Export Survival in Africa and Latin America: The Impacts of Firm-Level Diversification, Synergies and Competition

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Abstract

Using firm-level export data from six African and Latin American countries – Senegal, Mexico, Burkina Faso, Uruguay, Guatemala and Peru, we examine factors that determine the survival of export flows. We explore the effects of competition from home-country exporters serving the same destination, other home-country exporters, and country-level factors, as well as firm-level export diversification, on export survival. We find that destination country-specific effects explain a notable share of the observed pattern of export survival rates. Unlike previous studies, we find that export survival rates decrease with the number of co-exporters serving the same product-country combination. We also find that the relationship between firm-level diversification and export flow survival is hump-shaped. In our baseline specification, an exporting flow was most likely to survive past the first year when the firm had a product-destination HHI of 0.72. The findings are robust to various alternative specifications.

1 Introduction

Aggregate export growth rates are anemic in many developing economies because export flows have low survival rates. Firms incur the expense of finding buyers overseas, but the exporting relationships often end quickly, usually in the first year. In the average year, 16% of Chinese and 30% of Chilean exporters (Olabisi, 2015; Blum et al., 2013) fail to maintain export flows from one year to the next. The impact of these failing export flows is significant. Das et al. (2007) estimate that the average firm invests half a million dollars to establish an exporting foothold in a foreign market — resources that may have been employed more profitably elsewhere in the economy. Mora (2016) finds that financially constrained firms that attempt to export and fail are more likely to experience lower domestic revenue growth and to go out of business than similar successful exporters and firms serving only the domestic market.

This paper has two main goals: We re-examine whether positive external economies — "synergies" — result from larger exporting clusters. Recent work, such as Cadot et al. (2013b), argues that the survival odds of new export flows increase with the number of exporters serving the same product-destination combination. We also examine how the survival of export flows responds to firm-level choices — in terms of product specialization or diversification. Our empirics rely on a unique firm-level dataset of exports from six Latin American and African countries. The primary data set was collected by the World Bank as part of its Export Dynamics Database initiative (Fernandes et al., 2016; Cebeci et al., 2012). We focus on Latin America and Africa, as these are two of the world's largest regions with development challenges. Our comparative approach of studying two regions allows us to extend the geographic scope of the existing literature and to offer insights into how regional differences may contribute to patterns of export failure.[1]

The paper's main finding is that export survival rates decrease with the number of co-exporters serving the same product-country combination. Other studies find that this relationship is positive and refer to this relationship as synergies (see, for example, Cadot et al. (2013b)); the positive relationship may be due to positive external economies. While we too can replicate those findings, once we control for the product-destination, the reported synergies not only disappear, but become negative. The findings imply that the positive relationship observed between export survival and exporter numbers in previous findings may be capturing the competitiveness of a particular country's products abroad. That is, more competitive industries may have more exporters and also have higher survival rates. We do not argue that synergies

[1]Section A.1 highlights these regional differences.

do not exist, but simply that the competitiveness effect dominates in our data sample. Thus, in this paper, we argue that having more firms selling goods in the same product-destination space represents *competition*, rather than synergies, as described in Cadot et al. (2013b). We show that export flow survival decreases with competition — i.e. more firms in an exporting cluster selling the same product to the same destination. Similarly, the reported benefits of greater firm-level product and destination counts in previous papers also change from positive to negative once we introduce firm-product and firm-destination fixed effects into the specification.

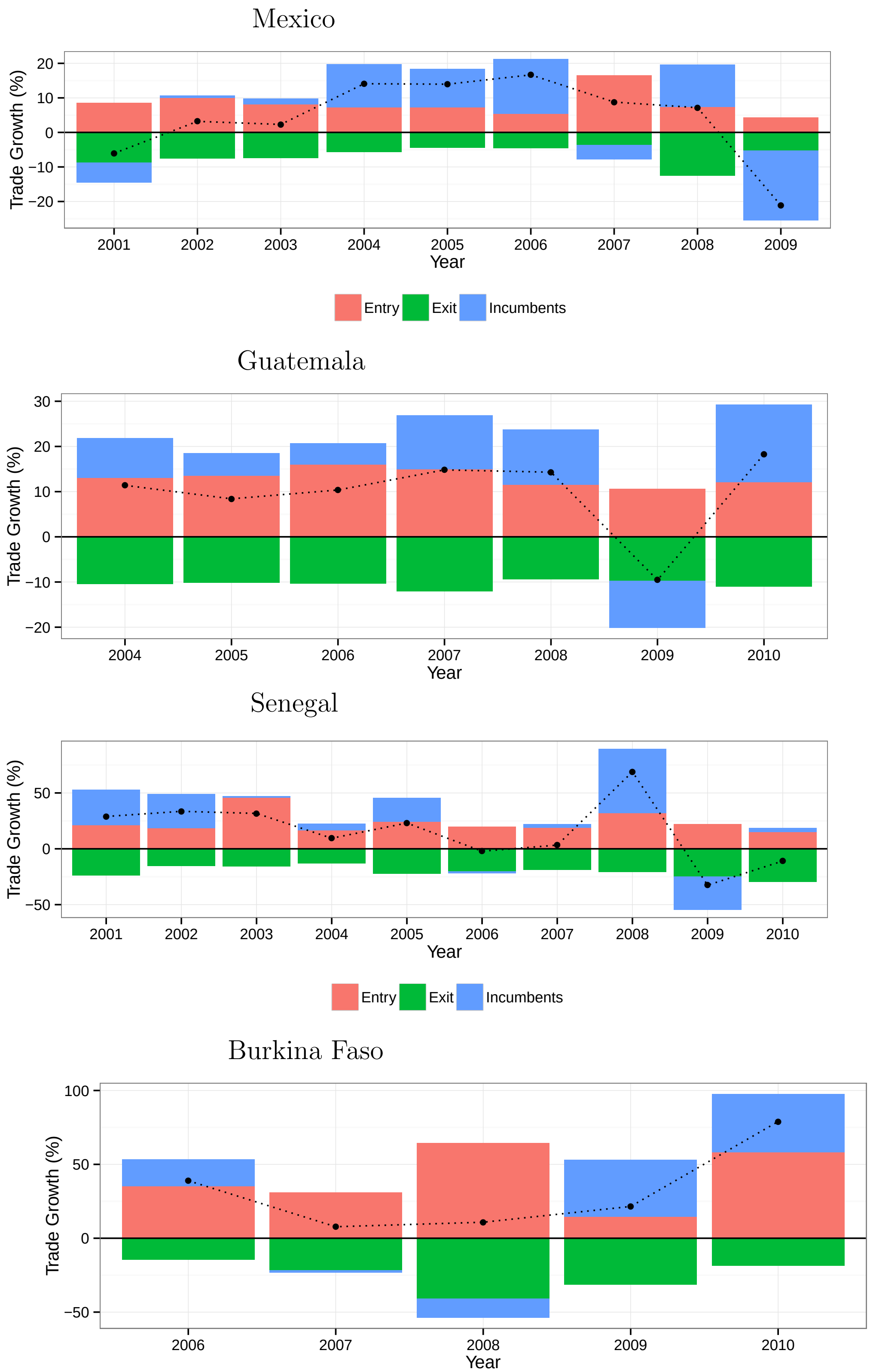
Second, we find that export flow survival rates respond to firm-level diversification. Specifically, export flow survival in the first year exhibits a hump-shaped relationship with diversification as measured by the firm-level Herfindahl-Hirschmann Index (HHI). The survival rates of export flows fall for the lowest levels of firm-level diversification (i.e., the highest HHI). Product diversification at the firm-level in the first year is the most relevant dimension of diversification to explain export flow survival rates. Diversification across product-destination combinations yields a pattern that is similar to product diversification. In our baseline specification, an export flow surviving past the first year of exporting was most likely with a product-destination HHI of 0.72.

To motivate the rest of this paper, and the importance of export survival to trade growth in developing economies, Figure 1 depicts its contribution to aggregate export growth for four selected economies. The connected dots indicate the aggregate export growth rate for each country-year in the figure. It also represents the sum of the stacked bars: the aggregate export growth from *entry*, i.e., new firm-product-destination flows; *survival*, i.e., exits by firm-product-destination flows that did not survive past the period; and the growth of flows from the previous year, or incumbents.[2]

A consistent pattern in all the figures is that the margin of export survival matters for aggregate export growth, as seen in the Figure from export flows that do not survive. Hypothetically, if all firm-product-destination flows were maintained from year to year in each instance in the graph and nothing else changed, export growth would be about 10% points higher for Guatemala and 5% points higher for Mexico. First-year export flows also contribute notably to export growth for all countries. While the literature generally agrees that new exporters contribute only marginally to export growth in the short term, this graph shows that new exporters, combined with product-market experimentation or discovery by incumbent exporters are the largest contributors to

[2]Note that export flow survival is not the same as exporter survival. An exporter may be responsible for more than one of the firm-product-destination export flows that make the unit of observation in our data. Exporter survival means that at least one of the export flows survives from one year to the next, or the export starts a new export flow in place of those that did not survive.

Figure 1: The Margins of Export Growth: 4 Countries



The graph shows year-on-year growth rates for four selected countries in our data. The contributions of export entry, failure, survival and growth by incumbents are highlighted with stacked color-coded bars. Data sourced from the World Bank firm-level export database was used to created the Export Dynamics Database (Cebeci et al., 2012).

export growth in these four economies.

We also find regional differences in the patterns of export survival.[3] For African economies, export survival is particularly relevant to growth. The negative contribution of exits is much larger for Burkina Faso and Senegal; the magnitude of exits as a share of export growth becomes clear when one considers the range of -50% to 50% on the vertical axis for Senegal, compared to the -20 to 20% for Mexico. Furthermore, nearly 59% of exporters fail to survive past one year in Senegal and 54% of export flows out of Tanzania fail (Cadot et al., 2013b). Recent estimates from aggregate trade figures suggest that, were African economies able to reduce export failure to the level of a developing economy like South Korea, long-run export growth rates would be 8.2%, not the historical average of 5.2% (Besedeš and Prusa, 2011). The preliminary evidence suggests that exporters' efforts may be spread too thinly; survival appears to be higher for products with clusters of exporters that may have 'network synergies' (Cadot et al., 2013b). This and other early efforts leave much room for research on the underlying causes of export failure, just as they raise important questions that are relevant beyond the African context.

