times POST = 0.5$. Thus, comparing before and after the suspension, we obtain $\log(y^{susp}_{after}) - \log(y^{susp}_{before}) = 0.5\widehat{\beta_1} = -0.43$, so that $y^{susp}_{after}/y^{susp}_{before} = \exp(-0.43) = 0.65$.

[18] For that firm, $SUSP \times POST = 0.5$. Thus, comparing before and after the suspension, we obtain $\log(y^{non-susp}_{after}) - \log(y^{non-susp}_{before}) = 0.5\widehat{\beta_1} = 0.505$, so that $y^{non-susp}_{after}/y^{non-susp}_{before} = \exp(0.505) = 1.66$.

detail.

In Table 9, we look explicitly at within-firm substitution patterns between suspended and non-suspended products. The samples in each column are the same used in the equivalent columns of Table 8. But since the goal in Table 9 is precisely to investigate substitution patterns within firms, using pre-suspension shares in the regression would not be adequate. Accordingly, in columns 1 and 2 the key independent variable is simply $POST_t$, rather than its interaction with $SUSP_j$.[19] In columns 3 and 4 we keep the weighted average MFN tariff interacted with $POST_t$ to capture whether the effect varies with the extent of the lost preferential treatment.

In Panel A, we confirm that the share of suspended products in the export baskets of Argentina's firms toward the U.S. drops significantly after the shock, especially for the firms shipping mostly GSP products, for which the share drops on average by 18 percentage points. Moreover, the effect is greater when the loss of preferences is more valuable. In line with that result, but restricting the analysis to the sub-extensive margin, Panel B shows that the probability that a firm will export a suspended product decreases, and decreases by more for GSP firms and when the loss of preferences is more valuable. Panel C shows that it is not only a matter of dropping affected products; firms also add non-suspended goods to their export baskets to the U.S. after the shock. In absolute value, this positive effect is about half the size of the direct effect on affected products shown in Panel B.

On the whole, Table 9 shows that the loss of tariff preferences induced firms to rearrange their baskets of products sold in the American market. Firms not only shift sales away from suspended products and towards non-suspended ones; they also tend to drop suspended products while adding non-suspended ones.

### 3.4 Product hierarchy within firms

Another way of looking at firms' product basket adjustment is to consider whether the policy shock affected product hierarchy within firms. We do so in Table 10, where we assess the impact of the suspension on the probability of being the firm's 'core product' (Panel A); the probability of being one of the firm's 'top 2' products (Panel B); and the probability of being one of the firm's 'top 3' products (Panel C). Those product definitions consider the rank order of sales to the U.S. in a year. Panes A, B and C condition on a firm exporting on average at least 2, 3 and 4 products, respectively, to the U.S. during 1994-1996. Since that analysis is at the firm-product level, the

[19] For completeness, in Table A4 (Appendix A.3) we also show results using $SUSP_j \times POST_t$ as the main independent variable. Results are qualitatively similar.

variable $SUSP$ is defined simply as a dummy at the product level. Similarly, in columns (3) and (4) we use the MFN tariffs of the suspended products directly. We include firm-product fixed effects, in addition to year fixed effects.

In line with the substitution between suspended and non-suspended products observed in previous results, Table 10 shows that the suspension reduces the probability that a product will feature prominently within a firm's export basked to the U.S., regardless of the definition. Again, this effect is more prominent for GSP firms. For example, using the point estimate for GSP firms, the probability of being a core product falls by 5 p.p. if the product is suspended, whereas the baseline probability of being core is 10 p.p. Again, the effects are greater when the margin of preference lost is larger.

Hence, those results further confirm that the change in variable export costs induced firms to rearrange the product composition of their export baskets to the U.S. Specifically, products whose tariffs increased were downgraded within firms' product hierarchies with respect to their sales in the American market.

### 3.5 Summary of results in the American market

We find that the elimination of tariff preferences for some Argentinian exports to the U.S. had a negative extensive margin effect, with some firms stopping exporting altogether to the U.S. because of the higher variable costs. On the other hand, the policy shock did not generate sizeable firm-level intensive margin effects. That is, if a firm kept exporting to the U.S. after the tariff hike, it did not change its export volume in a significant way. The reason is that some firms were able to partially offset the cost of the tariff hikes by reshuffling products within their export baskets to the U.S.

Indeed, within firms that kept serving the American market, there was significant product substitution. As the trade cost of some products increased, firms shifted the composition of their export basket away from those products and toward others whose trade cost had not changed. Moreover, firms were more likely to drop products that had lost preferential tariff treatment and to add products that did not incur such a cost increase. Furthermore, the policy shock caused a change in the rank order of products within firms' export baskets, with a product becoming less likely to remain the 'core' product of a firm if its tariff preference were removed.

As firms react to the suspension by reshuffling their export basket, we have to consider the possibility that this process was not just a reclassification of the same products into different HS codes as a way to elude the increase in tariffs of suspended products. This concern is mitigated by

acknowledging that the U.S. Customs and Borders has enough control over how different products enter the American market—or else the whole structure of the American tariffs would be called into question. Still, we can check whether the unit values of the new products added by a firm after the suspension are similar to the unit values of the products dropped by the same firm after the suspension. If they were very similar, it could be a sign of relabeling. In Table 11, we report the correlation between the unit value of products exported in 1996, hit by the suspension and dropped, and the unit value of products added in 1998 as a replacement.[20] As the table shows, the correlation between unit values of dropped and added product is very mild (and negative).

To the best of our knowledge, our results are novel. Moreover, they do not follow from standard trade models of multi-product atomistic firms, where product decisions within firms are often assumed independent. For that reason, in the next section we develop an analytical framework that is consistent with our empirical findings. We show that, although contrasting with most existing trade models of multi-product firms, it does not take too much to generate those results.

# 4 A framework with product interdependence

Consider that there are two products sold in the U.S. market by Argentinian firms, product 1 and product 2. They are differentiated and there is a large number of varieties of each of them. Each variety, which can be domestic or imported, is produced by a different firm in a monopolistically competitive setting. The residual demand for each variety of product $j$ is

$$q_j(A_j, p_j), \ j = 1, 2, \tag{6}$$

where $q$ and $p$ denote quantity and price, and $A$ is an idiosyncratic demand shifter. To keep notation compact, we do not use a variety-firm index. Parameters $\{A_1, A_2\}$ vary across firms. We assume that demands are independent across products.

Firms face a fixed cost of developing and maintaining each product, given by $F_1$ and $F_2$. Furthermore, to sell any quantity in the American market firms need to incur a market fixed cost, $F_{US}$. Variable costs are given by function $C(\phi, q_1, q_2)$, where $\phi$ is a cost shifter. The total cost of

[20] As firms may drop or add more than one product, we also report the correlation between the unit values of the products with the minimum, maximum and median value among the products dropped and added. See notes in Table 11.

producing and selling goods 1 and 2 in the American market is therefore

$$C(\phi, q_1, q_2) + F_1 + F_2 + F_{US}. \tag{7}$$

Parameters $\phi$, $F_{US}$, $F_1$ and $F_2$ vary across firms. Clearly, $F_{US} > 0$ introduces a source of increasing returns to scale at the extensive margin.

Critically, we allow the production technology to exhibit diseconomies of scope, with a total variable cost that depends on the quantities produced of each good. Specifically, the variable cost function satisfies

$$C(\phi, q_1, q_2) \geq C(\phi, q_1, 0) + C(\phi, 0, q_2). \tag{8}$$

A similar condition on marginal costs ($MC$), which implies (8), is that

$$MC_i(\phi, q_i, q_j') \geq MC_i(\phi, q_i, q_j'')$$

for any $q_i > 0$ if $q_j' > q_j''$, $i \neq j = 1, 2$. The cost function exhibits diseconomies of scope if the inequalities above are strict.[21] In that case, the marginal cost of a product within a firm is increasing in the amount produced of the other product.[22] Observe the contrast with the standard case in which there are no economies of scope, when $MC_i$ is independent of $q_j$ whenever $i \neq j$. We note that diseconomies of scope may arise from different sources, such as capacity or financial constraints, adjustment costs, and changes in organizational structure. Since we are agnostic about its precise nature, we keep this reduced-form approach without imposing any additional structure.

For notational ease, we also define $C(\phi, q_1, 0) = C_1(\phi, q_1)$; $C(\phi, 0, q_2) = C_2(\phi, q_2)$. Finally, we denote the vector of variety-product random variables as $\zeta \equiv (A_1, A_2, \phi, F_1, F_2, F_{US})$. The vector is drawn over the parameter space $\mathcal{Z}$ from a joint known distribution that is independent across firms.

There are specific import tariffs in the U.S. market, given by $\tau_1 > 0$ and $\tau_2 > 0$. We denote the tariff vector by $\tau$. Product 1 is a typical product directly affected by the policy shock. At first,

[21] Formally, a technology exhibits diseconomies of scope if the total cost $C$ to produce quantities $q_1 > 0$ and $q_2 > 0$ of goods 1 and 2 is such that $C(q_1, q_2) > C(q_1, 0) + C(0, q_2)$ for all levels of $q_1$ and $q_2$. That is, producing goods 1 and 2 within the firm is more costly than producing each of them in independent production units. See Panzar (1989) for a broader discussion.

[22] Given the diseconomies of scope in production at the firm level, one may wonder why a single firm would ever produce both goods 1 and 2—that is, why a firm that wanted to produce both goods does not disintegrate to avoid the diseconomies of scope. We simply assume that possibility away, but there are many possible explanations for that. One is that there may be complementarities in the development of the two goods. Another, simpler explanation is that there may be a sunk cost for a firm to exist.

it belongs to the GSP program, so that for Argentinian firms, $\tau_1 = 0$. Later, it is included in the group of products for which the preference is suspended. Thus, the policy shock can be interpreted as an increase in $\tau_1$, starting at zero. In turn, product 2 is a typical product not directly affected by the policy shock. It could be a good from the GSP program that was not included in the list of suspended products, or a good that does not receive any preference.

We are interested in the behavior of exporters from Argentina. There, firms decide whether to produce and export to the U.S. products 1 and/or 2, and the export price. Argentina is small relative to the U.S. market; therefore, simultaneous changes in prices of all Argentinian firms do not affect residual demands.

Firms choose between four entry modes: export only product 1 (option 1), export only product 2 (option 2), export both products (option $B$), or export neither product (option 0, with zero profits). Because of the economies of scale and the diseconomies of scope, the price and entry decisions are interdependent. Maximized profits under each of the three active export modes are

$$\begin{aligned}
\pi_1(\zeta,\tau) &= \max_{p_1}\left[p_1 q_1(A_1,p_1) - C_1\left(\phi, q_1(A_1,p_1)\right) - \tau_1 q_1(A_1,p_1) - F_1 - F_{US}\right], \\
\pi_2(\zeta,\tau) &= \max_{p_2}\left[p_2 q_2(A_2,p_2) - C_2\left(\phi, q_2(A_2,p_2) - \tau_2 q_2(A_2,p_2) - F_2 - F_{US}\right]\right., \\
\pi_B(\zeta,\tau) &= \max_{p_1,p_2}\left[p_1 q_1(A_1,p_1) + p_2 q_2(A_2,p_2) - C\left(\phi, q_1(A_1,p_1), q_2(A_2,p_2)\right) - \right. \\
&\quad \left. -\tau_1 q_1(A_1,p_1) - \tau_2 q_2(A_2,p_2) - F_1 - F_2 - F_{US}\right].
\end{aligned} \tag{9}$$

Firms with high demand shifters and low cost parameters choose to export. We further define firm-level parameter sets, or "zones," that lead to different export modes as

$$\begin{aligned}
D_0(\tau) &= \{\zeta \in \mathcal{Z} : \pi_1(\zeta,\tau) < 0; \pi_2(\zeta,\tau) < 0; \pi_B(\zeta,\tau) < 0\}, \\
D_1(\tau) &= \{\zeta \in \mathcal{Z} : \pi_1(\zeta,\tau) \geq 0; \pi_1(\zeta,\tau) \geq \pi_2(\zeta,\tau); \pi_1(\zeta,\tau) > \pi_B(\zeta,\tau)\}, \\
D_2(\tau) &= \{\zeta \in \mathcal{Z} : \pi_2(\zeta,\tau) \geq 0; \pi_2(\zeta,\tau) > \pi_1(\zeta,\tau); \pi_2(\zeta,\tau) > \pi_B(\zeta,\tau)\}, \\
D_B(\tau) &= \{\zeta \in \mathcal{Z} : \pi_B(\zeta,\tau) \geq 0; \pi_B(\zeta,\tau) \geq \pi_1(\zeta,\tau); \pi_B \geq \pi_2(\zeta,\tau)\},
\end{aligned} \tag{10}$$

where $D_0$ is the exit zone, $D_1$ and $D_2$ are the single-product zones, and $D_B$ is the multi-product zone.

Although our framework is economical in several ways, fully characterizing entry (as well as price and productions decisions) is not straightforward. The reason is the tension between complementarity forces (represented here by the economies of scale created by the market fixed cost

$F_{US}$) and substitutability forces (represented here by the diseconomies of scope embedded in the variable cost function).[23] The qualitative impact of changes in trade costs on firm export behavior depends on which force dominates.

To illustrate the consequences of each force, Figure 1 shows benchmark cases. Graphs on the left display the situation before the policy shock, while graphs on the right show the situation after the increase in $\tau_1$. In each figure, the zones are defined over pairwise combinations of the demand shifters $A_1$ and $A_2$ while the cost parameters are kept constant across firms. The parameterization is such that the two products are symmetric except that product 1 does not incur tariffs in the U.S., because of the GSP preference.[24]

Figure 1, panel (a), shows the case of product independence, where $F_{US} = 0$ and inequality (8) specializes to an equality. The decision zones are simple rectangles: given other parameters, a firm sells product $i$ in the U.S. if and only if its idiosyncratic demand shifter for $i$ is sufficiently high. The exit zone $D_0$ corresponds to low levels of $A_1$ and $A_2$ (bottom left corner). Firms with low demand shifters in both products choose to exit as their export revenue cannot compensate for the fixed cost to develop either product.[25] Single-product zones $D_1$ and $D_2$ occur when one demand shifter is high and the other is low. In that case, firms export only the product for which revenue is high enough to compensate paying its fixed cost. Finally, multiproduct zone $D_B$ corresponds to cases where firms have high enough demand shifters in both products (upper right corner). Those firms can afford to pay both product fixed costs and still make positive profits selling each of them.

On the right side, the graph shows both the original export zones under the tariff preference (limits in black), and the new export zones without preferences (limits in gray). The limits of the export zones without preferences are shifted to the right, as a higher $A_1$ cutoff is required to compensate for the increase in the cost of exporting product 1 due to $\tau_1 > 0$. On the other hand, the horizontal line, which defines the cutoff to sell product 2, is unchanged. As a result, the figure shows expansions of exit zone $D_0$ and single product zone $D_2$, together with a shrinkage of single-product zone $D_1$ and multi-product zone $D_B$, represented by light gray areas. All of that happens simply because the suspension of preferences for good 1 makes it less profitable to export that product. This is general. On the other hand, decisions regarding product 2 are unchanged.

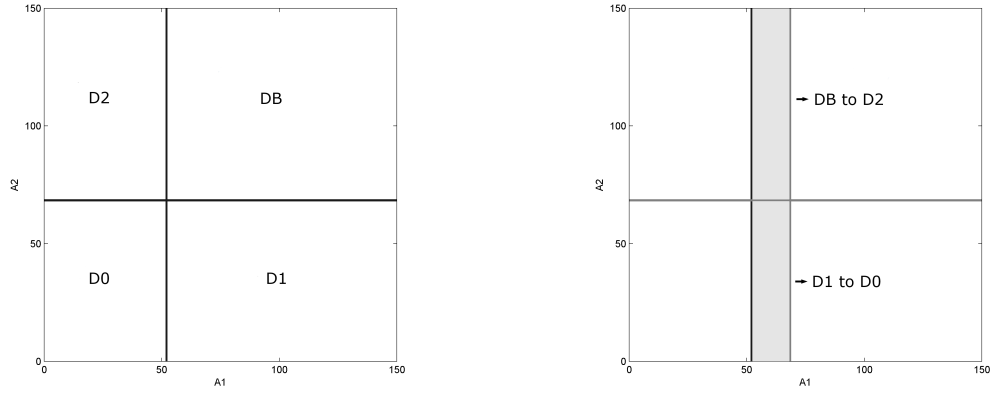
[23] It is worth noting that our goal is not to identify the precise sources of product complementarity and substitutability within firms, but rather to allow them to coexist. Other sources of complementarity (say, more efficient division of labor) and substitutability (e.g., due to product cannibalization) may be present as well.

[24] In the figures, the demand and cost functions are defined as $q_1 = A_1 p_1^{-\alpha}$, $q_2 = A_2 p_2^{-\alpha}$, and $C = \phi(q_1 + q_2)^{\beta}$, with $\alpha = 1.5$ and $\phi = 1$. The value of $\beta$ varies across panels to illustrate the different cases.

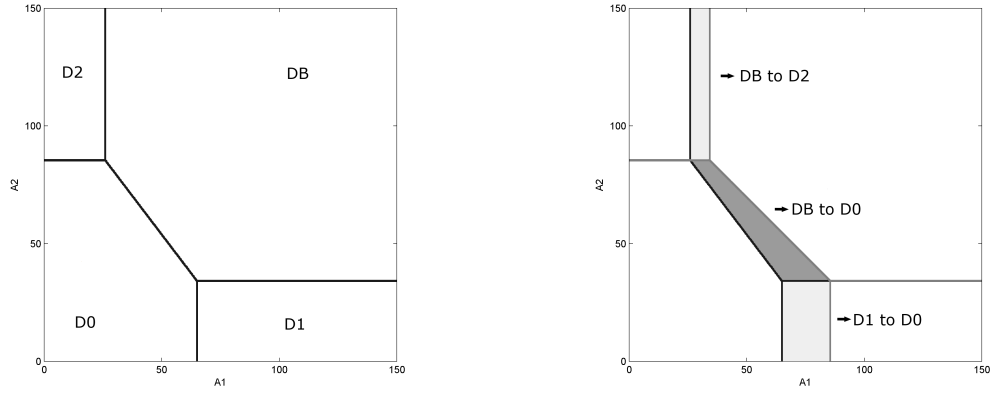
[25] Observe that, because product 2 incurs a tariff but product 1 does not, the height of the $D_0$ rectangle is greater than its width.

Fig. 1: The roles of fixed costs and diseconomies of scope

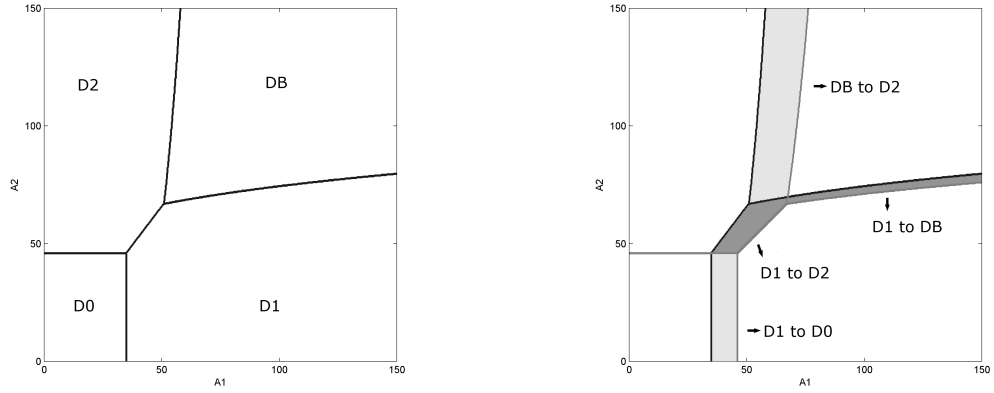
(a) No fixed costs, no diseconomies of scope




(b) With fixed costs, no diseconomies of scope




(c) No fixed costs, with diseconomies of scope




Notes: The figure illustrates export decision zones for different firm-level values for the demand shocks $A_1$ and $A_2$ and under different assumptions regarding interdependence across products. The graphs on the left plot cases of GSP preference on product 1, while the graphs on the right plot an increase in the tariff of product 1 (a suspension of preferences). Export decision zones are denoted by $D_0, D_1, D_2, D_B$. MFN tariffs are 20 percent on both goods. The demand and cost functions are defined as $q_1 = A_1 p_1^{-\alpha}$, $q_2 = A_2 p_2^{-\alpha}$, and $C = \phi(q_1 + q_2)^{\beta}$, with $\alpha = 1.5$ and $\phi = 1$. In Panels (a) and (b) $\beta = 1$, whereas $\beta = 3$ in panel (c). In turn, $F_{US} = 0$ in panels (a) and (c), while $F_{US} = 15$ in panel (b).

Some firms stop exporting product 1. Those firms either exit (if they were not exporting good 2 before—$D_1$ to $D_0$) or keep exporting product 2 (if they were exporting good 2 before—$D_B$ to $D_2$). There are no interdependencies. This is at odds with our empirical results.

Figure 1, panel (b), shows the situation where fixed costs to sell in the U.S. are introduced (i.e., $F_{US} > 0$). The figure on the left indicates that regions $D_0$ and $D_B$ are now adjacent to each other along a range of parameters, while zones $D_1$ and $D_2$ no longer intersect each other. This happens because, when variable profits are positive but only slightly higher than the product fixed cost, it is not worthwhile to serve the American market, because the firm cannot cover $F_{US}$. By contrast, if it is profitable enough to export one product, that will make exporting the other good more desirable. Specifically, note that around the negatively sloped curve separating $D_0$ from $D_B$, a small decrease in $A_i$, keeping $A_j$ constant, $i \neq j$, can induce a firm that exported both $i$ and $j$ to exit.

The graph on the right shows the changes in the export zones due to the higher $\tau_1$. There is now a new group of firms relative to those in panel (a): those in the dark gray area, which were exporting both products before the policy shock and exit after the suspension ($D_B$ to $D_0$). That happens when the revenue from product 2 is not enough to cover the fixed cost to sell in the U.S. market. In this case, the product interdependence is reflected in the exit patterns. On the other hand, there is no product switching.

In Figure 1, panel (c), we add diseconomies of scope, as in equation (8) satisfied with strict inequality, while removing the market fixed cost. The diseconomies of scope are reflected in two features of the figure. The first is the shape of the $D_B$ contour, which now has positive slopes and forms a less-than-90-degree angle. The reason is that, on the contour, as $A_j$ rises, the optimal $q_j$ increases and the marginal cost of product $i$ ($\neq j$) rises for given level of $q_i$; therefore, a higher level of $A_i$ is required to keep exporting good $i$ worthwhile.

The second feature is that zones $D_0$ and $D_B$ no longer share any border points. This occurs because in multi-product zone $D_B$ the counterfactual profits of exporting only product 1 or only product 2 are both positive (but lower than the joint profit of exporting both products). Demand shifters in the range neighboring $D_B$ belong to zones $D_1$ or $D_2$, where it is profitable to export one of the products, and not to zone $D_0$.[26]

[26] Another way to see this is as follows. Consider a point inside $D_0$ but arbitrarily close to its top-right corner. From there, consider simultaneous increases in $A_1$ and $A_2$ such that they do not reach the $D_B$ zone. The change makes exporting *a* product $j$ worthwhile. However, once that happens, the marginal cost of product $j'(\neq j)$ rises, and exporting it remains unprofitable despite the higher $A_{j'}$. The multi-product zone is reached only when both demand shifters become sufficiently large.

The right panel shows the situation in which preferences on product 1 are suspended and firms face tariff $\tau_1 > 0$. As a result, profits in zones $D_1$ and $D_B$ fall, while profits in zone $D_2$ remain unchanged, leading firms to revise their export participation decisions for both products. Assuming the profit functions are differentiable, we can derive first-order approximations from the envelope theorem as $\partial\pi_1(\zeta,\tau)/\partial\tau_1 = \partial\pi_B(\zeta,\tau)/\partial\tau_1 = -q_1 \leq 0$ and $\partial\pi_2(\zeta,\tau)/\partial\tau_1 = 0$. The range of parameters $\zeta$ that satisfy the inequalities $\pi_1(\zeta,\tau) \geq 0$, $\pi_1(\zeta,\tau) \geq \pi_2(\zeta,\tau)$, $\pi_B(\zeta,\tau) \geq 0$ and $\pi_B(\zeta,\tau) \geq \pi_2(\zeta,\tau)$ is reduced and the areas of zones $D_1$ and $D_B$ shrink in favor of zones $D_0$ and $D_2$.

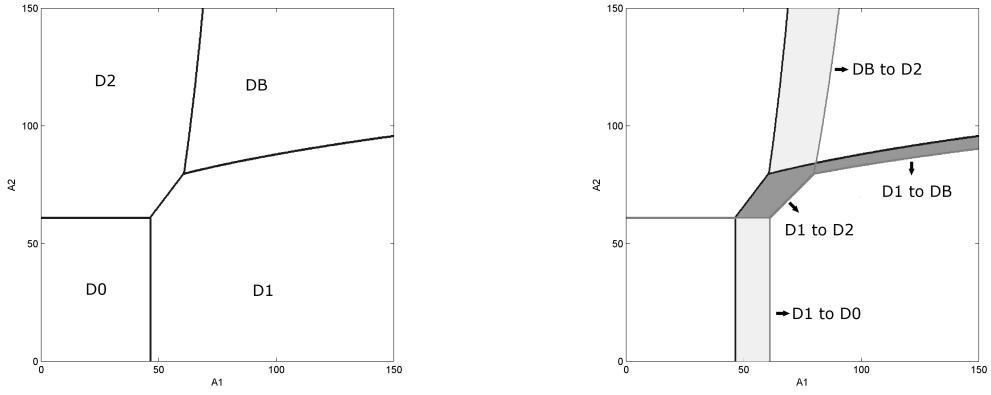
Relative to panel (b), we no longer have firms that switch from $D_B$ to $D_0$ (that is, firms that exit after exporting both products). This makes it clear that, because of diseconomies of scope alone, there is no extensive margin effect for firms that exported good 2. Conversely, we now have a new group of firms that switch from product 1 to product 2 ($D_1$ to $D_2$, in dark gray). That change is driven entirely by the diseconomies of scope. Those firms sold relatively small quantities of good 1 before the tariff increase. For them, the decrease in revenue due to the tariff no longer justifies paying the fixed cost to export product 1. They also have intermediate-level $A_2$. As they no longer produce good 1, the marginal cost of producing good 2 falls enough to make it worthwhile selling it in the U.S. market. There is an additional group of firms that starts exporting good 2 (also in dark gray). Because they have relatively large $A_1$, they keep exporting good 1, but now add good 2 to their export baskets as well. This seemingly unintuitive result also arises solely because of the diseconomies of scope. Those firms add product 2 to their export basket as sales of product 1 decrease in volume for given $A_1$, thus making it profitable to add product 2 because its marginal cost falls enough.