The rest of the paper is organized as follows: Section 2 summarizes the literature and highlights our contributions, section 3 introduces the data and descriptive evidence, section 4 goes over the results and provides robustness checks, and section 5 concludes.

2 Related Literature

Our paper is closely related to the recent and growing list of papers that explore the determinants of the margins of trade — specifically, why firms initiate exporting relationships but fail to sustain those export flows from year to year. This section organizes the literature into papers that focus on firm-level drivers of export failure and survival, and the set of papers that focus on country-level drivers. Country-level drivers can be bilateral, e.g., distance and trade agreements, or they can be specific to the origin or destination country. Each subsection outlines our contribution to the subset of the literature.

[3] Promoting exports has become a top policy issue in Latin America, as the region relies significantly on exports, especially exports of natural resources. In 2015, exports shrank by 14% (Giordano and Ramos, 2016). Latin American countries have a long history of industrial policy, with the 1950-1980 period characterized by import substitution industrialization (i.e., inward-looking development), and marked by significant failures (Graciela and Robert, 2012). Policymakers in Latin America and elsewhere favor efforts to promote trade diversification, given the volatility of commodity exports (e.g. Volpe Martincus and Carballo, 2009; Brenton and Newfarmer, 2009; Cadot et al., 2013a). The estimations in section A.5 will explore these factors.

2.1 Export Flow Survival: Product and Firm-Level Drivers

Following previous findings in the literature, we examine whether firm-level choices about export diversification affect survival rates. Tovar and Martínez (2011) use firm-level data from Colombia to show that month-to-month survival rates are higher for firms that diversify exports across multiple countries, and even more so for firms diversifying exports across product categories. The same paper shows that larger export clusters within the same product-destination category (which the authors call networks) are associated with improved odds of survival of exporters in the cohort.[4] Using data from French firms between 1994 and 2008, Berthou and Vicard (2015) argue that experience and size of firms should be considered jointly. They find that as experience increases, export survival declines and that export survival is negatively related to firm size. Export survival of a firm is also related to the role that firms plays along the global production chain. There seem to be higher survival rate for firms that produce intermediate goods compared to final goods (Córcoles et al., 2015).

Our main contributions to the foregoing are: the use of a larger dataset, and specifications that control for product differences. We re-examine the finding of higher export flow survival rates for larger cohorts of exporters (or larger export clusters, covering six countries in two regions). The argument for synergies in export survival was first laid out in Cadot et al. (2013b), using data for four African economies. Our work is most closely aligned with this paper by Cadot et al. (2013b), as well as the paper by Stirbat et al. (2015) that documents patterns of export failure and survival in Laos, another developing economy.

Our main econometric specifications will include product-fixed effects, or controls for product type at the sector-level. Others have shown that trade relationships involving differentiated products are more likely to survive than trade relationships involving homogeneous goods (Fugazza and Molina, 2009).

2.2 Country-Level Drivers of Export Survival

Characteristics of origin and destination countries could matter for firm-level export survival (Behrens et al., 2013; Iacovone et al., 2013; Besedeš, 2013; Cadot et al., 2013b). The policy environment in the origin country is likely to affect trade costs and the ability to export. For example, institutional factors such as the rule of law, private property

[4] Melitz (2003) implies that it is firm-level factors that allow firms with better (production or marketing) technology to gain and retain markets. This is related to the tests in Cadot et al. (2013b) that use the number of destinations as a diversification measure. We use HHI, a more robust measure of diversification, as suggested by Di Giovanni and Levchenko (2012).

rights, and the political environment will determine the business environment and will facilitate or hinder the conduct of business domestically and internationally. Another country-level factor that can affect the success of firms in international market is the level of financial development. Access to private credit is likely to reduce production costs and facilitate trade (Manova, 2012; Beck, 2002; Jaud et al., 2015). Export survival may also respond directly to demand shocks in destination country. These demand shocks are influenced by the economic and policy environment in destination countries (Foster et al., 2008). Put together, the foregoing make the case for examining how country and destination specific factors affect export flow survival.

We bring a two-sided approach to studying export relationships: it is important to consider firm-level traits with factors specific to origin-destination dyads. Trade agreements play a key role in facilitating trade relationships between countries. NAFTA for example, is relevant to our study. Besedeš (2013) shows that NAFTA increased the hazard rate of export failure for trade between the United States and Mexico, i.e. lower export survival, with smaller exporters accounting for most of the exits. For Mexico, competition from Chinese exports means that smaller plants and marginal products are more likely to exit, while larger plants and 'core products' are likely to survive (Iacovone et al., 2013).

Geographic characteristics matter for export survival as they are closely related to trade costs. Approximately one third of the growth of 23 developing economies' exports during the 1970-1997 period can be accounted for by sales of long-standing exportables to new trading partners. The probability of a previously unsupplied overseas market receiving goods from an exporter in the future depends on the proximity of the former from markets that the exporter currently supplies (Evenett and Venables, 2002). Cultural characteristics at the country level such as sharing common language between countries could also facilitate trade relationships. Furthermore, Fugazza and Molina (2009) shows that the duration of trade relationships increases with the region's level of development.

In sum, we contribute to the literature in the following ways. First, our paper extends the work in Cadot et al. (2013b) which controls for origin country-specific factors in estimating export-survival, but not product- and destination-specific factors, as we do. Second, we examine the impacts of firm-level diversification — measured with HHI, using a broader sample of Latin American and African countries. We also follow Besedes and Blyde (2010) and evaluate how country-level factors influence export survival. Trade policy can influence export success, and the evidence suggests important differences in trade policy between Africa and Latin America and among countries within each region. Furthermore, Latin America offers a unique set of experiences and features for international trade, given its proximity to the U.S., historical dependence on commodity exports, and attempts at industrial policy. African economies, on the other hand are farther from world markets, and are marked by strong ties to European markets and low leves of intra-regional trade. The common factor between the two regions is a dependence on exports of commodities. In this regard, our paper contributes to the existing body of work with a regional focus: Western Europe (Nitsch, 2009; Brenton et al., 2010), Africa, (Cadot et al., 2013b), South Asia (Stirbat et al., 2015), and Eastern Europe (Görg et al., 2012).

3 Data and Descriptive Evidence

3.1 Data

We use a novel collection of firm-level data covering export transactions out of six African and Latin American economies. The unit of observation in the data is an export flow, showing values and quantities exported for each unique firm-product-destination combination in a given year t. HS-6-digit product categories (henceforth HS6 products) define the product variable p, and destination country d for each export flow is identified with the country's three-letter ISO code. Firms are identified with "dummy" digital IDs, numeric codes that are unique to each origin country and stored in variable f. Firm names are not included in the database to protect the privacy of individual exporters. The data were compiled by the Trade and Integration Unit of the World Bank Research Department, from raw transaction-level data assembled by customs authorities, in its efforts to build the Exporter Dynamics Database, as described in Fernandes et al. (2016). Readers should note that only a very limited number of countries published in the EDD permitted the distribution of firm-level export data on conditions that preserve exporter privacy. Our selection of six countries belong to this limited set.[5]

We compare our firm-level data with the corresponding aggregate export flows in the UN COMTRADE database to assess its quality. Total export values at the country-product level are highly correlated, even if they do not exactly match. The correlation coefficients between total export values for the two export data sources at the product-origin-destination level are 0.98 for Senegal and 0.96 for Burkina Faso, 0.99 for Mexico

[5]Detailed description of the data and data collection process for each country are at `http://econ.worldbank.org/exporter-dynamics-database`. The years of available export data vary by country, as Table 1 shows.

and 0.999 for Peru.[6]

We also extend our results in section 4.2 to include the Exporter Dynamics Database (EDD), a dataset with fewer descriptors of firm-level exports but greater geographic scope — 68 countries. While the EDD offers a smaller set of usable control variables, it allows us to compare our findings with those from areas outside the developing economies of Africa and Latin America. The EDD contains data on the basic features of exports at a finer level of detail than national aggregates, but not firm-product-level export data, as described above for our six selected countries. The unit of observation in the EDD file we use is an HS2 product-origin-destination country combination. Variables in the EDD include the number of exporters, average exporter size, and total exports. The EDD also describes export diversification, in terms of the share of top exporters, as well as the number of products and destinations per exporter. Country of origin and year are also included in the database, among other measures of exporter dynamics. Details on how the EDD was sourced, cleaned and compiled are outlined in Cebeci et al. (2012).

3.2 Descriptive Statistics

This segment of the paper summarizes the key variables that feature in the regressions of Section 4. The next steps after the summary describe the dependent variable in terms of the variables that define each observation — countries, products and firms. The description here focuses on using R^2 values to illustrate each variable's apparent contribution to the explained variation in export flow survival rates.

3.2.1 Summary by Country

Table 1 describes the most pertinent elements of the firm-level data. We focus on the roughly 2.4 million firm-product-destination-year observations that represent export flows in their first year, out of the 4.3 million observations in the full dataset. We use only first-year flows because survival rates increase dramatically from the second year — the increase in survival rates is enough to make comparisons across years of export duration invalid. Additionally, as explained in Appendix Section A.2, the effect of extra competition should be stronger for first-year flows.[7] This working sample of nearly 2.4 million observations represents exports from over 185,000 unique firms, in

[6] Cebeci et al. (2012) explains that a small part of the difference may be due to how exchange rates are measured. That paper also reports on data quality for other countries in the EDD database.

[7] The model in the appendix is just one example of many models that show that, everything else equal, extra competition leads to a decrease in survival rates.

more than 5,700 product categories, to nearly 240 destination countries between 1993 and 2011. The years covered in the data vary by country: Burkina Faso has data for only six years, 2005-2010, while Peru covers 17 years, 1993-2009. Mexico, Senegal and Uruguay have 10, 11 and 12 years respectively, while data from Guatemala cover 8 years, 2003-2010.

Countries also differ in terms of size — the number of exporters — as well as the products and destinations linked to those exporters. Mexico is clearly the largest country of origin (131,809 firms in 1.5 million observations). There are 30,302 firms in 450,000 observations for Peru, 2,508 firms in about 47,000 observations from Senegal, and 1,247 firms in just over 10,000 observations from Burkina Faso. Guatemala has almost 260,000 observations linked to 12,463 firms, and 6,907 firms linked to almost 62,000 observations for Uruguay.

The survival rates of firm-product-destination export flows vary notably by product, firm, and country. We define first-year export flow survival rates formally as the fraction of export flows observed in year t that are also present in year $t + 1$. This variable ranges from a mean value of 0.14 for Burkina Faso to 0.28 for Uruguay, the highest value in this sample, with Mexico a close second at 0.27. These differences lend substance to the initial arguments in this paper that aggregate export growth in countries like Burkina Faso may be notably higher if the fraction of export flows that contribute to growth were not so low; in this case, half the value for Uruguay. The focus on first-year survival rates in our paper follows Cadot et al. (2013b) and Fernandes et al. (2016) among others. This approach avoids confounding the advantages of export incumbency with the other predictors of survival for an export flow.

We take cohort size n^c_{pdt} to be a measure of *competition*, as described in Section 1, (not a measure of synergy as a few published papers may have done). This variable, the number of firms from the same country selling to a product-destination combination shows notable differences between countries of export origin in our sample. The pattern, as expected for this variable, is that countries with more exporters have larger product-destination cohort sizes, so that the average first-year export flow from Senegal is part of a cohort of size 2.4, compared with a cohort of nearly 130 for Mexico. This measure of competition will feature in our specifications when trying to identify evidence of positive external economies when firms export.[8] In contrast, the number of firm-product combinations from origin country c in destination d may represent the strength and scope of existing trade relationships between two countries that firms can leverage to sustain exports.

[8] Logged values of the cohort size variable are used in the analysis that follows, but Table 1 uses levels for clarity at this initial phase.

Table 1: Descriptive Statistics: Firm-Product-Destination

VARIABLES	N	mean	sd	min	max
	Country: Mexico — 131,809 Firms, (2000-2009)				
Export Survival (First Year)	1,541,752	0.27	0.44	0	1
Cohort Size: Product Destination	1,541,752	129.68	309.78	1	2,343
Destination Count	1,541,752	3.47	7.04	1	117
Product Count	1,541,752	81.81	321.44	1	4,146
Firm HHI: Product	1,541,752	0.46	0.31	0.01	1
	Country: Peru — 30,302 Firms, (1993-2009)				
Export Survival (First Year)	445,433	0.22	0.41	0	1
Cohort Size: Product Destination	445,433	16.32	33.06	1	415
Destination Count	445,433	2.38	3.42	1	55
Product Count	445,433	20.98	35.61	1	354
Firm HHI: Product	445,433	0.38	0.29	0.01	1
	Country: Guatemala — 12,463 Firms, (2003-2010)				
Export Survival (First Year)	259,622	0.22	0.41	0	1
Cohort Size: Product Destination	259,622	10.87	19.13	1	252
Destination Count	259,622	2.14	2.63	1	45
Product Count	259,622	41.27	66.79	1	484
Firm HHI: Product	259,622	0.34	0.30	0.02	1
	Country: Uruguay — 6,907 Firms, (2001-2012)				
Export Survival (First Year)	61,888	0.28	0.45	0	1
Cohort Size: Product Destination	61,888	3.40	5.39	1	74
Destination Count	61,888	3.68	5.11	1	44
Product Count	61,888	8.37	15.14	1	155
Firm HHI: Product	61,888	0.54	0.29	0.04	1
	Country: Senegal — 2,508 Firms, (2000-2010)				
Export Survival (First Year)	47,202	0.19	0.39	0	1
Cohort Size: Product Destination	47,202	2.41	3.20	1	35
Destination Count	47,202	2.55	3.82	1	53
Product Count	47,202	12.09	19.36	1	163
Firm HHI: Product	47,202	0.38	0.27	0.03	1
	Country: Burkina Faso — 1,247 Firms, (2005-2010)				
Export Survival (First Year)	10,419	0.14	0.35	0	1
Cohort Size: Product Destination	10,419	2.68	3.98	1	31
Destination Count	10,419	2.05	2.71	1	25
Product Count	10,419	8.60	19.69	1	165
Firm HHI: Product	10,419	0.47	0.31	0.07	1

Firm-level diversification measures also vary broadly from country to country. Diversification across products, HHI_{HS6} (measured with the Herfindahl-Hirschmann Index (HHI)) was greater than 0.54 for Uruguay, averaged near 0.46 for Mexico and Burkina Faso, but was much lower, less than 0.4 for Peru, Guatemala and Senegal. The pattern suggests that exporting in more than one HS6 product category is more common for firms in the latter three countries. Exporters of only one product in a particular year, for example, made up 47% of the firm-years associated with Mexico, compared with 42% for Senegal.

The product count n_{fpt} and destination count n_{fdt} (the number of destinations to which firm f exports product p and the number of products that firm f exports to destination d) reflect differences in the pattern of firm-level diversification for the countries. Export values and n^c_{dt} are left out of Table 1 to manage space, but these also show considerable variation between countries. For example, average export flow values are $49,000 for Senegal and $197,000 for Mexico. The number of firm-product combinations in a bilateral trade relationship varies in proportion with the number of firms in the origin country, as expected. (Cadot et al. (2013b) suggests that the variable is a proxy for the size of the *bilateral trade relationship* between the origin and destination countries.) These differences, among others, motivate the country fixed effects in the regressions that appear later in this paper.

Following the differences observed in Figure 1, regional patterns also appear in Table 1. Just as export failures rates are more notable in Figure 1, export survival rates are lower on average for the African countries in Table 1. The role of geography may also be glimpsed in the differences between the average product counts of African and Latin American economies in our data (with the exception of Uruguay). These differences may be due to differences in the respective shares of crude commodities and manufactures in the countries' and regions' exports - there are many more product varieties among manufactured goods than among crude commodities. The next steps continue to describe variations in survival rates along the key variables that define an export flow: (1) origin country, (2) destination country, (3) product and (4) firm.

Appendix Section A.1 breaks down the variation in export flow survival and these patterns motivate two features of the work that follows: the inclusion of product fixed effects in some regressions, and the emphasis on firm-level variables like product diversification in exports. The next section sets up regressions that explore these drivers of export survival. For firm-level export characteristics, we extend the work in Cadot et al. (2013b) to include the firm-level export HHI, in addition to their destination counts and product counts. Export HHI is simply the sum of the squared shares of a product or destination in the exports for each firm-year. We use this measure because it captures more than just whether a firm is a multi-product exporter, the extent to which a firm is diversified between between products is also reflected in this variable.

4 Results

4.1 Firm-Level Diversification and the Survival of Export Flows

To consider the effect of firm-level diversification choices, we begin with a linear probability model, with variables defined to emulate the main empirical model in Cadot et al. (2013b). Our goal is to first show that our baseline findings are similar, even with an expanded dataset. After establishing the baseline, we then show that the findings change as we introduce additional controls.

In Equation (1) we use the linear probability model for the mean survival rate for several reasons: it is immune to the incidental parameter problem when including large numbers of fixed effects, it is a highly-defensible model for conditional expectation even when nonlinear models may seem apt (Angrist, 2001). On the other hand, the probit model employed by some earlier papers implies a highly unnatural hazard rate (Sueyoshi, 1995), and the marginal effects from probit regressions rarely differ substantially from OLS regression coefficients.

The positive marginal effects on survival may be correlated with various unobserved factors. Our concern is that the number of firms in a product-destination and the survival rates of export flows are endogenous, being jointly determined by the primitives of producer costs (competitive advantage) and market demand that shape competition among firms. We therefore investigate this relationship, as outlined in Section 1, with results reported in Table 2.

$$I_{fpd} = \alpha + \beta_0 n^c_{pdt} + \beta_1 n_{fpt} + \beta_2 n_{fdt} + \beta_3 n^c_{dt} + \beta_v Value_{fpdt} + HHI_{ft} + \varepsilon_{fpdt} \tag{1}$$

The dependent variable I_{fpdt} simply indicates if an export flow of a product p from a firm f in country c to destination d survives from period $t-1$ to t, i.e. $I_{fpd} = 1$ if $Value_{fpdt-1} > 0$ and $Value_{fpdt} > 0$. ($I_{fpd} = 0$ if $Value_{fpdt-1} > 0$ and $Value_{fpdt} = 0$, though one must note that $Value_{fpdt-1} > 0$ for all the first-year export flows that make up our data sample). The α terms in (1) are fixed effects for country, product, firm and other combinations as described later in this section. The competition (n^c_{pdt}), export cohort (n^c_{dt}), and other variables in the equation follow the definitions and explanations provided in Section 3.2.1. ε_{fpdt} is an error term.

Column 1 of Table 2 repeats the baseline specification in Cadot et al. (2013b). The results, as noted above, show a positive association between export survival rates and the number of competing firms serving the same product-destination combination in the same year, n^c_{pdt}. To fix the idea with an example, say there are 20 firms exporting ballpoint pens from Mexico to the United States in 2010. Column 1 suggests that the likelihood of a first-time export of ballpoint pens surviving past the first year would increase by roughly 3.4% if the cohort of Mexican firms exporting ballpoint pens to the US increased in number to 40. This counter-intuitive result is interpreted as evidence of positive external economies in exporting, or synergies in Cadot et al. (2013b). Other papers come up with similar findings (e.g., Tovar and Martínez, 2011; Stirbat et al., 2015). However, it is likely that there are unobserved factors that make both entry more attractive and the chance of survival higher in a particular market, a point we will return to shortly.

The other baseline results match the expectations set in previous work: export survival rates are positively associated with the destination (n_{fpt}) and product (n_{fdt}) counts, and export value (v_{fpdt}). The number of firm-product pairs exporting to the destination country (n^c_{dt}) has a negative significant effect on survival; this negative effect become insignificant once we control for the origin, product, and destination. Note that all estimations have fixed effects for origin-destination, origin-year, destination-year, and HS-2 product category, and that the standard errors account for multi-way clustering on product-destination and firm.