Having developed the intuition for each case, let us consider the general case when we have both market fixed cost and diseconomies of scope. In this case, there is a tension between the forces shaping the contours in panels (b) and (c). The shape of the resulting figure depends on which of the two prevails. If economies of scale are sufficiently high, firm decisions about export basket composition look like those in panel (b). But if diseconomies of scope are strong enough, then the firm decisions look like those in panel (c).

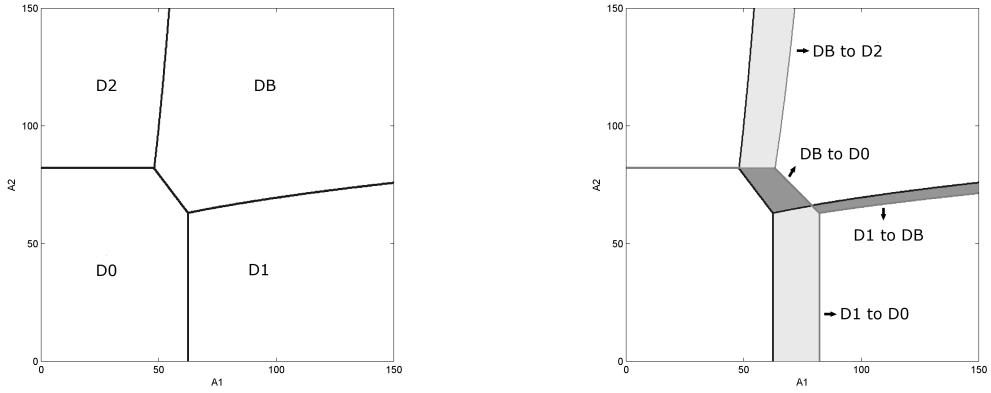
In Figure 2 we show each case. In panel (a), $F_{US}$ is small relative to the diseconomies of scope, which dominate. In panel (b), $F_{US}$ is large relative to the diseconomies of scope, so economies of scale dominate. Some firms will be best represented by panel (a), while others will fit best the changes illustrated in panel (b), according to their idiosyncratic parameter values. Together, the

Fig. 2: Joint effect of fixed cost and diseconomies of scope

(a) High diseconomies of scope




(b) High fixed costs




Notes: The figure illustrates export decision zones analogous to Figure 1 with the same MFN tariffs and demand and cost functions. In Panel (a) $\beta = 3$, $F_{US} = 2$. In Panel (b) $\beta = 3$, $F_{US} = 7$.

two cases rationalize our empirical results in tables 7-10.

First, note that in all scenarios we observe that some small firms whose sales are exclusively of product 1 (that is, suspended products) exit. However, as Figure 2 panel (b) shows, some firms that were selling product 2 (i.e., non-suspended products) also exit. This is consistent with the results of Table 7 and Table A2 on the extensive margin. Without the product complementarity coming from the market fixed cost, no firm exporting other goods would exit because of the shock, regardless of how little they sold of the other goods.

Second, the diseconomies of scope imply that, for firms selling both types of goods, suspended and non-suspended, the shock implies a reduction in sales of the former and an increase in sales of the latter. The first result would arise in virtually any setup, but not the second. This helps to understand our findings in Table 8 on the intensive margin. In panel B, we find a negative

intensive-margin effect when we restrict the analysis to the affected products, while in panel C we find a positive intensive-margin effect when we restrict the analysis to the unaffected products. Panel A, which is inconclusive, reflects the mix of the two opposing effects.

The diseconomies of scope also affect the sub-extensive margin of exporting firms, as our findings in Table 9 show. As panel B indicates, the shock induces firms to drop the affected product, a result that would arise in any context. But as panel C reveals, the shock also prompted firms to add unaffected products to their export baskets, a result that requires product substitutability, as illustrated in Figure 2, panel (a). Table 9, panel A, incorporates the results from both intensive and sub-extensive margins. Finally, the results in Table 10 on product hierarchy are a corollary of those effects.

In Appendix A.2, we provide a formal proof that changes in decisions about products not directly affected by the policy shock require product interdependence of some form. Moreover, we show that a setting with both product complementarities and product substitutabilities, like this, is able to rationalize our empirical results.

## 5 Spillovers across markets

In our suspension episode, there is an increase in U.S. tariffs on Argentinian exports due to the removal of preferences for some products. We have seen that this policy change had implications within the U.S. market for firm export decisions about products not directly affected by the policy. We now consider the logical subsequent step, of whether there were spillovers to markets where policy did not change, but that were also served by Argentinian firms that exported to the U.S. and were subject to the American policy shock. The underlying, broader question is whether there are interdependencies also across markets: can a policy circumscribed to a (large) market have meaningful implications for firm export behavior toward other foreign markets?

To study that possibility, we retain the same theoretical structure as before, except for the introduction of another market. To keep it simple, we group all other markets in the "rest of the world" (ROW). We assume that demand is independent across the U.S. and ROW, and that varieties are not differentiated across markets. That is, a firm that chooses to export product $j$ to both markets sells the same variety to the U.S. and to ROW, although it may choose different prices for each market. We further assume that idiosyncratic shocks are the same across markets except for a multiplicative parameter $\theta$ that varies across firms. A firm's residual demand function

for each variety of product $j$ is then given by

$$q_{j,ROW}(\theta A_j,\ p_{j,ROW}); j = 1, 2,\ \ \theta > 0. \tag{11}$$

The multiplicative parameter $\theta$ captures differences between the U.S. and ROW that are common to all firms, such as market size and geographical and cultural distances between Argentina and those markets, as well as differences between the U.S. and ROW that vary across firms, such as idiosyncratic demand shocks that affect the ability of each firm to penetrate in each of the two markets. Differences in $\theta$ help to explain why destination export shares vary across firms.

In this section, we adjust notation and add subindexes $US$ and ROW to denote the destination market. We let $q_1$ and $q_2$ denote total exports of each good, and not just exports to the U.S., with $q_1 = q_{1,US} + q_{1,ROW}$ and $q_2 = q_{2,US} + q_{2,ROW}$. The variable cost function depends on total exports of each good, and is therefore written as $C(\phi, q_1, q_2)$, just as before. The assumption of diseconomies of scope across products is still represented by equation (8), except that now $q_j$ denotes the sum of exports of good $j$ to the U.S. and to ROW. There is also a fixed cost specific to exporting to ROW, denoted by $F_{ROW}$. A key point to note is that the fixed costs $F_1$ and $F_2$ to develop and export a product are unaffected by the number of markets to which the product is exported. This creates firm-level economies of scale across markets.[27] Thus, the total cost for a firm exporting both products and serving both markets is

$$C(\phi, q_1, q_2) + F_1 + F_2 + F_{US} + F_{ROW}. \tag{12}$$

Idiosyncratic firm parameters are summarized by the random vector $\zeta \equiv (A_1, A_2, \theta, \phi, F_1, F_2, F_{US}, F_{ROW})$, drawn over the parameter space $\mathcal{Z}$ from a joint known distribution that is independent across firms. We also allow for specific import tariffs in ROW, denoted by $\tau_{1,ROW}$ and $\tau_{2,ROW}$, and summarized by the vector $\tau_{ROW}$.

Firms decide which markets to export to, or entry modes. The alternatives are: export only to the U.S. (option 1), export only to ROW (option 2), export to both markets (option $B$), or not export at all (option 0, with zero profits). Within each market, firms optimally choose a product basket (export only product 1, export only product 2, or export both products) and market-

[27] If we introduced a positive fixed cost to export on top (or instead) of the market-specific fixed costs, $F_{US}$ and $F_{ROW}$, there would be an additional source of economies of scale across markets. This is, however, unnecessary for our analysis. For the same reason, we do not add market-product fixed costs on top of the market and product fixed costs.

product prices. This allows for multiple combinations of export decisions. Since in this section we are interested in describing interdependencies that occur at the destination level, we focus on that level of decision-making.

Let $\varphi_1(\zeta, \tau_{US})$, $\varphi_2(\zeta, \tau_{ROW})$, $\varphi_B(\zeta, \tau_{US}, \tau_{ROW})$ denote maximized profits of entry modes 1, 2 and $B$, respectively. These profits are maximized over product basket composition and over market-product prices. The choice between entry modes depends on tariffs and the firm idiosyncratic parameters, $\zeta$. We define sets of firm-level parameter values, or zones, that lead to the different entry modes as

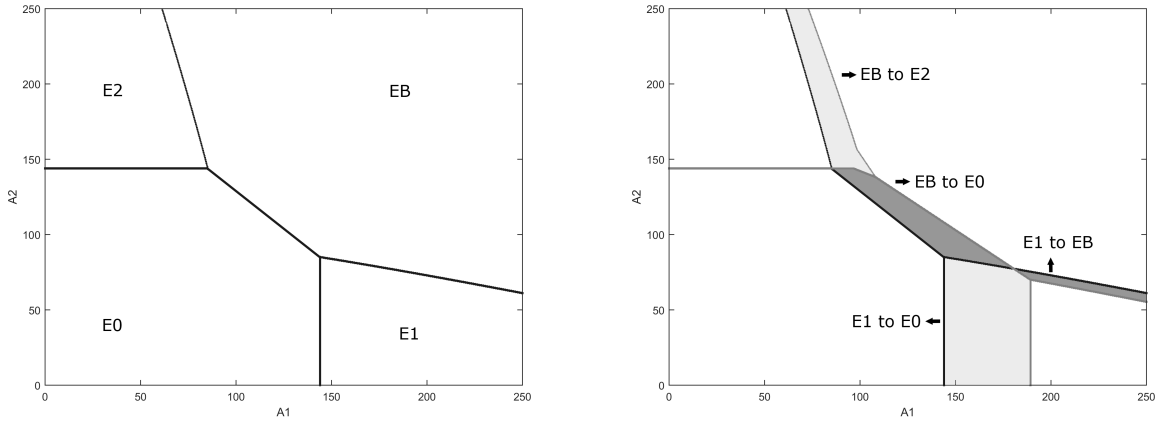
$$
\begin{aligned}
E_0(\tau_{US}, \tau_{ROW}) &= \{\zeta \in \mathcal{Z} : \varphi_1(\zeta, \tau_{US}) < 0; \varphi_2(\zeta, \tau_{ROW}) < 0; \varphi_B(\zeta, \tau_{US}, \tau_{ROW}) < 0\}, \qquad (13)\\
E_1(\tau_{US}, \tau_{ROW}) &= \{\zeta \in \mathcal{Z} : \varphi_1(\zeta, \tau_{US}) \geq 0; \varphi_1(\zeta, \tau_{US}) \geq \varphi_2(\zeta, \tau_{ROW}); \varphi_1(\zeta, \tau_{US}) > \varphi_B(\zeta, \tau_{US}, \tau_{ROW})\},\\
E_2(\tau_{US}, \tau_{ROW}) &= \{\zeta \in \mathcal{Z} : \varphi_2(\zeta, \tau_{ROW}) \geq 0; \varphi_2(\zeta, \tau_{ROW}) > \varphi_1(\zeta, \tau_{US}); \varphi_2(\zeta, \tau_{ROW}) > \varphi_B(\zeta, \tau_{US}, \tau_{ROW})\},\\
E_B(\tau_{US}, \tau_{ROW}) &= \{\zeta \in \mathcal{Z} : \varphi_B(\zeta, \tau_{US}, \tau_{ROW}) \geq 0; \varphi_B(\zeta, \tau_{US}, \tau_{ROW}) \geq \varphi_1(\zeta, \tau_{US}); \varphi_B \geq \varphi_2(\zeta, \tau_{ROW})\},
\end{aligned}
$$

where $E_0$ is the exit zone, $E_1$ is the export-only-to-the-US zone, $E_2$ is the export-only-to-ROW zone, and $E_B$ is the export-to-both-markets zone. Note that, unlike in section 4, where we define export decision zones based on which products are exported, here we define the zones based on which foreign markets are served.