Once we control for origin-product-destination fixed effects (columns 4-6 of Table 2), we obtain the more intuitive result that, with more firms competing within a cohort, the export flow survival rate *falls*. This finding is in line with Melitz-type trade models, as in Appendix Section A.2, as well as in standard models of industrial organization: other things equal, more competitors lower each firm's profit and therefore each firm's chance of survival. The basic idea is that even with differentiated products, another competitor entering a product-destination market typically steals at least some market share from existing firms and pushes prices down as well.[9] Lower profitability implies a lower buffer for adverse cost or demand shocks, and hence lower export survival.

Thus, controlling for product-specific factors reverse the findings of export synergies in previous papers. The apparent synergies, or positive externalities that increase the success probability for new entrants, disappear completely once fixed-effects are

[9]Most standard models of competition (e.g., Cournot and Bertrand competition with homogeneous or differentiated products, monopolistic competition models with a fixed number of firms, etc.) share this result. To share just one specific result, consider Cowling and Waterson (1976) for Cournot competition with constant marginal costs and demand from consumers who spend a fixed amount of their income on the (homogeneous) good. Under these conditions, the HHI is exactly proportional to industry profitability.

Table 2: Determinants of Survival Past First Year: Product-Destinations Fixed Effects

VARIABLES	(1) Baseline	(2) + HHI	(3) + HHI^2	(4) (1) + FE	(5) (2) + FE	(6) (3) + FE
Cohort Size (n^c_{pdt})	0.034***	0.034***	0.034***	-0.034***	-0.034***	-0.034***
	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)
Destination Count (n_{fpt})	0.114***	0.114***	0.115***	0.117***	0.117***	0.118***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Product Count (n_{fdt})	0.034***	0.040***	0.045***	0.037***	0.043***	0.047***
	(0.003)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)
Log(value)	0.038***	0.037***	0.036***	0.039***	0.039***	0.038***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Firm-Product Count (n^c_{dt})	-0.021***	-0.022***	-0.021***	-0.004	-0.005	-0.004
	(0.008)	(0.007)	(0.007)	(0.009)	(0.009)	(0.009)
Share of Firm Exports (Z_{fp})	-0.002***	-0.001***	-0.000	-0.002***	-0.001**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI$_{HS6}$		0.048***	0.217***		0.047***	0.184***
		(0.004)	(0.041)		(0.004)	(0.021)
(HHI$_{HS6}$)^2			-0.151***			-0.123***
			(0.036)			(0.018)
Observations	2,365,886	2,365,886	2,365,886	2,215,549	2,215,549	2,215,549
R-squared	0.192	0.193	0.193	0.274	0.275	0.275
Origin-Dest. FE	Y	Y	Y	–	–	–
HS2 FE	Y	Y	Y	–	–	–
Orig-Prod-Dest FE	N	N	N	Y	Y	Y
Orig-Year FE	Y	Y	Y	Y	Y	Y
Dest-Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a firm-product-destination-year combination or export flow, limited to only those export flows in their first year. The main variables, as discussed earlier include the number of exporting firms in the same cohort selling the same HS6 product (*pt*), exporting to the same destination country (*dt*) or selling to the same product-destination combination (*pdt*). All specifications include year- and HS2 category- fixed effects.

Table 3: Determinants of Survival Past First Year: Firm Fixed Effects

VARIABLES	(1) Baseline	(2) + HHI	(3) + HHI^2	(4) (1) + FE	(5) (2) + FE	(6) (3) + FE
Cohort Size (n^c_{pdt})	-0.035***	-0.035***	-0.035***	-0.015***	-0.015***	-0.015***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Destination Count (n_{fpt})	-0.100***	-0.099***	-0.099***	0.132***	0.132***	0.132***
	(0.006)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)
Product Count (n_{fdt})	0.090***	0.091***	0.092***	-0.053***	-0.047***	-0.048***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Log(value)	0.038***	0.038***	0.038***	0.029***	0.029***	0.029***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Firm-Product Count (n^c_{dt})	-0.014	-0.014	-0.013	0.001	0.000	-0.000
	(0.010)	(0.010)	(0.009)	(0.012)	(0.012)	(0.012)
Share of Firm Exports (Z_{fp})	-0.014***	-0.013***	-0.013***	0.008***	0.008***	0.008***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
HHI_{HS6}		0.046***	0.092***		0.056***	-0.019
		(0.008)	(0.033)		(0.006)	(0.021)
$(\text{HHI}_{HS6})^2$			-0.041			0.067***
			(0.026)			(0.017)
Observations	904,705	904,705	904,705	2,000,632	2,000,632	2,000,632
R-squared	0.586	0.586	0.586	0.455	0.455	0.455
Orig-Prod-Dest FE	Y	Y	Y	Y	Y	Y
Firm-Product FE	Y	Y	Y	N	N	N
Firm-Dest. FE	N	N	N	Y	Y	Y
Orig-Year FE	Y	Y	Y	Y	Y	Y
Dest-Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a firm-product-destination-year combination or export flow, limited to only those export flows in their first year. The main variables, as discussed earlier include the number of exporting firms in the same cohort selling the same HS6 product (*pt*), exporting to the same destination country (*dt*) or selling to the same product-destination combination (*pdt*). All specifications include year- and HS2 category- fixed effects.

introduced to control for between-product differences in export survival rates. Average export survival rates in our data sample vary from nearly zero for products like frogs' legs (HS 020820), to higher than 0.7 for products like zinc plates (HS 790500). This finding suggests that the observed pattern of synergies may in fact, be driven by events occurring in the destination markets for a specific product that lead to increases in the number of exporting firms and the survival of first-time exporters to that product-destination pair. The finding is also consistent with the level of explained variation in the dependent variable from product-destination fixed effects in Table A.1, especially for African countries.

Similarly, the signs are reversed on the coefficient of the destination count in the baseline regression, once firm-product fixed effects are introduced as controls (compare column 1 in Table 2 with column 1 in Table 3). In the baseline, firm-product-destination survival rates are higher for firms selling to more destinations within a product category (i.e., a higher Destination Count), so that in our example, firm A selling ballpoint pens to the U.S. and Brazil (i.e., a Destination Count of 2), all other things equal, is more likely to maintain its export linkage to the U.S. than firm B selling ballpoint pens to only the U.S.. Cadot et al. (2013b) treats this measure of geographic diversification as a proxy for unobserved factors, such as "more robust production lines..., better information about the cross-country drivers of a product's demand, or, alternatively, higher product quality." Once those factors are absorbed into firm-product fixed effects, as they are in columns 1-3 in Table 3, the remaining variation in time of the destination count yields a negative coefficient on n_{fpt}. Again, there appears to be no strong evidence for a *causal* positive link between geographical diversification and export survival. In contrast, column 1 in Table 3 suggests that firm A's exports of pens may inherently be less resilient than firm B's, after controlling for differences in the firm-level technologies or productivity within the product category. Holding those factors constant, serving one more country decreases the likelihood that an export flow survives past the first year, perhaps because firms are trying to leverage cost, quality, or marketing advantages into increasingly weaker markets.

The signs are also reversed on the coefficient of the product count in the baseline regression, once firm-destination fixed effects are introduced as controls (columns 4-6 in Table 3). In the baseline, first-year survival rates are higher for firms selling more products within the same destination (i.e., a higher Product Count). For our example, survival rates are expected to be higher for a firm C selling ballpoint pens and fountain pens to the U.S. (i.e., a Product Count of 2), all other things equal, relative to a firm D selling only ballpoint pens to the U.S.. Cadot et al. (2013b) describe the product count as a proxy for product scope but also interpret its coefficient as causal, discussing the "effect on exports success" of an increment to n_{fdt}. However, because n_{fdt} counts product-firm tuples, it is higher when there are more firms exporting to the destination. Therefore, as with n^c_{pdt}, the most natural expectation is that after controlling for unobservables, n_{fdt} would be negatively associated with survival, at least when changes in n_{fdt} are driven mainly by differences in the number of firms. For differences in the number of products, holding constant the number of competitors, the expectation is less clear. While greater product scope may allow more profit opportunities and higher overall profitability, it also exposes the firm to a higher number of product-specific shocks. Columns 4-6 of Table 3 imply that differences in the firm-level marketing or connections to a given country may account for the higher number of products and survival rates. Once we control for these unobserved firm-destination factors, exporting more products to the same destination decreases the likelihood that any one linkage to the destination survives past the first year.

It is interesting to note that a high export value in the initial year remains positively correlated with survival rates in all regressions in Table 2 and Table 3, even after the addition of firm-product and firm-destination fixed effects. Thus, variable v_{fpdt} appears to be more than merely a proxy for firm-specific cost or demand advantages. Similarly, the survival rates of exports also increases with the number of firm-product pairs exporting to the destination country. The foregoing results highlight the difficulty in identifying the existence of synergies of various kinds in exporting. Survival rates may instead be responding to firm-, product-, or destination-specific measures like changes in cost or demand. These measures are not observed in our data, but instead are absorbed into the various fixed effects introduced into the regressions in Table 2 and Table 3.[10]

Finally, we add HHI as a measure of firm-level diversification, based on export flow value, v_{cfp}, where f indexes the firm, c the country of origin, and p the HS-6 product line. The regressor measures the firm's diversification across products, with no regard for the destination country: $HHI_{hs6} = \sum_p (v_{cfp}/V_{cf})^2$, where v_{cfp} is summed over all destinations served by the exporter. The middle panel of Appendix Figure A.1 shows that diversification over products is more prevalent than diversification over destinations; we also run specifications that include diversification across product-destination combinations, and these do not change the explained variation or the coefficients for

[10] The apparent impacts of product diversification as measured by HHI_{HS6} that we found above are subject to the same general criticism: they could be driven by unobservables. To explore this, we repeated the estimation in column 5 of Table 2 with firm-product fixed effects. The shape and significance of the estimated quadratic in HHI_{HS6} remain unchanged, except that the implied HHI associated with the maximum survival rate rose to 0.95.

diversification across products. We do not report these regressions, but the results suggest that most of the effect of firm-level diversification on export survival is driven by how firms specialize or diversify their product portfolio. We find a positive association between HHI and probability of survival. However, the results with HHI_{HS6} in column 3 of Table 2 display a hump-shaped relationship to survival, with a maximum at 0.72.[11]

The results are broadly consistent with the findings in Cadot et al. (2013b) and Tovar and Martínez (2011), that survival rates are higher for firms that diversify exports. What we add is evidence that the relationship between survival rates and export diversification at the firm-level is not monotonic. At some point, a firm can spread its export portfolio too thin and increase the hazard of losing its existing export flows. The results are also consistent with previous findings that export survival rates are particularly low for firms that are highly concentrated, i.e., with high HHI values.