Naturally, relative to the situation considered in the section 4, now many more scenarios can arise depending on the combinations of fixed costs of entry, fixed costs of introducing products, and diseconomies of scope. Figure 3 plots a scenario that captures the relevant tradeoffs. It illustrates a situation in which tariffs are relatively high in the U.S. for product 2 and relatively high in ROW for product 1. In this case, Argentine firms with high $A_1$ tend to export to the U.S. and firms with high $A_2$ tend to export to ROW. Firms with high $A_1$ and high $A_2$ tend to export to both markets. The fixed costs of entry for each market create interdependencies across products, but not across markets. On the other hand, $F_1 > 0$, $F_2 > 0$ and diseconomies of scope in function $C(.)$ do. For simplicity, in these figures only demand shifters $A_1$ and $A_2$ vary across firms.

The left-hand side represents the initial equilibrium when the four zones are active. Firms with low demand shifters exit. Firms with a high demand shifter for one product, but not for the other, export only to the market that has a low tariff on the former. Firms with high demand shifters for both products serve both markets. Observe that the shape of Figure 3 is similar to that in panel (b) of Figure 2, where economies of scale are stronger than diseconomies of scope, although both

Fig. 3: Spillovers across markets




Notes: The figure illustrates export decision zones for different firm-level values for the demand shocks $A_1$ and $A_2$. The graph on the left plots a case of GSP preference on product 1, while the graph on the right plots an increase in the tariff of product 1 (a suspension of preferences). Export decision zones are denoted by $E_0, E_1, E_2, E_B$. US MFN tariffs are 20 and 60 percent for good 1 and good 2. ROW MFN tariffs are 60 and 0 percent. The demand and cost functions are as in Figure 1 with $\beta = 2$, $F_1 = F_2 = 8$.

are present.[28]

Now consider what happens when preferences on good 1 are suspended in the U.S. The right-hand side of Figure 3 plots that situation. There is a group of firms that stop exporting to the U.S. but keep exporting to ROW (light gray area on the top region of the figure). These are firms that shipped both goods, no longer find it optimal to pay $F_1$ to export good 1, but have demand shifter $A_2$ high enough to keep selling good 2 to ROW (where the tariff on good 2 is lower). There is another group of firms that exported only to the U.S. and decides to exit after the removal of the preference on good 1 (light gray area on the bottom region of the figure). They correspond to firms with low $A_2$ and moderate $A_1$, which exported to the U.S. only because of the tariff preference.

The dark gray areas in the figure represent situations when there are interdependencies across markets. There is a group of firms that stop exporting to the U.S. *and* to ROW (dark gray area on the central region of the figure). These are firms that sold both goods to both markets, but were near the break-even point to export. With the tariff hike, exporting good 1 becomes unprofitable; without good 1, serving each market becomes unprofitable. As a result, because of scale economies in the foreign sales of product 1, these firms exit both markets. Finally, there is an effect represented by a group of firms that keep exporting to the U.S. and *add* ROW (small dark gray area on the

[28] In Appendix A.3, we illustrate and briefly discuss two alternative scenarios. In Figure A1, we consider a situation with asymmetric trade policies across markets, like here, but where diseconomies of scope are stronger, so that the shape of the initial equilibrium looks like panel (a) of Figure 2. In Figure A2, we consider a symmetric situation across markets, in terms of both trade policies and other parameters.

right region of the figure). These are firms that have a high demand shifter $A_1$ and, for that reason, keep exporting good 1 to the U.S. after the tariff increase. However, as they now sell less of good 1 in the U.S., their marginal cost of other product-market combinations falls, making it worthwhile to serve ROW. This happens because of the economies of scope.

### 5.1 Empirical evidence on third-market effects

We now proceed to empirically test interdependencies across destinations. To study whether tariff hikes trigger third-country effects, we focus on the impact of the suspension in the U.S. on the probability of exporting to the rest of the world. We proceed analogously to our analysis of the extensive margin in the American market. Thus, in Table 12 we consider Argentinian firms that exported to the U.S. before the policy shock (so they could have been directly affected by the shock) and to markets other than the U.S. at some point during our sample. The goal is to see the effects of the suspension on the extensive margin of exports, as in Table 7, but considering the probability of exporting to a non-U.S. market.

The results in Table 12 show that firms that are more exposed to the suspension of preferential treatment in the American market become less likely to export to other markets. In terms of magnitudes, if a firm exported only suspended products to the U.S. prior to 1997, then on average the suspension would reduce the probability that this firm would export to ROW after 1997 by four percentage points. This compares to a baseline probability of exporting to ROW after 1997 of 48 percentage points. This third-market effect is increasing in the preferential margin enjoyed before the shock, and is larger for firms whose exports are concentrated on GSP products. These results are similar to what we find for the American market. Hence, there is a positive externality to other markets; since the shock is negative (a reduction of market access), it affects negatively export participation in the rest of the world.

Although the received literature does not usually investigate such effects, this result follows directly from our theoretical framework. Specifically, this *positive* interdependence across markets is generated by scale economies within products and across markets (namely, $F_1$ and $F_2$ in the model). Diseconomies of scope work in the direction of creating negative interdependences, which in our context would imply starting to export to ROW because of the shock. The empirical findings in Table 7 support the idea that scale economies dominate diseconomies of scope across destinations. In what follows, we test for heterogeneous impacts across firms to further scrutinize this possibility.

With scale economies within products, exit in ROW is triggered by exit in the U.S. This is

illustrated by the central dark gray area in the right-hand side of Figure 3. Basically, if a firm leaves the American market, recovering the product fixed costs by selling only in ROW may not be possible, in which case the firm stops exporting altogether. On the other hand, if a firm kept serving the American market after the increase in the tariff, because of the diseconomies of scope the profitability of selling to ROW would rise, not fall. In that case, we would not observe exit from ROW, and possibly even entry in ROW (as in the dark gray area in the right region of the right-hand side of Figure 3).

In Table 13, we disentangle these possibilities. Specifically, we replicate the regressions in Table 12, but interacting our main variable with a dummy that is one if the firm exits the American market after 1997. The results show, first, that firms that do not exit the U.S. hardly change their export participation in third markets. This indicates that, although we find evidence that diseconomies of scope influence firms' export basked composition in the market affected by the policy shock, they are not strong enough to influence firm export participation in third markets. On the other hand, the results in Table 13 reveal that the policy-induced exit from other markets stems solely from economies of scale, since the results are driven exclusively by firms that also exit the U.S.

Now, if the fundamental force linking the two markets is indeed the existence of scale economies, then exit from ROW must depend on how important the exports to the affected market were for the firm. Specifically, in the presence of scale economies at the firm level, a policy that forces a firm out of a particular market is more likely to trigger third-market effects if that market is relatively important for the firm. Conversely, for firms that exported only a tiny value of suspended products to the U.S., the shock would have a correspondingly tiny effect on their presence in other markets. Thus, under scale economies, third-market effects should stem mostly from the firms for which sales to the U.S. were more meaningful.

To further investigate that hypothesis, we split firms based on their U.S. exposure. Table 14 reports the estimates of two different groups of exporters according to their U.S. intensity. To measure U.S. intensity pre-1997, let $X_{jt}^{US}$ denote exports of firm $j$ to the U.S. in year $t$ and $X_{jt}$ denote total exports of firm $j$ in year $t$. We define U.S. intensity as:[29]

[29]In unreported analysis, we explore alternative measures of U.S. intensity. Namely, we use $sh_j^{US2} \equiv \frac{X_{jt'}^{US}}{X_{jt'}}$, where $t'$ is the latest year with non-zero exports to the U.S. before the shock; and $sh_j^{US3} \equiv Max\{sh_{j1994}^{US}, sh_{j1995}^{US}, sh_{j1996}^{US}\}$, where $sh_{jt}^{US} \equiv \frac{X_{jt}^{US}}{X_{jt}}$. Results are very similar using those alternative measures.

$$sh_j^{US} \equiv \frac{\sum_{t=1994}^{1996} X_{jt}^{US}}{\sum_{t=1994}^{1996} X_{jt}}.$$

We then define a threshold for a firm's "sufficiently high U.S. exposure." In Table 14 we set the threshold at the median of each measure: "Low U.S. share" ($sh_j^{US} < p50$) and "High U.S. share" ($sh_j^{US} \geq p50$).

The results support the hypothesis of third-country effects being conditional on a relevant participation in the U.S. market. That is, we find a third-market effect that reproduces (qualitatively) the effect in the U.S. when the American market is sufficiently important for the firm, but not otherwise, in which case the policy shock has no effect on the firm's export participation in third markets.

In Table 15, we carry out a sensitivity analysis for different threshold values, focusing on the estimates for the share of suspended products including all firms.[30] Notice that the impact of the suspension increases as we move across the distribution of the US-intensity, which is suggestive of third-market effects depending on how relevant the market hit by the tariff hike is for the firm. The exception is when we look at the firms that are heavily concentrated in the U.S. market, for which the shock probably does not affect the decision to export to the U.S., and hence the decision to export elsewhere.

Finally, we also for test heterogeneous effects regarding firm size. Figure 3 offers a good illustration for this situation. In both panels, the firms that exit ROW are the ones that have relatively small demand shifters $A_1$ and $A_2$, which are associated with low sales. In contrast, those that have high demand shifters absorb the tariff hike and keep exporting. This is because it is easier for large firms to cover the market and product fixed costs, since their variable profits are higher. This puts them far from the break-even point where the shock can trigger exit in third markets through economies of scale.

In Table 16 we test that prediction by interacting our main variable with an indicator for small firms based on total firm exports and defined according to two different thresholds: below the 25th percentile and below the 50th percentile. For the first threshold, we find that the negative impact on the extensive margin in third markets is indeed greater for smaller firms. As expected, that result goes away once we use a high threshold, at the 50th percentile, which includes many firms that are not "small."

[30] Results are similar if we consider instead GSP firms or the average MFN tariff of suspended products.

Hence, the tariff suspension in the U.S. triggered the exit of some affected firms not only from the American market, but also from other foreign markets. This appears to have happened because of economies of scale linking the U.S. to other markets from the perspective of Argentinian exporting firms. A rich set of evidence supports that view. First, exit from other markets due to the shock is driven exclusively by firms that also existed the U.S. Second, exit from other markets driven by the shock affected only firms that relied heavily on the American market for their foreign sales. And third, the effect was driven by small exporters. All of these are consequences of a mechanism where economies of scale at the firm level drive interdependencies across markets.

# 6 Conclusion

In this paper, we estimate the firm-level impact of tariff hikes on specific products. Our identification strategy is particularly clean. It relies on unanticipated tariff changes by the United States, which affected only imports coming from Argentina, and only a subset of the products exported by Argentina to the American market. The U.S. could impose the tariff hikes without any institutional restriction because they happened in the context of the Generalized System of Preference, which is offered to developing countries on a unilateral basis.

We find that the removal of preferences, which represented an increase in tariffs from zero to its MFN level for the Argentinian firms previously benefiting from them, had a clear negative effect on the extensive margin: firms more affected by the increase in tariffs became less likely to export to the U.S. after the shock. On the other hand, intensive margin effects were largely mute: firms that kept serving the American market did not experience a clear drop in total sales to that market.

The lack of clear intensive margin effects is explained by changes in the "sub-extensive" and "sub-intensive" margins reflecting the reallocation of firm resources across products. Specifically, we find that affected firms reduced the share of affected products in their export baskets to the U.S. This happened for two reasons. First, they decreased the volume and exported less often the products suspended from the preference list. Second, and more remarkably, affected firms also increased the volume and started to export other, non-suspended products.

At least as surprising is the finding that our extensive margin results extend to third markets, where policy did not change. That is, the firms more affected by the policy shock in the American market not only became more likely to exit that market; they also became more likely to exit other markets and stop exporting altogether.

A key advantage of our approach is the identification strategy, which relies on an exogenous change in policy from the firms' perspectives that affects imports from only one country and only of some of the products imported from that country. To reconcile our findings with theory, we develop a reduced-form framework that rationalizes the observed export interdependencies. We show how the results on the extensive margin and third-country effects require increasing returns emanating from country and product specific fixed costs. We also show how the effect of tariff changes on the sub-extensive and sub-intensive margins requires diseconomies of scope, where exporting a product increases the marginal cost of exporting the rest of products in the export mix. Clearly, the uncovered interdependencies in exporting have important implications for quantifying the consequences of changes in import tariffs.

On the policy front, we find that GSP can significantly affect firm decisions, across products and across markets. Specifically, our results indicate that nonreciprocal preferences can be an effective policy instrument to stimulate foreign market entry, consistent with the GSP goal of promoting export-led growth. Furthermore, since similar effects are observed also in third markets, it follows that preferences to one market can have global consequences. On the other hand, since the preferences are selective across products and induce firms to shift their export focus to the favored goods at the expense of the non-selected ones, for perennial exporters the preferences may serve as a source of extra rents but have little effect on the aggregate productivity of the beneficiary countries. Those findings can serve as a starting point for a thorough assessment of the merits of programs of nonreciprocal preferences across the globe.

Naturally, our results are drawn from a specific institutional environment, and generalizations must be considered carefully. Nevertheless, it is worth mentioning that our policy shock shares several characteristics with recent changes in tariffs, especially in the U.S.: tariffs rise (rather than fall) suddenly, following unilateral decisions (and not because of bilateral or multilateral negotiations), affecting specific countries and sectors (instead of most trade partners and most goods). Since in recent history such cases are relatively rare, our results can offer useful insights in case such events become recurring in the future.

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Table 1: Argentine exports to the U.S., product level, 1996

| | All Products (1) | GSP Products (2) | Suspended Products (3) |
|---|---|---|---|
| **All Products** | | | |
| Value (millions of 1996 USD) | 2278.4 | 388.1 | 126.1 |
| Number of 8-digit products | 1340 | 595 | 123 |
| Percentage of total exports | | 17.0% | 5.5% |
| Percentage of GSP exports | | | 32.5% |
| GSP claimed | | 90.0% | 95.4% |
| Average MFN tariff | 2.4% | 3.7% | 3.6% |
| **Manufacturing** | | | |
| Value (millions of 1996 USD) | 1987.2 | 373.3 | 118.9 |
| Number of 8-digit products | 1235 | 568 | 120 |
| Percentage of total exports | | 18.8% | 6.0% |
| Percentage of GSP exports | | | 31.8% |
| GSP claimed | | 93.7% | 96.8% |
| Average MFN tariff | 2.4% | 3.8% | 3.9% |

Notes: Data from USITC.

Table 2: Selection of suspended products

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Imports ARG 1996 | 0.259 | 0.085 | 0.077 | 0.061 | 0.170 |
| | (0.359) | (0.217) | (0.213) | (0.199) | (0.165) |
| Import Growth ARG | | | 0.011 | 0.011 | 0.007 |
| | | | (0.007) | (0.007) | (0.011) |
| Imports ROW 1996 | | | | 0.007 | 0.012 |
| | | | | (0.006) | (0.008) |
| Import Growth ROW | | | | 0.020 | −0.102 |
| | | | | (0.064) | (0.080) |
| MFN tariff | 0.279 | 1.160 | 1.163 | 1.302 | 1.316 |
| | (0.662) | (0.992) | (0.995) | (1.002) | (1.933) |
| Product effects (4 digits) | | | | | Yes |
| Conditional on growth sample | | Yes | Yes | Yes | Yes |
| Observations | 610 | 395 | 395 | 395 | 395 |
| R-squared | 0.002 | 0.005 | 0.008 | 0.014 | 0.334 |

Notes: Data from USITC. Standard errors in parentheses. No estimate is statistically significant. Imports ARG and Imports ROW refer to imports for the year 1996. Import growth is computed as the log change in imports between 1995–1996 and 1993–1994. Columns (1) and (2) differ in that column (2) conditions on the sample of columns (3) to (5), that is, product observations for which the growth rate can be computed.

Table 3: Change in the share of suspended products

| | Double Difference | | Triple Difference | |
|---|---|---|---|---|
| | All products | GSP products | All products | GSP products |
| | (1) | (2) | (3) | (4) |
| $SUSP \times POST$ | $-0.025^{**}$ | $-0.204^{**}$ | $-0.020^{**}$ | $-0.160^{**}$ |
| | (0.010) | (0.081) | (0.011) | (0.072) |
| Observations | 1906 | 912 | 1906 | 912 |
| Products | 953 | 456 | 953 | 456 |
| Average share susp | 0.058 | 0.374 | 0.058 | 0.374 |
| Year effects | Yes | Yes | | |
| Product effects | Yes | Yes | | |
| Year-origin effects | | | Yes | Yes |
| Product-year effects | | | Yes | Yes |
| Product-origin effects | | | Yes | Yes |

Notes: Regressions at the 8-digit product level. Data from USITC between 1996 and 1999, excluding 1997. Dependent variable: share of 8-digit product in total exports of source country $m$ to the U.S., with $m = \{\text{Argentina}\}$ in double difference, and $m = \{\text{Argentina, rest of the world}\}$ in triple difference. SUSP: binary variable that takes the value of one for products that were suspended from the GSP in 1997 and originated from Argentina. POST: binary variable that takes the value of one for the years 1998-1999. Columns (1) and (3): sample of all products with strictly positive exports from Argentina before and after 1997. Columns (2) and (4): sample of all products granted GSP in 1996 and with strictly positive exports from Argentina before and after 1997. Average share is the average share of suspended products in 1996, defined between 0 and 100. Standard errors clustered at the product level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 4: Trade elasticity at the product level

| | 8 digits | 6 digits | 4 digits |
|---|---|---|---|
| | (1) | (2) | (3) |
| Tariff | $-10.22^{**}$ | $-5.09^{**}$ | $-1.78^{*}$ |
| | (4.88) | (2.47) | (1.06) |
| Number of products | 845 | 741 | 454 |
| Product effects | Yes | Yes | Yes |

Notes: Data from USITC. Dependent variable: log exports. Tariffs are defined as percentage points. Sample years: 1996 and 1998. Products are defined at the 8-digit (column 1), 6-digit (column 2), and 4-digit (column 3) level of disaggregation. In columns 2 and 3 tariffs are weighted by the share of each 8-digit product in total exports in 1996. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 5: Argentine exports to the U.S., firm level

| | 1994-1996 (1) | 1998-2001 (2) |
|---|---|---|
| Number of firms | 3267 | 2036 |
| Median number of destinations | 3 | 6 |
| Median number of products | 4 | 8 |
| *Participation in firms exports* | | |
| Suspended products* | 0.31 | 0.26 |
| Suspended products | 0.13 | 0.12 |
| Non-suspended GSP products | 0.35 | 0.34 |
| Non-GSP products | 0.51 | 0.53 |

Notes: Data from customs. Firms in 1998-2001 are those that exported before 1997 to the U.S. Suspended products* considers only firms that sell at least one suspended product to the U.S. between 1994-1996.

Table 6: Pre-suspension comparison of firms

| | Suspended firms | | | Non-suspended GSP firms | | | Difference | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std.Dev. | Obs. | Mean | Std.Dev. | Obs. | Diff | SE |
| Growth 96–95 | 0.02 | 0.042 | 1,538 | 0.03 | 0.037 | 2,148 | -0.01 | 0.127 |
| Growth 96–94 | 0.07 | 0.057 | 1,188 | 0.08 | 0.048 | 1,656 | -0.01 | 0.067 |

Notes: Data from customs. Table compares export growth to the U.S. between 1995 and 1996 and between 1994 and 1996, of two groups of firms depending on whether they were affected by the change in policy of 1997: suspended firms and non-suspended GSP firms. Suspended firms are defined as those that exported at least one suspended product in 1996. Non-suspended GSP firms correspond to those that exported at least one GSP-eligible good, but not a suspended one, in 1996. Columns (1) and (4) report the mean, columns (2) and (5) the standard deviation, and columns (3) and (6) the number of observations for the two groups of firms. Column (7) reports the difference in means (difference between columns 1 and 4) and column (8) the standard error of the difference.

Table 7: Probability of exporting to the U.S.

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Probability of exporting** | | | | |
| $SUSP \times POST$ | $-0.04^{***}$ | $-0.05^{***}$ | $-0.58^{***}$ | $-0.55^{**}$ |
| | (0.01) | (0.02) | (0.18) | (0.21) |
| Observations | 22869 | 5803 | 22869 | 5803 |
| Firms | 3267 | 829 | 3267 | 829 |
| **Panel B: Probability of exporting** | | | | |
| $SUSP \times 1998$ | $-0.04^{**}$ | $-0.05^{**}$ | $-0.59^{***}$ | $-0.65^{**}$ |
| | (0.02) | (0.02) | (0.22) | (0.26) |
| $SUSP \times 1999$ | $-0.04^{***}$ | $-0.04^{**}$ | $-0.54^{**}$ | $-0.34$ |
| | (0.01) | (0.02) | (0.23) | (0.27) |
| $SUSP \times 2000$ | $-0.05^{***}$ | $-0.05^{***}$ | $-0.52^{**}$ | $-0.45$ |
| | (0.01) | (0.02) | (0.23) | (0.28) |
| $SUSP \times 2001$ | $-0.04^{***}$ | $-0.05^{***}$ | $-0.65^{***}$ | $-0.75^{***}$ |
| | (0.01) | (0.02) | (0.18) | (0.21) |
| Observations | 22869 | 5803 | 22869 | 5803 |
| Firms | 3267 | 829 | 3267 | 829 |

Notes: Regressions at the firm-year level. Data from Argentine customs. Dependent variable: indicator variable for positive firm exports to the U.S. Treatment variable: initial firm share of suspended products in total exports during 1994-1996 (columns 1 and 2) and firm weighted average MFN tariff of suspended products during 1994-1996 (columns 3 and 4), both interacted with a POST indicator that is equal to one after 1997. Suspended products are those suspended from GSP from Argentina in 1997. Sample: All firms with positive exports to the U.S. in 1994-1996 (Columns 1 and 3) and firms with more than 80 percent of exports under GSP in 1994-1996 (Columns 2 and 4). Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 8: Firm-level exports of suspended and non-suspended products to the U.S.

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Total exports** | | | | |
| $SUSP \times POST$ | −0.21 | −0.51* | 0.08 | −2.28 |
| | (0.19) | (0.27) | (2.49) | (3.04) |
| Observations | 2962 | 728 | 2962 | 728 |
| Firms | 1481 | 364 | 1481 | 364 |
| **Panel B: Exports of suspended products** | | | | |
| $SUSP \times POST$ | −0.86** | −1.10** | −4.09 | −3.88 |
| | (0.36) | (0.54) | (2.93) | (2.84) |
| Observations | 585 | 259 | 585 | 259 |
| Firms | 402 | 158 | 402 | 158 |
| **Panel C: Exports of non-suspended products** | | | | |
| $SUSP \times POST$ | 1.01** | 1.30** | 16.06*** | 13.32** |
| | (0.43) | (0.56) | (5.68) | (6.60) |
| Observations | 2156 | 458 | 2156 | 458 |
| Firms | 1280 | 282 | 1280 | 282 |

Notes: Regressions at the firm-year level. Data from Argentine customs. Dependent variable: Log total exports (Panel A); Log exports of suspended products (Panel B); Log exports of non-suspended products (Panel C). Treatment variables are analogous to Table 7. Time periods are collapsed into before and after 1997 and only firms with positive exports in both time periods are kept in the sample. All regressions include firm and year fixed effects, and firm-year dummies for firm size as controls. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 9: Product substitution, U.S. market

| | Post binary variable | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Share of suspended products** | | | | |
| $POST$ | $-0.06^{***}$ | $-0.18^{***}$ | | |
| | (0.005) | (0.014) | | |
| $SUSP \times POST$ | | | $-3.63^{***}$ | $-3.14^{***}$ |
| | | | (0.28) | (0.27) |
| **Panel B: Probability of exporting at least one suspended product** | | | | |
| $POST$ | $-0.08^{***}$ | $-0.22^{***}$ | | |
| | (0.006) | (0.016) | | |
| $SUSP \times POST$ | | | $-3.89^{***}$ | $-3.10^{***}$ |
| | | | (0.29) | (0.27) |
| **Panel C: Probability of exporting at least one non-suspended product** | | | | |
| $POST$ | $0.04^{***}$ | $0.12^{***}$ | | |
| | (0.004) | (0.012) | | |
| $SUSP \times POST$ | | | $2.39^{***}$ | $2.22^{***}$ |
| | | | (0.25) | (0.27) |
| Observations | 22869 | 5803 | 22869 | 5803 |
| Firms | 3267 | 829 | 3267 | 829 |

Notes: Regressions at the firm-year level. Data from Argentine customs. Dependent variable: firm share of suspended products in total exports (Panel A); indicator variable for positive exports of suspended products (Panel B); indicator variable for positive exports of non-suspended products (Panel C). Treatment variable: POST indicator variable for years after 1997 (Columns 1 and 2) and firm weighted average MFN tariff of suspended products during 1994-1996 interacted with the POST dummy (Columns 2 and 4). Suspended products are those suspended from GSP from Argentina in 1997. Sample: All firms with positive exports to the U.S. in 1994-1996 (Columns 1 and 3) and firms with more than 80 percent of exports under GSP in 1994-1996 (Columns 2 and 4). All regressions include firm and year fixed effects, and firm-year dummies for firm size as controls. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 10: Product hierarchy within firms, U.S. market

| | Suspension dummy | | Tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Probability of being core** | | | | |
| $SUSP \times POST$ | $-0.01^{*}$ | $-0.05^{***}$ | $-0.23^{*}$ | $-0.72^{**}$ |
| | (0.01) | (0.02) | (0.12) | (0.31) |
| Observations | 72978 | 16815 | 54691 | 13347 |
| Firm-products | 15372 | 3567 | 11680 | 2902 |
| **Panel B: Probability of being top 2** | | | | |
| $SUSP \times POST$ | $-0.02^{**}$ | $-0.08^{***}$ | $-0.50^{***}$ | $-1.46^{***}$ |
| | (0.01) | (0.02) | (0.16) | (0.40) |
| Observations | 57569 | 12470 | 42876 | 10034 |
| Firm-products | 12081 | 2654 | 9102 | 2173 |
| **Panel C: Probability of being top 3** | | | | |
| $SUSP \times POST$ | $-0.02$ | $-0.05^{*}$ | $-0.29^{*}$ | $-1.06^{**}$ |
| | (0.01) | (0.03) | (0.16) | (0.42) |
| Observations | 49895 | 10975 | 37017 | 8796 |
| Firm-products | 10447 | 2298 | 7839 | 1874 |