4.2 Extended Results: Exporter Dynamics Database

We examine whether our main findings hold for data that span more countries, but with less detailed export flow definitions. In Table 4 and Table 5 we broadly follow the specifications in Table 2 to see whether our main findings could apply to the 68 countries in the Exporter Dynamics Database (EDD). Since these data are reported as origin-sector-destination aggregates (as described in section 3), we cannot construct exact analogs to the variables in Table 2 and Table 3 for this exercise. In the EDD, sectors are defined as HS2 product categories. For example, one observation in the data represents exports from Senegal to Germany in the *meats, fish and seafood food preparations* category (HS 16). At this aggregate level, we have the survival rate of first-year export flows, which we take as the dependent variable in the regression.[12]

The number of firms exporting in each origin-sector-destination set becomes our measure of competition, much like n^c_{pdt} in our previous table. The number of exporters from the origin country serving the destination country is much like the firm count n^c_{dt}. We also add another variable, a count of the number of unique destinations for each country's HS2 sector. Our other control variables are average export value per exporter, and the same measure of export size for new exporters. We also obtain the HHI index of diversification from the EDD data, the average product count (i.e., the number of

[11]This hump shape shows up even when controlling for Origin-Product-Destination (column 6 of Table 2) and firm-product fixed effects (column 3 of Table 3), but disappears when controlling for firm-destination (column 6 of Table 3).

[12]The UN maintains a list of HS2 product descriptions at `https://comtrade.un.org/db/mr/rfCommoditiesList.aspx`.

HS6 products per exporter), and the product's share of exports. None of these are firm-level measurements, which makes it difficult to compare with the previous results. The HHI measurement, in particular, is not comparable as it measures concentration at the country level, rather than firm-specific concentration. These results test our main findings with less finely detailed data, but for a broader set of countries.

Table 4: Survival Past First Year: 68 Countries in Exporter Dynamics Database

VARIABLES	(1) Baseline	(2) + HHI	(3) + HHI^2	(4) (1) + FE	(5) (2) + FE	(6) (3) + FE
Cohort Size (n^c_{pdt})	0.021***	0.004***	0.003**	-0.076***	-0.079***	-0.080***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Avg Exporter size	0.001***	0.002**	0.002**	-0.011***	-0.011***	-0.011***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Avg New Exporter size	0.029***	0.026***	0.027***	0.038***	0.037***	0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm Count (n^c_{dt})	-0.072***	-0.069***	-0.069***	-0.005*	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Avg Product Count		0.016***	0.017***		0.025***	0.025***
		(0.001)	(0.001)		(0.001)	(0.001)
Share of Exports		0.002*	0.002*		-0.001	-0.001
		(0.001)	(0.001)		(0.001)	(0.001)
Destination Count		0.006***	0.006***		0.037***	0.036***
		(0.001)	(0.001)		(0.004)	(0.004)
HHI_{HS2}		-0.067***	-0.098***		-0.019***	-0.082***
		(0.002)	(0.006)		(0.003)	(0.008)
$(\text{HHI}_{HS2})^2$			0.026***			0.054***
			(0.005)			(0.007)
Observations	636,641	622,343	622,343	595,620	582,763	582,763
R-squared	0.172	0.177	0.177	0.372	0.373	0.373
HS2 FE	Y	Y	Y	–	–	–
Origin-Dest. FE	Y	Y	Y	–	–	–
Origin-HS2-Dest. FE	N	N	N	Y	Y	Y
Orig-Year FE	Y	Y	Y	Y	Y	Y
Dest-Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a unique country origin-destination-HS2 combination. The main variable is the number of exporting firms selling the same HS-2-digit product to the same destination in the same year. All independent variables are in logs. All specifications include year and HS2 category fixed effects. Note that the number of exporting firms and the number of entrants, or new exporting linkages are included as separate variables, to highlight the possibility that more new exporters may indicate a surge of competition, while a large number of established exporting firms may capture other features of the bilateral trade relationship. HHI here is not at the firm level, but at the country level.

Table 4 suggests that our findings are broadly applicable to the larger set of countries in the EDD — increasing competition leads to lower survival rates for export

Table 5: Survival Past First Year: Africa vs. Latin America

VARIABLES	(1) Africa OD FE	(2) LatAm OD FE	(3) Africa OPD FE	(4) LatAm OPD FE
Cohort Size (n^c_{pdt})	0.011***	-0.001	-0.070***	-0.095***
	(0.002)	(0.003)	(0.003)	(0.004)
Avg Exporter size	0.002	-0.001	-0.011***	-0.015***
	(0.002)	(0.002)	(0.002)	(0.003)
Avg New Exporter size	0.024***	0.029***	0.034***	0.039***
	(0.001)	(0.001)	(0.001)	(0.001)
Firm Count (n^c_{dt})	-0.067***	-0.070***	-0.007	-0.003
	(0.006)	(0.007)	(0.007)	(0.008)
HHI_{h2}	-0.091***	-0.127***	-0.052***	-0.135***
	(0.012)	(0.013)	(0.015)	(0.017)
$(\text{HHI}_{h2})^2$	0.023**	0.047***	0.028**	0.095***
	(0.010)	(0.011)	(0.013)	(0.015)
Avg Product Count	0.016***	0.013***	0.023***	0.018***
	(0.001)	(0.001)	(0.002)	(0.002)
Share of Exports	-0.000	0.005**	-0.001	0.004
	(0.002)	(0.002)	(0.002)	(0.003)
Destination Count	0.006**	0.009***	0.027***	0.043***
	(0.003)	(0.003)	(0.007)	(0.007)
Observations	152,821	166,666	143,504	158,594
R-squared	0.164	0.174	0.353	0.365
HS2 FE	Y	Y	–	–
Origin-Dest. FE	Y	Y	–	–
Origin-HS2-Dest. FE	N	N	Y	Y
Orig-Year FE	Y	Y	Y	Y
Dest-Year FE	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a unique country origin-destination-HS2 combination. The main variable is the number of exporting firms selling the same HS-2-digit product to the same destination in the same year. All independent variables are in logs. All specifications include year and HS2 category fixed effects. Note that the number of exporting firms and the number of entrants, or new exporting linkages are included as separate variables, to highlight the possibility that more new exporters may indicate a surge of competition, while a large number of established exporting firms may capture other features of the bilateral trade relationship. HHI here is not at the firm level, but at the country level.

flows. We observe the same reversal of the sign for the coefficient that measures competition (*Cohort Size*), as in Table 2. In Table 4 the sign reversal happens between columns 1-3 and column 4-6, when we introduce origin-sector-destination controls. As expected from a conventional model of trade, more exporters competing within a country-sector-destination channel decreases export flow survival rates once we control for product-fixed effects. Unlike the previous results, the Firm Count estimates are negative and significant. These estimates, however, are small and become less significant when introducing origin-sector-destination fixed effects; once we separate out Africa and Latin America they become insignificant (see Table 5). Other variables in this test of our main findings are consistent with Table 2. Increasing destination counts, product counts and value - measured by exporter size, all correspond to higher export flow survival rates.

Table 5 shows that the results are consistent for the Latin American and African countries listed within the EDD. The signs and statistical significance of the estimates are broadly consistent across columns, even if the sizes of the coefficients on the variables that predict export survival rates differ by small amounts.

4.3 Robustness Checks

4.3.1 Survival Past the Second Year

Our main findings are largely robust to using other subsets of the main data. Specifically, Table 6 and 7 repeat the regression exercises in Tables 2 and Tables 3 for export flows in their second consecutive year. Given the findings in Besedes and Blyde (2010) and Besedeš and Prusa (2011) that export flow survival rates increase with age, second year flows are not to be compared directly with first-year flows. In the 4.3 million data observations available for all countries and years in our sample, about 600,000 are for flows in their second year (compared with just under 2.4 million observations for first-year export flows).

In columns 4-6 of Table 6, the coefficients on number of co-exporters changes from positive to negative, once we introduce origin-product-destination fixed effects, just as in Table 2. The same argument that unobserved variables that predict higher numbers of firms serving a product-destination combination, may also influence the the survival rate of export flows, applies here. Even for export flows in their second consecutive year, for which firms may have established advantages of incumbency and reputation, we don't find evidence of synergies once we introduce fixed effects that account for products in the bilateral country trade relationships. Rather, it appears to support

Table 6: Determinants of Survival Past Second Year: Product-Destinations Fixed Effects

VARIABLES	(1) Baseline	(2) + HHI	(3) + HHI^2	(4) (1) + FE	(5) (2) + FE	(6) (3) + FE
Cohort Size (n^c_{pdt})	0.025***	0.024***	0.024***	-0.035***	-0.035***	-0.035***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
Destination Count (n_{fpt})	0.089***	0.088***	0.089***	0.091***	0.090***	0.091***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Product Count (n_{fdt})	0.040***	0.049***	0.055***	0.041***	0.049***	0.053***
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
Log(value)	0.043***	0.042***	0.041***	0.047***	0.046***	0.045***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm-Product Count (n^c_{dt})	-0.009	-0.010	-0.009	0.058***	0.056***	0.058***
	(0.015)	(0.015)	(0.015)	(0.018)	(0.018)	(0.018)
Share of Firm Exports (Z_{fp})	0.001	0.002***	0.004***	-0.001	0.001	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
HHI_{HS6}		0.068***	0.265***		0.060***	0.199***
		(0.008)	(0.056)		(0.007)	(0.032)
$(\text{HHI}_{HS6})^2$			-0.175***			-0.123***
			(0.048)			(0.026)
Observations	593,146	593,146	593,146	527,558	527,558	527,558
R-squared	0.232	0.233	0.234	0.344	0.344	0.344
Origin-Dest. FE	Y	Y	Y	–	–	–
HS2 FE	Y	Y	Y	–	–	–
Orig-Prod-Dest FE	N	N	N	Y	Y	Y
Orig-Year FE	Y	Y	Y	Y	Y	Y
Dest-Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a firm-product-destination-year combination or export flow, limited to only those export flows in their first year. The main variables, as discussed earlier include the number of exporting firms in the same cohort selling the same HS6 product (*pt*), exporting to the same destination country (*dt*) or selling to the same product-destination combination (*pdt*). All specifications include year- and HS2 category- fixed effects.

Table 7: Determinants of Survival Past Second Year: Firm Fixed Effects

VARIABLES	(1) Baseline	(2) + HHI	(3) + HHI^2	(4) (1) + FE	(5) (2) + FE	(6) (3) + FE
Cohort Size (n_{pdt}^c)	-0.037***	-0.037***	-0.037***	-0.002	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Destination Count (n_{fpt})	-0.003	-0.003	-0.003	0.103***	0.102***	0.102***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Product Count (n_{fdt})	0.082***	0.083***	0.083***	-0.008	0.005	0.004
	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.006)
Log(value)	0.041***	0.040***	0.040***	0.038***	0.037***	0.037***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Firm-Product Count (n_{dt}^c)	0.013	0.014	0.014	0.076***	0.077***	0.075***
	(0.018)	(0.018)	(0.018)	(0.028)	(0.028)	(0.028)
Share of Firm Exports (Z_{fp})	-0.008***	-0.008***	-0.008***	0.008***	0.009***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
HHI_{HS6}		0.055***	0.011		0.134***	0.037
		(0.018)	(0.062)		(0.013)	(0.038)
$(\text{HHI}_{HS6})^2$			0.039			0.089***
			(0.051)			(0.031)
Observations	222,503	222,503	222,503	444,574	444,574	444,574
R-squared	0.686	0.686	0.686	0.564	0.564	0.564
Orig-Prod-Dest FE	Y	Y	Y	Y	Y	Y
Firm-Product FE	Y	Y	Y	N	N	N
Firm-Dest. FE	N	N	N	Y	Y	Y
Orig-Year FE	Y	Y	Y	Y	Y	Y
Dest-Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a firm-product-destination-year combination or export flow, limited to only those export flows in their first year. The main variables, as discussed earlier include the number of exporting firms in the same cohort selling the same HS6 product (*pt*), exporting to the same destination country (*dt*) or selling to the same product-destination combination (*pdt*). All specifications include year- and HS2 category- fixed effects.

the idea that increased competition leads to lower survival rates, as projected by the model in Appendix Section A.2. Table 7 reaffirms this finding, none of the Cohort Size estimates are positive.

4.3.2 Alternative Estimation Approaches

We estimate the same models specified in Table 2 including the country-level variables described in section A.4 in order to determine whether our findings regarding competition and synergy are robust to controlling for specific country characteristics. We include country level variables similar to the ones included in Besedes and Blyde (2010). Estimates including country level variables are shown in Table A.2 (See Appendix Section A.4 for a more thorough description of the variables). We observe that size, sign, and significance of the coefficient of the competition or cohort size variable in Table A.2 are very similar to those obtained estimating our model without controlling for country level characteristics (estimates in Table 2).

The interaction between GDP in the origin and destination countries is positive and statistically significant coefficients in the baseline specifications. Controlling for firms and products changes this result, however, suggesting that firm-level and product-level attributes matter more for explaining the survival of export flows than country size. We follow Besedes and Blyde (2010) in measuring financial development with the ratio of private credit to GDP - expecting that higher levels of financial development in an origin country will predict higher levels of export survival, as found in Besedes and Blyde (2010). The results go against expectations, with negative and statistically significant coefficients on the financial development variable in all specifications. The pattern may suggest that firm-, product- and country- attributes that predict export survival override the effects of private credit, or that higher levels of private credit is correlated with more risk-taking in exports, after we control for other variables. We find that export survival rates increase with the rule of law, consistent with previous published work (Besedes and Blyde, 2010). The exchange rate has a negative and statistically significant effect, which was also expected since currency appreciation is reflected in lower export demand in destination country, which results in a lower probability of export survival.

5 Conclusion

Aggregate export growth is linked to the export survival margin, not just the intensive margin (average export value per exporting firm), and the extensive margin (the number of exporters). The findings of a growing literature show that with higher export survival rates, export growth in developing economies would increase. Previous research shows that survival rates differ notably between regions - with some of the worst-hit regions being Latin America and Africa (e.g. Besedeš and Prusa, 2011; Besedes and Blyde, 2010). Interestingly, recent papers suggest that higher survival rates may be due to synergies, i.e., positive external economies that increase export flow survival rates as the number of home-country exporters increase (e.g. Cadot et al., 2013b; Tovar and Martínez, 2011).

Our work revisits this literature by focusing on the pattern of survival for export flows from six Latin American and African countries. We find little evidence of synergies in our data and more evidence of competition among same-country exporters of the same product to the same destination. Additionally, we find that export diversification at the firm-level influences export flow survival rates; export flow survival in the first year exhibits a hump-shaped relationship with diversification, so that export flow survival is low for highly-diversified and single-product exporting firms. The highest levels of export flow survival correspond on average to firms with product HHIs near 0.72. These findings are broadly consistent for the regions represented in our data, even though export survival for flows from the African countries in our sample are more responsive to product-fixed effects than their Latin American counterparts.

These finding have important policy implications. Policies that target specific products or industries may limit the intended impact and result in a smaller than expected increase in export sales in that industry. Country-level characteristics have a larger impact on export failure, and improvements at this level would be benefit competitive firms in all industries and are likely to have a larger impact in terms of export growth at the country level. These findings suggest further research into policy-relevant questions on the drivers of exports and export growth in developing economies.

For future research, it will be important to test whether the results found in our empirical analysis hold when we account for changes in the size of the firm and its experience in the global market (see for example, Berthou and Vicard (2015) using French data). Export survival of a firm is also related to the role that firms plays along the global production chain. It has been found that the survival rate for firms that produce intermediate goods is higher compared to those firms that produce final goods (Córcoles et al., 2015). Thus, accounting for the role of the firm in the global production chain is also warranted. We are unable to control for these factors given the nature of our dataset.

Bibliography

Angrist, J.D., 2001. Estimation of Limited Dependent Variable Models with Dummy Endogenous Regressors: Simple Strategies for Empirical Practice. Journal of Business & Economic Statistics 19, 2–28.

Beck, T., 2002. Financial Development and International Trade: Is There a Link? Journal of international Economics 57, 107–131.

Behrens, K., Corcos, G., Mion, G., 2013. Trade Crisis? What Trade Crisis? Review of Economics and Statistics 95, 702–709.

Berthou, A., Vicard, V., 2015. Firms' export dynamics: Experience versus size. The World Economy 38, 1130–1158.

Besedeš, T., 2013. The Role of NAFTA and Returns to Scale in Export Duration. CESifo Economic Studies 59, 306–336.

Besedes, T., Blyde, J., 2010. What Drives Export Survival? An Analysis of Export Duration in Latin America. Inter-American Development Bank, mimeo .

Besedeš, T., Prusa, T.J., 2011. The Role of Extensive and Intensive Margins and Export Growth. Journal of Development Economics 96, 371–379.

Blum, B.S., Claro, S., Horstmann, I.J., 2013. Occasional and Perennial Exporters. Journal of International Economics 90, 65–74.

Brenton, P., Newfarmer, R., 2009. Watching more than the Discovery Channel to Diversify Exports. Breaking into New Markets: Emerging Lessons for Export Diversification , 111–24.

Brenton, P., Saborowski, C., Von Uexkull, E., 2010. What Explains the Low Survival Rate of Developing Country Export Flows? The World Bank Economic Review , 474–499.

Cadot, O., Carrere, C., Strauss-Kahn, V., 2013a. Trade Diversification, Income, and Growth: What do we Know? Journal of Economic Surveys 27, 790–812.

Cadot, O., Iacovone, L., Pierola, M.D., Rauch, F., 2013b. Success and Failure of African Exporters. Journal of Development Economics 101, 284–296.

Cebeci, T., Fernandes, A.M., Freund, C.L., Pierola, M.D., 2012. Exporter Dynamics Database. World Bank Policy Research Working Paper .

Córcoles, D., Díaz-Mora, C., Gandoy, R., 2015. Export survival in global production chains. The World Economy 38, 1526–1554.

Cowling, K., Waterson, M., 1976. Price-Cost Margins and Market Structure. Economica 43, 267–274.

Das, S., Roberts, M.J., Tybout, J.R., 2007. Market Entry Costs, Producer Heterogeneity, and Export Dynamics. Econometrica 75, 837–873.

Di Giovanni, J., Levchenko, A.A., 2012. Country Size, International Trade, and Aggregate Fluctuations in Granular Economies. Journal of Political Economy 120, 1083–1132.

Díez, F.J., Mora, J., Spearot, A.C., 2016. Firms in International Trade. Working Paper .

Dür, A., Baccini, L., Elsig, M., 2014. The Design of International Trade Agreements: Introducing a New Dataset. Review of International Organizations 9, 353–375.

Evenett, S.J., Venables, A.J., 2002. Export Growth in Developing Countries: Market Entry and Bilateral Trade Flows. Technical Report. mimeo.

Fernandes, A.M., Freund, C., Pierola, M.D., 2016. Exporter Behavior, Country Size and Stage of Development: Evidence from the Exporter Dynamics Database. Journal of Development Economics 119, 121–137.

Foster, L., Haltiwanger, J., Syverson, C., 2008. Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability? American Economic Review 98, 394–425.