Notes: Regressions at the firm-product level (6 digits). Data from Argentine customs. Dependent variable: indicator variable for core product (Panel A); indicator variable for top 2 product (Panel B); indicator variable for top 3 product (Panel C). Treatment variable: indicator variable for suspended products after 1997 (columns 1 and 2); MFN tariff of suspended products after 1997 (columns 3 and 4). Sample: All firms with positive exports to the U.S. in 1994–1996 (columns 1 and 3) and firms with more than 80 percent of exports under GSP in 1994–1996 (columns 2 and 4). Panel A conditions on the firm exporting more than one product, Panel B conditions on the firm exporting at least three products, and Panel C conditions on the firm exporting at least 4 products, all on average during 1994–1996. All regressions include firm-product and year fixed effects, and firm-year dummies for firm size as controls. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 11: Pairwise correlation coefficients: Unit values of dropped and added products

| | Unit value of dropped products | | | |
|---|---|---|---|---|
| Unit value of added products | Single | Max | Min | Median |
| Single | -0.06 | | | |
| Max | | -0.05 | | |
| Min | | | -0.03 | |
| Median | | | | -0.04 |

Notes: The sample includes firms with at least one suspended product in 1996 with positive exports in 1998 with a different export basket. "Single-uv" is the unit value of dropped and added products when reshuffling involved only one product. If reshuffling involved dropping or adding more than one product, we select the maximum ("Max-uv"), minimum ("Min-uv") and the median unit value ("Median-uv") of dropped and added products.

Table 12: Probability of exporting to non-U.S. markets

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| $SUSP \times POST$ | $-0.04^{**}$ | $-0.08^{***}$ | $-0.68^{***}$ | $-0.94^{***}$ |
| | (0.02) | (0.03) | (0.26) | (0.29) |
| Observations | 18116 | 4487 | 18116 | 4487 |
| Number of firms | 2588 | 641 | 2588 | 641 |

Notes: Regressions at the firm-year level. Data from Argentine customs. Dependent variable: indicator variable for positive exports to non-U.S. markets. The treatment variables are defined as in Table 7. Samples condition on positive exports to the U.S. for at least one year between 1994 and 1996 and to a non-U.S. market for at least one year between 1994 and 2001. All regressions include firm and year fixed effects, and firm-year dummies for firm size as controls. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 13: Probability of exporting to non-U.S. markets. Firms that exit the U.S.

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Firms that exit the US market after the suspension** | | | | |
| $SUSP \times POST$ | 0.01 | $-0.01$ | 0.01 | $-0.24$ |
| | (0.02) | (0.03) | (0.27) | (0.27) |
| $SUSP \times POST \times EXIT$ | $-0.12^{***}$ | $-0.15^{***}$ | $-1.92^{***}$ | $-1.93^{***}$ |
| | (0.04) | (0.04) | (0.57) | (0.61) |
| Observations | 18116 | 4487 | 18116 | 4487 |
| Number of firms | 2588 | 641 | 2588 | 641 |

Notes: Regressions at the firm-year level. Analogous to Table 12. The treatment variable is interacted with an *EXIT* indicator variable that is equal to one for firms that exit the U.S. market after 1997. All regressions include firm and year fixed effects, and firm-year dummies for firm size as controls. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 14: Probability of exporting to non-U.S. markets. U.S. exposure

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Measure 1** | | | | |
| **Low US share** | | | | |
| $SUSP \times POST$ | 0.02 | 0.01 | −0.05 | −0.14 |
| | (0.02) | (0.03) | (0.29) | (0.33) |
| Observations | 9058 | 2184 | 9058 | 2184 |
| Number of firms | 1294 | 312 | 1294 | 312 |
| **High US share** | | | | |
| $SUSP \times POST$ | $-0.11^{***}$ | $-0.18^{***}$ | $-1.42^{***}$ | $-1.91^{***}$ |
| | (0.03) | (0.04) | (0.41) | (0.47) |
| Observations | 9058 | 2303 | 9058 | 2303 |
| Number of firms | 1294 | 329 | 1294 | 329 |

Notes: Regressions at the firm-year level. Data from Argentine customs. Dependent variable: indicator variable for positive firm exports to a non-U.S. market. Treatment variable: initial firm share of suspended products in total exports during 1994-1996 (columns 1 and 2) and firm weighted average MFN tariff of suspended products during 1994-1996 (columns 3 and 4), both interacted with a POST indicator that is equal to one after 1997. Suspended products are those suspended from GSP from Argentina in 1997. Sample: All firms with positive exports to the U.S. in 1994-1996 (Columns 1 and 3) and firms with more than 80 percent of exports under GSP in 1994-1996 (Columns 2 and 4). Low and High U.S. share is defined according to whether the 1994-1996 share of US exports in total firm exports is below or above the median across firms. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 15: Probability of exporting to non-U.S. markets. Sensitivity analysis to U.S. exposure

| | p10 | p25 | p50 | p75 | p90 |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| **Measure 1** | | | | | |
| **Low US share** | | | | | |
| $SUSP \times POST$ | −0.02 | 0.02 | 0.02 | −0.01 | −0.02 |
| | (0.03) | (0.03) | (0.02) | (0.02) | (0.02) |
| Observations | 1806 | 4529 | 9058 | 13587 | 16303 |
| Number of firms | 258 | 647 | 1294 | 1941 | 2329 |
| **High US share** | | | | | |
| $SUSP \times POST$ | −0.05*** | −0.07*** | −0.11*** | −0.16*** | −0.12 |
| | (0.02) | (0.02) | (0.03) | (0.04) | (0.08) |
| Observations | 16310 | 13587 | 9058 | 4529 | 1813 |
| Number of firms | 2330 | 1941 | 1294 | 647 | 259 |

Notes: Regressions at the firm-year level. Data from Argentine customs. Dependent variable: indicator variable for positive firm exports to a non-U.S. market. Analogous to Table 14, column (1), with cutoffs for low and high US share defined according to whether the 1994-1996 share of US exports in total firm exports is below or above the percentiles 10, 25, 50, 75 and 90 across firms. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table 16: Probability of exporting to non-U.S. markets. Firm size

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Small firms: below 25th percentile** | | | | |
| $SUSP \times POST$ | $-0.04^{**}$ | $-0.08^{***}$ | $-0.62^{**}$ | $-0.90^{***}$ |
| | (0.02) | (0.03) | (0.26) | (0.29) |
| $SUSP \times POST \times SMALL(25\%)$ | $-0.21^{**}$ | $-0.16$ | $-2.40^{***}$ | $-1.81^{***}$ |
| | (0.09) | (0.11) | (0.54) | (0.55) |
| **Small firms: below 50th percentile** | | | | |
| $SUSP \times POST$ | $-0.04^{**}$ | $-0.08^{***}$ | $-0.58^{**}$ | $-0.89^{***}$ |
| | (0.02) | (0.03) | (0.25) | (0.28) |
| $SUSP \times POST \times SMALL(50\%)$ | $-0.003$ | 0.02 | $-1.07$ | $-0.57$ |
| | (0.068) | (0.08) | (1.06) | (1.16) |
| Observations | 18116 | 4487 | 18116 | 4487 |
| Number of firms | 2588 | 641 | 2588 | 641 |

Notes: Regressions at the firm-year level. Analogous to Table 12. The treatment variable is interacted with a *SMALL* indicator variable that is equal to one for firms that are below the 25th percentile (Panel A), and below the 50th percentile (Panel B), both in exports of suspended and non-suspended products. All regressions include firm and year fixed effects, and firm-year dummies for firm size as controls. Standard errors are clustered at the firm level. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

# A Appendices

## A.1 Timeline of news on suspension

**17 December 1995: First article mentioning the conflict on patents and the possibility of sanctions** The Argentinian government declares that the law was compatible with the GATT but the U.S. demands stronger recognition of property rights for pharmaceuticals. Ambassador Granillo Ocampo explains that the patent law was the only conflict Argentina had with the U.S. and dismisses the possibility of trade sanctions.

Furthermore, because the new patent law was voted by the Argentinian Congress and approved with unanimity, the government had its hands effectively tied. That helps to explain why the government, which at the time was otherwise completely aligned with the U.S., did not respond to the U.S. pressures with policy changes.

**8 January 1997: First article mentioning the possibility of GSP suspensions related to the conflict on patents** Enrique Mansilla, the chief of the chamber of exporters, says in an interview that he expected strong pressures from the U.S. in the near future. The article mentions that the potential punishment was the removal from GSP. This possibility was mentioned, according to the article, in the *Journal of Commerce*, which stated that President Clinton would adopt that decision in the "next week," although there was no indication on how the suspension would be implemented.

The article also mentions that another mechanism considered by the U.S. was the introduction of a clause on property rights in the ongoing discussions about the creation of a Free Trade Area of the Americas.

**15 January 1997: First indication that the suspension was going to be the removal of 50% of the products receiving preferences under GSP** The article came out after the formal communication of the decision of the U.S. Administration to partially suspend Argentina from GSP. It mentions that the cause of the suspension is the patent law on pharmaceuticals. The expectation was that the loss for Argentina would be about US$ 20 million dollars.

The article also mentions that the pressures on Argentina were lobbied for by a chamber of U.S. pharmaceutical multinational firms and that, according to Argentinian officers, the unilateral sanction demonstrated that the Argentinian law was compatible with the GATT. Moreover, the

fact that the sanction included only half of GSP-eligible products was taken as a surprise and was difficult to understand by the Argentinian authorities.

The timeline expected on January 15 was that the U.S. would select the products to be suspended in a month. On February 14, the products would be announced. And on April 1st the sanction would take place.

**Subsequent weeks: Substantial political activity trying to convince the Clinton Administration not to implement the sanction** Those attempts, nevertheless, did not bear fruit, and the suspension was put in place on 15 April 1997, although with fewer products suspended than anticipated.

## A.2 Results on product interdependence

We first show that the profit from selling good 2 minus the profit from not selling good 2—the key criterion to define whether to sell it—changes with $\tau_1$ if and only if variable costs are not independent and/or there are economies of scale through fixed costs. We then show a similar result at the intensive margin, when both products are sold.

**Result 1** *Dropping and adding non-suspended goods requires product interdependence.*

**Proof.** There are three possible cases. We consider each in turn.

**Case 1: good 1 is exported neither before nor after the shock**

This case is trivial. Since $\tau_1$ can affect the gains from selling good 2 only through changes in $q_1$, the impact is nil, regardless of possible interdependences.

**Case 2: good 1 is exported both before and after the shock**

The change in profits from selling good 2 in this case may depend on $\tau_1$. It can be written as (dropping firm parameters $\phi$, $A_1$ and $A_2$ for brevity):

$$\begin{aligned} \pi_B - \pi_1 &= [p_1 q_1 + p_2 q_2 - C(q_1, q_2) - \tau_1 q_1 - \tau_2 q_2 - F_1 - F_2] - \left[p_1^0 q_1^0 - C(q_1^0, 0) - \tau_1 q_1^0 - F_1\right] \\ = \quad & \left(p_1 q_1 - p_1^0 q_1^0\right) + p_2 q_2 - \left[C(q_1, q_2) - C(q_1^0, 0)\right] - \tau_1 \left(q_1 - q_1^0\right) - \tau_2 q_2 - F_2, \end{aligned} \tag{14}$$

where all variables are evaluated at the level that maximizes profits in each case. Superscript 0 on a variable related to product $i$ indicates that it is evaluated when $q_j = 0$, $i \neq j$. Note that $F_{US}$ does not appear in equation (14), because it is always incurred if good 1 is exported.

Under independence of variable costs, $C(q_1, q_2) = C(q_1, 0) + C(0, q_2)$. As a result, $q_1 = q_1^0$ and $p_1 = p_1^0$. Equation (14) then collapses to

$$p_2 q_2 - C(0, q_2) - \tau_2 q_2 - F_2,$$

which is independent of $\tau_1$.

With diseconomies of scope, $C(q_1, q_2) > C(q_1, 0) + C(0, q_2)$. As a result, $q_1 < q_1^0$ (see Auxiliary Result 2 for the proof). After the tariff hike, the change in profits from exporting good 2 has the same form as in equation (14), but now it is evaluated at a higher $\tau_1$. Thus, we can assess the impact of the shock on the desirability of selling good 2 by considering a small increase in

$\tau_1$. Differentiating $\pi_B - \pi_1$ as given by equation (14) with respect to $\tau_1$, while using the envelope theorem, we find

$$\frac{\partial(\pi_B - \pi_1)}{\partial \tau_1} = -q_1 + q_1^0 > 0.$$

Hence, an increase in $\tau_1$ makes it more appealing to export good 2. This result rationalizes the findings of Table 9, panel B, on substitutability: with the shock, the likelihood that a firm will add a non-suspended good to its export basket increases. This effect is illustrated by the dark gray area labeled "$D_1$ to $D_B$" in panel (a) of Figure 2.