Fugazza, M., Molina, A.C., 2009. The Determinants of Trade Survival. Technical Report. HEID Working Paper.

Giordano, P., Ramos, A., 2016. Trade and Integration Monitor 2016: Downshifting: Latin America and the Caribbean in the New Normal of Global Trade. Working Paper .

Görg, H., Kneller, R., Muraközy, B., 2012. What Makes a Successful Export? Evidence from Firm-Product-level Data. Canadian Journal of Economics/Revue Canadienne d'Économique 45, 1332–1368.

Graciela, M., Robert, D., 2012. Whats New in the New Industrial Policy in Latin America? Policy Research Working Paper Series .

Iacovone, L., Rauch, F., Winters, L.A., 2013. Trade as an Engine of Creative Destruction: Mexican Experience with Chinese Competition. Journal of International Economics 89, 379–392.

International Monetary Fund, 2015. International Financial Statistics, 2015. International Monetary Fund Washington, DC.

Jaud, M., Kukenova, M., Strieborny, M., 2015. Financial development and sustainable exports: Evidence from firm-product data. The World Economy 38, 1090–1114.

Manova, K., 2012. Credit Constraints, Heterogeneous Firms, and International Trade. Review of Economic Studies 80, 711–744.

Mayer, T., Zignago, S., 2011. Notes on CEPII's Distances Measures: The GeoDist Database. Working Paper .

Melitz, M.J., 2003. The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. Econometrica 71, 1695–1725.

Mora, J., 2016. Export Failure and Its Consequences: Evidence from Colombian Exporters. Working Paper .

Nitsch, V., 2009. Die Another Day: Duration in German Import Trade. Review of World Economics 145, 133–154.

Olabisi, M., 2015. Demand Volatility and Export Entry. FREIT working paper 942 .

Secchi, A., Tamagni, F., Tomasi, C., 2016. Financial Constraints and Firm Exports: Accounting for Heterogeneity, Self-Selection, and Endogeneity. Industrial and Corporate Change 25, 813–827.

Spearot, A.C., 2013. Variable demand elasticities and tariff liberalization. Journal of International Economics 89, 26–41.

Stirbat, L., Record, R., Nghardsaysone, K., 2015. The Experience of Survival: Determinants of Export Survival in Lao PDR. World Development 76, 82–94.

Sueyoshi, G.T., 1995. A Class of Binary Response Models for Grouped Duration Data. Journal of Applied Econometrics 10, 411–431.

Tovar, J., Martínez, L.R., 2011. Diversification, Networks and the Survival of Exporting Firms. Technical Report. UNIVERSIDAD DE LOS ANDES-CEDE.

Van Biesebroeck, J., 2014. Productivity, Exporting and Financial Constraints of Chinese SMEs. IDB Working Paper Series .

Volpe Martincus, C., Carballo, J., 2009. Survival of New Exporters in Developing Countries: Does It Matter How They Diversify? IDB working paper series .

World Bank, 2016a. Global Financial Development Database.

World Bank, 2016b. World Governance Indicators.

World Bank, 2017. World Development Indicators.

Appendix A

A.1 Explained Variation in Export Flow Survival

Table A.1 shows the R^2 values from basic linear regressions of the export flow survival variable with only fixed effects and no control variables. The table provides at the most basic level, insight into what explains variation in export flow survival, as well as *regional differences* in those explanations. As the unit of observation in the data is the flow of a product p from an origin country c to a destination d by a unique firm f, the table asks how the pattern of export flow survival is most associated with any of these four elements that define each export flow. The specification in Table A.1 is: $I_{fpdt} = \alpha_* + \alpha_t + \varepsilon_{fpdt}$. I_{fpd} is a dummy that represents whether an export flow survived in a given period t, while α_* represents any of the f, p, c or d fixed effects; only one is applied in each regression.[13]

Columns 1 and 2 of Table A.1 show that destination countries explain just as much of the variation in export flow survival rates as origin countries. This pattern motivates the inclusion of country bilateral fixed effects in the estimations that follow this section of the paper. To obtain reasonable results one must consider the two fixed effects jointly, as most country-level features that influence international trade are bilateral, e.g., distance. Trade treaties and other policy options that countries use to stimulate trade also tend to be bilateral in nature. Overall, year and country-level effects explain only about 6% of the variation in export flow survival.

Columns 3 and 5 of Table A.1 show that much more of the variation in export flow survival rates is explained by the product that is exported, and by the exporting firm. These two factors, the HS6 product category and firm identity, yield notably higher R^2 values than origin and destination countries. Not shown in the table are the results of regressions that use origin-destination fixed effects ($R^2 = 0.07$), and origin-product-destination fixed effects ($R^2 = 0.21$). It is notable that using country-pair fixed effects improves the explained variation by only 1% over either destination or origin country, which may suggest that the selection of destination countries by exporters is endogenous. Nevertheless, the improvement suggests the fixed effects that we use later in this section.

On the other hand, the sizable change in explained variation from 0.09 (column 3) in Table A.1 to 0.17 (column 4) suggests that much about how export flows survive may lie in the interactions between specific products and the country-pairs that trade

[13] Another approach to Table A.1 would be to evaluate the share of variation explained by each of the four categorical variables in an ANOVA table. The number of categories and observations — more than 2.4 million — makes this approach impractical or infeasible.

Table A.1: Export Survival Variation: R-Squared Values

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent Variable: Export Flow Survival					
	All Countries					
Observations	2,366,316	2,366,316	2,366,316	2,366,316	2,366,316	2,366,316
R-squared	0.06	0.06	0.09	0.17	0.23	0.68
	Latin American Countries					
Observations	2,308,695	2,308,695	2,308,695	2,308,695	2,308,695	2,308,695
R-squared	0.06	0.06	0.09	0.17	0.23	0.68
	African Countries					
Observations	57,621	57,621	57,621	57,621	57,621	57,621
R-squared	0.06	0.07	0.19	0.45	0.22	0.60
Origin FE	Y					
Destination FE		Y				
Prod. FE			Y			
Prod-Dest. FE				Y		
Firm FE					Y	
Firm-Prod FE						Y

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a firm-product-destination-year combination or export flow, limited to only those export flows in their first year. All specifications in the table use year fixed-effects.

them. Note that the R^2 value for product-destination fixed effects is larger than the sum of R^2 values obtained for products (0.09) and origin-destination pairs (0.07). The fact that the product- destination interaction explains more of the variation in the dependent variable than either destination or product fixed effects, suggests that the individual contributions of country- and product-features to export survival are not orthogonal. Similarly, firm-product fixed effects explain 68% of the variation in export survival in Column 6, almost three times the R^2 values for firm fixed effects reported in Table A.1.

There are notable differences between African and Latin American countries in how fixed effects explain the variation in export survival. Columns 3, 4 and 6 of Table A.1 show that product fixed effects explain a larger share of export survival for the African subset of our data. Even more startling is the difference between Latin America ($R^2 = 0.17$) and Africa ($R^2 = 0.45$) in the variation explained by product-destination fixed effects. Within the limits of what can be inferred from R^2 values, columns 4 and 5 suggest that for African firms, the quality of a firm matters less for whether its export streams survive the first year, than which product-destination pair it chooses to export.

A.2 Model: Survival Rates and Competition

Many international trade models with monopolistic competition show that, all else equal, an increase in competition (an increase in the number of firms exporting or in the number of varieties exported) results in a decrease in average demand for each existing exporter and would likely lead to a decrease in the value exported and even a decrease in the survival rate for exporters.[14] These models demonstrate in the particular setting of internal trade a natural set of results that are common in models of industrial organization: more competition means smaller market share and more exit of firms. The conclusion of these models conflicts with the empirical finding of (Cadot et al., 2013b) that an increase in the number of exporter in a firm's sector *increases* the probability of survival, but is consistent with our empirical results. The Melitz-type model detailed here is based on Spearot (2013).

A.2.a Consumers Maximize Utility

In Spearot (2013), preferences are quasi-linear and exhibit love of variety. Preference for the representative consumer have the following form:

[14] For a summary of recent literature, both theoretical and empirical, of firms in trade see Díez et al. (2016).

$$U^l = x_0^l + \theta \int_{i\epsilon\Omega} q_i^l di - \frac{1}{2}\eta \left(\int_{i\epsilon\Omega} q_i^l di \right)^2 + \frac{1}{2}\gamma \int_{i\epsilon\Omega} \left(q_i^l \right)^2 di \tag{2}$$

where q_i^l is the quantity consumed of variety i by individual l; x_0^l is the numeraire good; $\theta, \eta > 0$ determine the pattern of substitution between varieties; and $\gamma > 0$ shows the value of variety.

The representative consumer maximizes utility subject to a budget constraint; the budget is written as $x_0^l + \int_{i\epsilon\Omega} p_i^c q_i^l di \leq I$, where I is the income of the representative consumer and p_i^c is the price paid by the consumer for a unit of q_i^l. Solving the consumer's problem gives us the following inverse demand for individual l: $p_i^c = A - \gamma q_i^l$, where $A = \theta - \eta \int_{i\epsilon\Omega} q_i^l$. As we show below, A is a demand parameter, and all else equal a more competitive market (more q_i varieties available) leads to a decrease in A and, thus, a decrease in demand for all varieties. Within A, $\int_{i\epsilon\Omega} q_i^l$ is total production in this market. Thus, we can also think of A as including GDP at the export destination as well as preferences, aggregate price level, etc.

For a country with L consumers, demand for variety i is $q_i = Lq_i^l = \frac{L}{\gamma}\left(A - p_i^c\right)$ and the inverse demand function is $p_i^c = A - \frac{\gamma}{L} q_i$.