**Case 3: good 1 is exported before but not after the shock**

The gain from selling good 2 before the tariff hike remains given by $\pi_B - \pi_0$, as shown in equation (14). But now, after the shock, $q_1 = 0$, so the gain from selling good 2 becomes

$$p_2^0 q_2^0 - C(0, q_2^0) - \tau_2 q_2^0 - F_2 - F_{US}. \tag{15}$$

Hence, the difference between (14) and (15) can be written as

$$\begin{aligned} &\left[p_1^0 q_1^0 - C(q_1^0, 0) - \tau_1 q_1^0\right] + \left[p_2^0 q_2^0 - C(0, q_2^0) - \tau_2 q_2^0\right] \\ &- \left[p_1 q_1 + p_2 q_2 - C(q_1, q_2) - \tau_1 q_1 - \tau_2 q_2\right] - F_{US}, \end{aligned} \tag{16}$$

or equivalently,

$$\pi_1 + \pi_2 - \pi_B. \tag{17}$$

Equation (17) is the "diff-in-diff" profits from exporting good 2 relative to not exporting it after the shock (in the case where good 1 is no longer exported), compared with the same difference before the shock (when good 1 is exported).

Let us first assess the sign of this double-difference. Clearly, under independence of variable costs and without a market fixed cost, $\pi_1 + \pi_2 - \pi_B = 0$ and the gains from exporting good 2 is unaffected by $\tau_1$. If we introduce $F_{US} > 0$ but keep the independence of variable costs, equation (17) becomes $\pi_1 + \pi_2 - \pi_B = -F_{US} < 0$. Because of the fixed cost to sell in the American market, there are economies of scale, which lower the gain from exporting good 2 after the shock. Now, introducing diseconomies of scope, $\pi_1 + \pi_2 - \pi_B > -F_{US}$ and the difference in (17) may become positive despite the fixed cost.

Therefore, whether selling good 2 in the US becomes more attractive after the shock depends

on the relative importance of the diseconomies of scope vs. the economies of scale. For a given size of the diseconomies of scope, there is a threshold value $F_{US}^{sc}$ that makes $\pi_1 + \pi_2 + \pi_B = -F_{US}^{sc}$. For any $F_{US} > F_{US}^{sc}$, economies of scale prevail and it may not be worthwhile to export good 2 after the shock even if it were exported before the shock. This rationalizes the findings of Table 7 on the extensive margin. This effect is illustrated by the light gray areas "$D_1$ to $D_0$" in both panels of Figure 2, as well as by the light gray area "$D_B$ to $D_0$" in Figure 2, panel (b). Conversely, if $F_{US} < F_{US}^{sc}$, diseconomies of scope prevail and it may become worthwhile to export good 2 after the shock even if it were not exported before the shock. This further rationalizes the findings of 9, panel B, on substitutability. This effect is illustrated by the area $D_1$ to $D_2$ in Figure 2, panel (a). ■

**Result 2** *Under diseconomies of scope, the optimal quantity of good 1 falls if good 2 is exported:* $q_1 < q_1^0$.

**Proof.** The first-order conditions when the firm exports only $q_1$ and when it exports both goods are, respectively

$$\frac{d\pi_1}{dq_1} = MR_1(q_1) - MC_1(q_1, q_2 = 0) - \tau_1 = 0$$

and

$$\frac{d\pi_1}{dq_1} = MR_1(q_1) - MC_1(q_1, q_2 > 0) - \tau_1 = 0,$$

where $MR_j$ and $MC_j$ represent marginal revenue and marginal cost of good $j$. Due to the diseconomies of scope, $MC_1(q_2 = 0) < MC_1(q_2 > 0)$ for a given level of $q_1$. Thus, given the concavity of the profit functions, the only way both conditions can be satisfied is if the optimal choices $q_1^0$ and $q_1$ satisfy $q_1 < q_1^0$. ■

**Result 3** *If goods 1 and 2 are sold both before after the shock, the shock makes it worthwhile to increase sales of good 2 if and only if there are diseconomies of scope.*

**Proof.** When the firm exports both goods he first-order condition with respect to good 2 is

$$\frac{d\pi_B}{dq_2} = MR_2 - MC_2 - \tau_2 = 0.$$

It is affected by the tariff on good 1 as follows:

$$\frac{d^2\pi_B}{dq_2 d\tau_1} = -\frac{dMC_2}{dq_1}\frac{\partial q_1}{\partial \tau_1}.$$

Under product independence, this expression is zero, since $MC_2$ is unaffected by $\tau_1$. Under diseconomies of scope, the expression is negative because $\frac{\partial q_1}{\partial \tau_1} < 0$ and $\frac{dMC_2}{dq_1} > 0$. ■

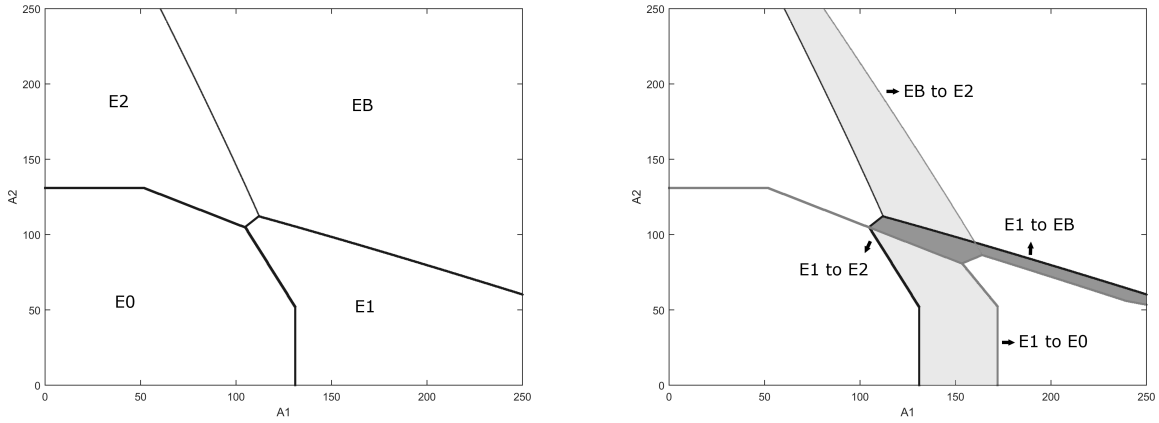
## A.3 Additional figures and tables

Figure A1 illustrates a situation analogous to that in Figure 3, except that the parameter governing diseconomies of scope is higher. For that reason, the initial equilibrium in the left-hand side looks akin to panel (a) of Figure 2. The right-hand side shows the equilibrium after the policy shock. With the removal of the tariff preference on good 1 in the U.S., the light gray areas, where firms exit the U.S. but do not change their decisions regarding entry in ROW, are qualitatively analogous to the situation depicted in Figure 3. The same is true about the region "$E_1$ to $E_B$," where firms add ROW. On the other hand, there is no longer a region where firms exit both markets. Instead, there is now a central region where firms replace the U.S. with ROW. This happens precisely because in this case diseconomies of scope are strong, relative to scale economies: as firms exit the U.S. and stop producing good 1, their marginal cost of producing good 2 decreases enough to make it worthwhile to incur $F_2$ and $F_{ROW}$ to sell it to ROW. We do not find empirical support for this possibility.

In turn, Figure A2 illustrates the symmetric case where tariffs are the same across countries (except for the preference), and the U.S. and ROW have the same market size and require the same fixed costs of entry. In the left-hand side, there are only two active zones: firms choose to export to both markets simultaneously or to exit.[31] In the right-hand side, the shaded area represents firms that exit both the U.S. and ROW. This happens because, for any given price, revenue and variable profits from selling good 1 fall. With lower variable profits, it becomes more difficult to cover the fixed cost of good 1, $F_1$. Furthermore, since total variable profits also fall, it becomes more difficult to cover the fixed costs of entering markets as well. Thus, firms that were just past the break-even point to export, and especially those that depended largely on U.S. revenue from good 1, exit both markets. While the primary reason to leave the American market is the direct effect of the tariff hike, it is its indirect effect through scale economies stemming from $F_1$ that pushes some firms out of the ROW market.

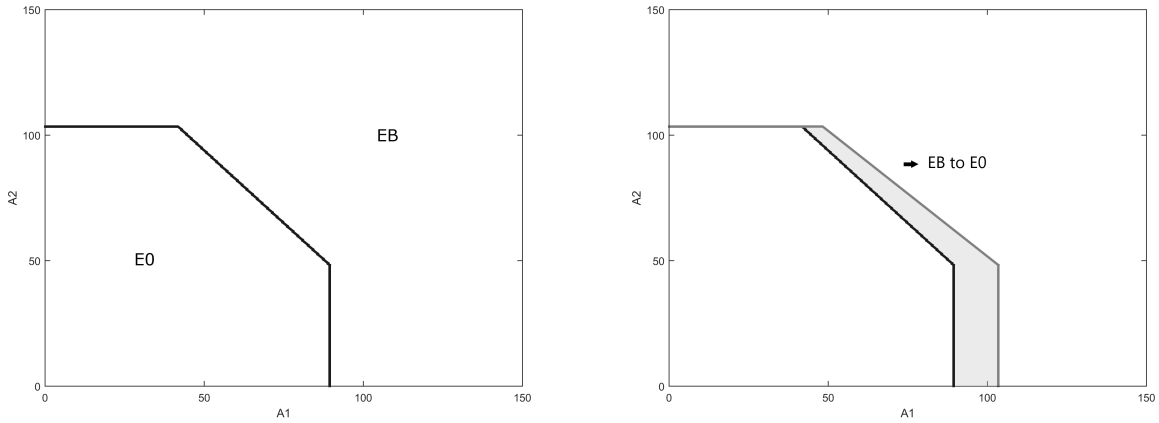
[31] Because of the symmetry, firms that export to only one country are indifferent between the U.S. and ROW after the preference is removed. To avoid confusion with the indifference situation, we select parameter values so that firms choose either to exit or to export to both markets.

Fig. A1: Spillovers across markets. Large diseconomies of scope




Notes: Analogous to Figure 3 with $\beta = 2.5$, $F_1 = F_2 = 4$ (instead of $\beta = 2$, $F_1 = F_2 = 8$).

Fig. A2: Spillovers across markets. Symmetric case




Notes: Similar to Figures 3 and A1 with MFN tariffs of 20 percent on both goods in both markets and $\beta = 3$, $F_1 = F_2 = 10$.

Table A1: List of Suspended Products

| | |
|---|---|
| 03037700 | Sea bass, frozen, excluding fillets, other meat portions, livers and roes |
| 04049010 | Milk protein concentrates |
| 07032000 | Garlic, fresh or chilled |
| 16041610 | Anchovies, whole or in pieces but not minced, in oil, in airtight containers, th |
| 17011110 | Cane sugar, raw, in solid form, w/o added flavoring or coloring, subject to add. |
| 28054000 | Mercury |
| 28139050 | Sulfides of nonmetals, excluding carbon disulfide and sulfides of arsenic or pho |
| 28323010 | Sodium thiosulfate |
| 28399000 | Silicates and commercial alkali metal silicates, excluding those of sodium and p |
| 28413000 | Sodium dichromate |
| 28415000 | Chromates and dichromates except of sodium, potassium, lead or zinc; peroxochrom |
| 28433000 | Gold compounds |
| 28491000 | Calcium carbide |
| 28500050 | Hydrides, nitrides, azides, silicides and borides other than of calcium, titaniu |
| 29021100 | Cyclohexane |
| 29051200 | Propan-1-ol (Propyl alcohol) and Propan-2-ol (isopropyl alcohol) |
| 29051300 | Butan-1-ol (n-Butyl alcohol) |
| 29052250 | Acyclic terpene alcohols, other than geraniol and isophytol |
| 29061400 | Terpineols |
| 29141200 | Butanone (Methyl ethyl ketone) |
| 29141300 | 4-Methylpentan-2-one (Methyl isobutyl ketone) |
| 29157000 | Palmitic acid, stearic acid, their salts and esters |
| 29171450 | Maleic anhydride, except derived in whole or in part from benzene or other aroma |
| 29182150 | Salicylic acid and its salts, not suitable for medicinal use |
| 29182210 | O-Acetylsalicylic acid (Aspirin) |
| 29182250 | Salts and esters Of O-acetylsalicylic acid |
| 29291015 | Mixtures of 2,4- and 2,6-toluenediisocyanates |
| 29329990 | Nonaromatic heterocyclic compounds with oxygen hetero-atom(s) only, nesoi |
| 29334030 | Pesticides of heterocyclic compounds with nitrogen hetero-atom(s) only, cont. a |
| 29339055 | Aromatic or modified aromatic analgesics, etc., affecting the CNS, of heterocycl |
| 32099000 | Paints and varnishes based on synthetic polymers or chemically modified natural |
| 33011910 | Essential oils of grapefruit |
| 33019010 | Extracted oleoresins consisting essentially of nonvolatile components of the nat |
| 33021010 | Mixtures of odoriferous substances, mixtures with a basis of these substances, u |
| 33021020 | Mixtures of or with a basis of odoriferous substances, used in the food or drink |
| 33029010 | Mixtures of or with a basis of odoriferous substances, used in other than the fo |
| 33030030 | Perfumes and toilet waters, containing alcohol |
| 33042000 | Eye make-up preparations |
| 33049950 | Beauty or make-up preparations & preparations for the care of the skin, excl. m |
| 33051000 | Shampoos |
| 33059000 | Preparations for use on the hair, nesoi |
| 33072000 | Personal deodorants and antiperspirants |
| 33074900 | Preparations for perfuming or deodorizing rooms, including odoriferous preparati |
| 34011110 | Castile soap in the form of bars, cakes or molded pieces or shapes |
| 35040050 | Peptones and their derivatives; protein substances and their derivatives, nesoi; |
| 35069900 | Prepared glues and other prepared adhesives, excluding adhesives based on rubber |
| 37011000 | Photographic plates and film in the flat, sensitized, unexposed, of any material |
| 37021000 | Photographic film in rolls, sensitized, unexposed, for X-ray use; of any materia |
| 37061030 | Sound recordings on motion-picture film of a width of 35 mm or more, suitable fo |
| 37079032 | Chemical preparations for photographic uses, nesoi |

Notes: List of products with suspended preferences in 1997.

| | |
|---|---|
| 38220050 | Composite diagnostic or laboratory reagents, nesoi |
| 39019090 | Polymers of ethylene, nesoi, in primary forms, other than elastomeric |
| 39021000 | Polypropylene, in primary forms |
| 39022050 | Polyisobutylene, other than elastomeric, in primary forms |
| 39029000 | Polymers of propylene or of other olefins, nesoi, in primary forms |
| 39039050 | Polymers of styrene, nesoi, in primary forms |
| 39044000 | Vinyl chloride copolymers nesoi, in primary forms |
| 39061000 | Polymethyl methacrylate, in primary forms |
| 39069050 | Acrylic polymers (except plastics or elastomers), in primary forms, nesoi |
| 39073000 | Epoxide resins in primary forms |
| 39076000 | Polyethylene terephthalate in primary forms |
| 39079900 | Polyesters nesoi, saturated, in primary forms |
| 39091000 | Urea resins; thiourea resins |
| 39095050 | Polyurethanes, other than elastomeric or cements, in primary forms |
| 39139020 | Polysaccharides and their derivatives, nesoi, in primary forms |
| 39219050 | Nonadhesive plates, sheets, film, foil and strip, nonflexible, nesoi, of noncell |
| 39239000 | Articles nesoi, for the conveyance or packing of goods, of plastics |
| 40111010 | New pneumatic radial tires, of rubber, of a kind used on motor cars (including s |
| 42010060 | Saddlery and harnesses for animals nesi, (incl. traces, leads, knee pads, muzzle |
| 43031000 | Articles of apparel and clothing accessories, of furskins |
| 43039000 | Articles of furskin, nesi |
| 44101100 | Waferboard, including oriented strand board, of wood |
| 44101900 | Particle board and similar board of wood, other than waferboard |
| 44111100 | Fiberboard of a density exceeding 0.8 g/cm3, not mechanically worked or surface |
| 48025210 | Writing paper, weighing 40 g/m2 to 150 g/m2, cont. n/o 10% by weight total fibe |
| 69109000 | Ceramic (o/than porcelain or china) sinks, washbasins, baths, bidets, water clos |
| 70071100 | Toughened (tempered) safety glass, of size and shape suitable for incorporation |
| 71141160 | Articles of silver nesoi, for household, table or kitchen use, toilet and sanita |
| 72022150 | Ferrosilicon containing by weight more than 55% but not more than 80% of silic |
| 72023000 | Ferrosilicon manganese |
| 73089095 | Iron or steel, structures (excluding prefab structures of 9406) and parts of str |
| 73159000 | Iron or steel, parts of chain (other than articulated link chain) |
| 74091150 | Refined copper, plates, sheets and strip, in coils, with a thickness over 0.15mm |
| 74092100 | Copper-zinc base alloys (brass), plates, sheets and strip, in coils |
| 74199950 | Copper, articles nesoi, not coated or plated with precious metal |
| 79011100 | Zinc (o/than alloy), unwrought, containing o/99.99% by weight of zinc |
| 79011250 | Zinc (o/than alloy), unwrought, o/than casting-grade zinc, containing at least 9 |
| 82072000 | Interchangeable dies for drawing or extruding metal, and base metal parts thereo |
| 84099150 | Parts nesi, used solely or principally with spark-ignition internal-combustion p |
| 84099199 | Parts nesi, used solely or principally with spark-ignition internal-combustion p |
| 84099991 | Parts nesi, used solely or principally with the engines of heading 8408, for veh |
| 84139190 | Parts of pumps, nesi |
| 84223090 | Machinery for filling,closing,sealing, capsuling or labeling bottles, cans, boxe |
| 84314910 | Parts suitable for use solely or principally with the machinery of heading 8426, |
| 84714937 | ADP printer units, nesoi, entered with the rest of a system |
| 84716057 | Assembled ADP printer units, nesoi, incorporating at least certain mechanisms, n |
| 84775100 | Machinery for molding or retreading pneumatic tires or for molding or otherwise |
| 84792000 | Machinery for the extraction or preparation of animal or fixed vegetable fats or |
| 84803000 | Molding patterns |
| 84813020 | Check valves of iron or steel for pipes, boiler shells, tanks, vats or the like |

Notes: Continuation of Table A1.

| | |
|---|---|
| 84818030 | Taps, cocks, valves & similar appliances for pipes, boiler shells, tanks, vats |
| 84818090 | Taps, cocks, valves & similar appliances for pipes, boiler shells, tanks, vats |
| 84819030 | Parts of hand operated and check appliances for pipes, boiler shells, tanks, vat |
| 85030065 | Stators and rotors for electric motors & generators of heading 8501, nesi |
| 85243100 | Pre-recorded discs for laser reading systems, reproducing phenomena other than s |
| 85243200 | Pre-recorded discs for laser reading systems, reproducing sound only |
| 85245210 | Pre-recorded magnetic video tape recordings of a width exceeding 4 mm but not ex |
| 85246000 | Pre-recorded sound or other similar recorded phenomena, recorded on cards incorp |
| 85249100 | Pre-recorded media, nesoi, with recordings of phenomena other than sound or imag |
| 85249940 | Pre-recorded media of sound or other similar recorded phenomena, nesoi |
| 85369000 | Electrical apparatus nesi, for switching or making connections to or in electric |
| 85389080 | Other parts nesi, suitable for use solely or principally with the apparatus of h |
| 87086080 | Pts. & access. of mtr. vehic. of 8701, nesoi, of 8702, and of 8704-8705, non-dr |
| 87087060 | Pts. & access. of mtr. vehicc of 8701, nesoi, and of 8702-8705, pts. & access. |
| 87089980 | Pts. & access., nesoi, of motor vehicles of 8701, nesoi, and 8702-8705 |
| 87169050 | Parts of trailers and semi-trailers and vehicles, not mechanically propelled, ne |
| 90039000 | Parts of frames and mountings for spectacles, goggles or the like |
| 90189010 | Mirrors and reflectors used in medical, surgical, dental or veterinary sciences, |
| 91131000 | Watch straps, watch bands and watch bracelets, of precious metal or of metal cla |
| 91132060 | Parts of watch bracelet of base metal, whether or not gold- or silver-plated, va |
| 94032000 | Furniture (o/than seats) of metal nesoi, o/than of a kind used in offices |
| 94035090 | Furniture (o/than seats) of wood (o/than bentwood), of a kind used in the bedroo |
| 94036080 | Furniture (o/than seats & o/than of 9402) of wooden (o/than bentwood) nesoi |

Notes: Continuation of Table A1.

Table A2: Probability of exporting to the U.S. Additional results

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Probability of exporting** | | | | |
| $SUSP \times POST$ | $-0.06^{***}$ | $-0.08^{***}$ | $-0.77^{***}$ | $-0.70^{**}$ |
| | (0.02) | (0.02) | (0.22) | (0.28) |
| Observations | 21469 | 4690 | 21469 | 4690 |
| Firms | 3067 | 670 | 3067 | 670 |
| **Panel B: Probability of exporting** | | | | |
| $SUSP \times 1998$ | $-0.05^{+}$ | $-0.06^{+}$ | $-0.68^{**}$ | $-0.61$ |
| | (0.03) | (0.03) | (0.31) | (0.37) |
| $SUSP \times 1999$ | $-0.06^{**}$ | $-0.06^{**}$ | $-0.62^{**}$ | $-0.33$ |
| | (0.02) | (0.03) | (0.30) | (0.38) |
| $SUSP \times 2000$ | $-0.08^{***}$ | $-0.09^{***}$ | $-0.89^{***}$ | $-0.84^{***}$ |
| | (0.02) | (0.03) | (0.24) | (0.29) |
| $SUSP \times 2001$ | $-0.07^{***}$ | $-0.11^{***}$ | $-0.89^{***}$ | $-1.03^{***}$ |
| | (0.02) | (0.02) | (0.25) | (0.29) |
| Observations | 21469 | 4690 | 21469 | 4690 |
| Firms | 3067 | 670 | 3067 | 670 |

Notes: Analogous to Table 7 restricting the sample to firms that do not only export suspended products ($SUSP$ variable below one). Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table A3: Firm-level exports to the U.S. Intensive margin, additional results

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Log exports – year by year** | | | | |
| $SUSP \times POST$ | −0.23 | −0.43** | −0.94 | −2.20 |
| | (0.15) | (0.22) | (1.89) | (2.44) |
| Observations | 2303 | 546 | 2303 | 546 |
| Firms | 329 | 78 | 329 | 78 |
| **Panel B: Log exports – before and after, conditional on exporting in 1996** | | | | |
| $SUSP \times POST$ | −0.26 | −0.49** | 1.00 | −1.72 |
| | (0.16) | (0.23) | (2.22) | (2.73) |
| Observations | 2310 | 556 | 2310 | 556 |
| Firms | 1155 | 278 | 1155 | 278 |
| **Panel C: Log exports – before and after** | | | | |
| $SUSP \times POST \times YEARLY$ | 0.044 | 0.005 | 1.58 | 2.61 |
| | (0.18) | (0.25) | (2.15) | (2.58) |
| $SUSP \times POST \times NONYEARLY$ | −0.30 | −0.67** | −0.53 | −4.11 |
| | (0.24) | (0.31) | (3.31) | (3.82) |
| Observations | 2962 | 728 | 2962 | 728 |
| Firms | 1481 | 364 | 1481 | 364 |

Notes: Compare with Table 8, Panel A. The table shows different sample specifications for estimating the effect of the change in policy on firm log exports. In Panel A observations are year by year and the sample is a balanced panel of firms that export to the U.S. in every year of the sample. In Panel B we aggregate firm exports over the periods 1994-1996 and 1998-2001, as in Table 8, and condition on exporting to the U.S. in the year 1996. Panel C uses the same sample as in Table 8 and adds an interaction with an indicator variable that is equal to one for firms that export to the U.S. in every year during the sample ($YEARLY = 1, NONYEARLY = 0$). Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

Table A4: Product substitutability, U.S. market. Additional results

| | Share of suspended products | | Average tariff increase | |
|---|---|---|---|---|
| | All firms | GSP firms | All firms | GSP firms |
| | (1) | (2) | (3) | (4) |
| **Panel A: Share of suspended products** | | | | |
| $SUSP \times POST$ | $-0.34^{***}$ | $-0.35^{***}$ | $-3.63^{***}$ | $-3.14^{***}$ |
| | (0.02) | (0.02) | (0.28) | (0.27) |
| **Panel B: Probability of exporting at least one suspended product** | | | | |
| $SUSP \times POST$ | $-0.36^{***}$ | $-0.34^{***}$ | $-3.89^{***}$ | $-3.10^{***}$ |
| | (0.02) | (0.02) | (0.29) | (0.27) |
| **Panel C: Probability of exporting at least one non-suspended product** | | | | |
| $SUSP \times POST$ | $0.24^{***}$ | $0.27^{***}$ | $2.39^{***}$ | $2.22^{***}$ |
| | (0.02) | (0.02) | (0.25) | (0.27) |
| Observations | 22869 | 5803 | 22869 | 5803 |
| Firms | 3267 | 829 | 3267 | 829 |

Notes: Compare with Table 9. In columns 1 and 2 the treatment variable is the initial firm share of suspended products in total exports during 1994-1996 interacted with a POST indicator variable as in Table 7, and unlike Table 9, where the treatment variable is a POST indicator variable. Significance at the 10, 5 and 1 percent level denoted with *, **, ***.

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