A.2.b Firms Maximize Profits

Firms pay an ad-valorem tariff (τ) per unit exported and $p^c = (1+\tau)p_i^s = tp_i^s$, where $t = (1+\tau)$ and p_i^s is the price received by the firms exporting variety i. We assume that each firm produces only one variety and that the variety is produced at a constant, but firm-specific, marginal cost (c_i); thus, i denotes both the firm and the product variety. Firms face the following inverse demand function: $p_i^s = \frac{1}{t}\left(A - \frac{\gamma}{L} q_i\right)$, where firms take A as given. Firms maximize profits by choosing the quantity produced of variety i; the maximization problem can be written as follows:

$$\pi(c_i) = max_{q_i} \ \frac{1}{t}\left(A - \frac{\gamma}{L} q_i\right) q_i - c_i q_i \tag{3}$$

Solving the firm's problem gives us the optimal production for the firm producing variety i; the solution to the firm problem is $q(c_i) = \frac{L}{2\gamma}(A - c_i t)$. Firms export as long as $A > c_i t$; that is, firms with low enough marginal costs export and the others only supply their home market.

A.2.c Model Implications

The export value, not including tariff revenue, for this firm is $v(c_i) = \frac{L}{4\gamma t}(A^2 - (c_i t)^2)$. Export value is increasing with the number of consumers abroad (L) and with the demand parameter (A); and export value is decreasing with marginal costs (c_i) and tariff costs (t). Note, however, that lower trade costs affect export revenue through two channels. The first is positive and direct by increasing $v(c_i)$, and the second is negative and indirect by increasing competition (lower A); for a more thorough examination of when the first outweighs the second, and vice versa, see Spearot (2013). Here we focus on the demand parameter A. By substituting optimal production $\left(q_i^l = \frac{q(c_i)}{L} = \frac{1}{2\gamma}(A - c_i t)\right)$ into $A = \theta - \eta \int_{i \epsilon \Omega} q_i^l$, we can express A as follows:

$$A = \left(\frac{2\gamma}{2\gamma + \eta N}\right)\theta + \left(\frac{\eta N}{2\gamma + \eta N}\right)\bar{c}t \tag{4}$$

Where $\bar{c}$ is the average marginal cost of imported varieties and N is the number of varieties available to the consumers. This is the equation of interest for our paper, and it shows that all else equal an increase in the number of varieties (N) leads to a decrease in A.[15] Since A is the demand parameter, when it is smaller it lowers the price a firm can charge the L consumers abroad and decreases export revenue. The reductions in revenue implies that the marginally profitable exporting firms can no longer compete. In the model, N includes exporters from the home country as well as exporters from a third country. Thus, any increase in competition, be it from a competitor in the home country or from a competitor in a third country, results in less export revenue for all exporters. More importantly, for our empirics, this also implies that, all else equal, we should expect more firms to fail at exporting when competition increases, and this effect should be felt stronger for firms exporting the first year. While not directly shown in the model, if new exporters face a more elastic demand curve then the extra competition would have a disproportionate impact on those firms. Intuitively, first year exporters may still be attempting to find successful export matches, or may even be in the process of "learning" about their export potential. For all of these reasons, we focus on first-year survival in our empirics.

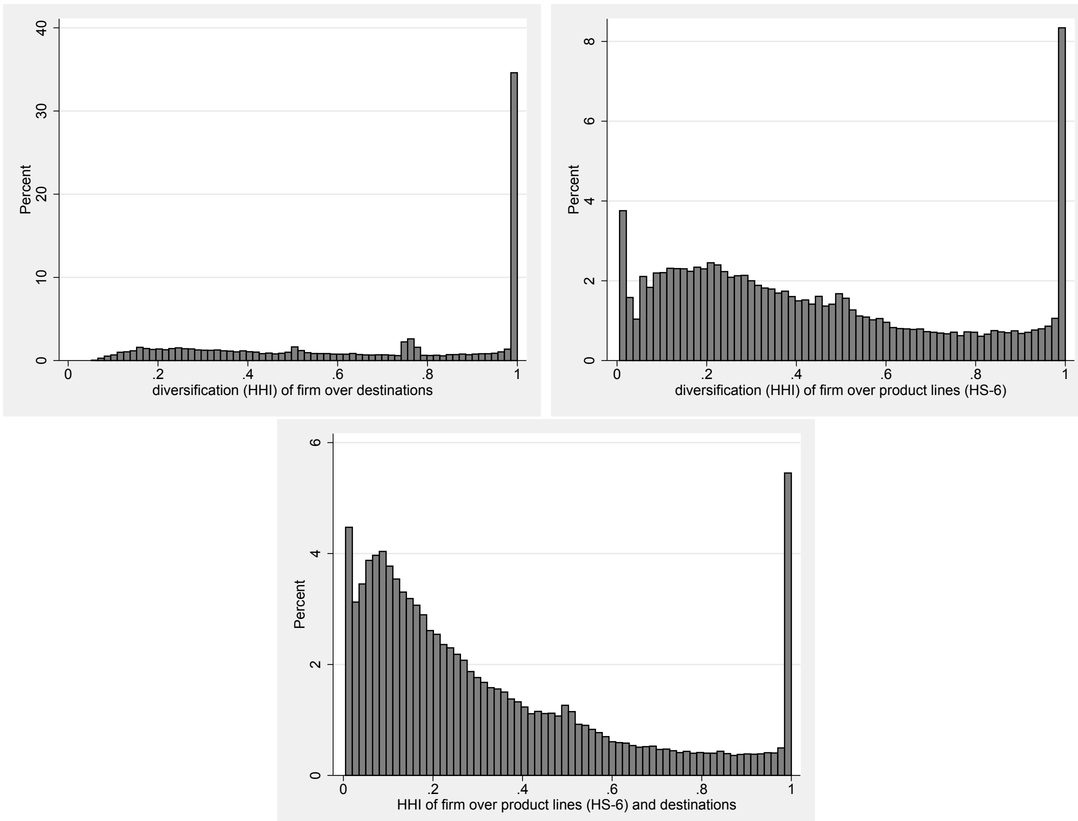
A.3 Product Diversification

Export diversification at the firm-level depends largely on how exports from a firm are defined. Figure A.1 highlights this fact, showing histograms of firm-level export

[15] This assumes that $\bar{c}t < \theta$. Since $A > c_i t$ for all exporters, then it must be that $c_i t < \theta$ for all exporters and $\bar{c}t < \theta$.

diversification in terms of destinations, products and product-destination combinations.

Figure A.1: Histograms of Firm-Level Export Diversification



The graph shows the Herfindahl-Hirschmann Index (HHI) for all firms in our data. The index measures the concentration (or diversification) of exports at the firm-level, with an HHI of zero representing the highest level of diversification and and HHI of 1 showing that the firm exported to only one group. The groups are defined as country destinations on the left panel, and as country-product combinations on the right panel, (e.g. exports of shoes to China as one category, exports of shoes to India as another category and exports of belts to India by the same firm as another category). Data source described in Cebeci et al. (2012).

The first panel in the figure shows that most firms in our sample are not diversified across destinations. Roughly 35% of the firms export to only one country, and thus have an HHI^{dest} of 1. The second panel shows that there is a greater level of diversification across products, as defined by narrow HS6 categories. Even though, slightly more than 8% of firms export only one product, the distribution appears bimodal, with a notable number of firms having HHI^{prod} levels below 0.5 — the level expected for firms selling two products in equal volumes.

The third panel of the figure shows that combining products and destinations in defining diversification at the firm only leads to small improvements in measured diversification. As expected, higher levels of diversification (or lower HHIs) are observed, but we still observe an $HHI^{prod-dest}$ of 1 for about 5.5% of firms. This distribution, as in the second panel also appears bimodal. In sum, the most common form of diversification observed in exporting firms is product diversification, such that defining diversification by product-destination combinations adds little information.

A.4 Country-Level Data and Variables

Following Besedes and Blyde (2010), we also include in our estimation a set of variables that will account for the characteristics of origin and destination countries. We include in our model the interaction of GDP in origin and destination country (in natural logarithm). This indicator was constructed using data from the World Bank (2017). We also include in our model two variables that account for geographic and cultural characteristics: distance between origin and destination countries (in logs) and an indicator variable equal to one if the origin country has a common language (official) with the destination country (zero otherwise; data obtained from Mayer and Zignago (2011).[16]

We include the following policy variables in our model, one variable at the time and then all together in our full model: the financial development of the origin country (private credit as a share of GDP in logs, obtained from the World Bank (2016a));[17] rule of law in the origin country (obtained from the World Bank (2016b));[18] the exchange rate between origin and destination country (constructed using data from International Monetary Fund (2015)); and the presence of trade agreements between countries (created using data from Dür et al. (2014)).[19]

[16] In our model we include the distance between countries estimated by Mayer and Zignago (2011) based on bilateral distances between largest cities of origin and destination countries, where inter-city distances are weighted by the share of the city in the overall country's population. The common language indicator is equal to one if official or national languages and languages spoken by at least 20% of the population are common between the origin and destination country, and equal to zero otherwise. Besedes and Blyde (2010) also include in their baseline model an indicator variable for contiguity of the two countries. We estimated our model including a contiguity variable (dummy equal to one if country of origin was contiguous to country of destinations, and zero otherwise) but it was insignificant. We decided not to include this variable since we believe the variable that accounts for distance between countries does a much better job controlling for trade costs associated with distance between countries.

[17] Besedes and Blyde (2010) use as an indicator of financial development the addition of private credit and stock market capitalization, both as a share of GDP. Because data on stock market capitalization is missing for four out of the six countries in our analysis, we instead decided to use private credit as a share of GDP in our model.

[18] The rule of law variable is available biennially; we used linear interpolation to fill in missing observations.

[19] Exchange rates between origin and destination countries are constructed using exchange rates in terms of United States dollars, where the exchange rate variable is expressed as the value of one unit of currency of origin country in terms of destination country. For trade agreements, we construct our variable to equal

A.5 Country-Level Factors and Export Flow Survival

Table A.2 presents the first set of results with country-specific predictors of export flow survival using a linear probability model. In Table A.2 in our baseline model, where we include country of origin, product and year fixed effects, we observe that export flow survival rates show a weakly positive relationship with GDP. Financial development has a statistically negative significant negative effect, which is unexpected. However, this may simply be due to how financing changes how firms select into exporting. Larger volumes of private credit can lead smaller more vulnerable firms to start exporting (Secchi et al., 2016; Van Biesebroeck, 2014).

As we add relevant policy variables one at the time to our model, we observe that rule of law has a positive statistically significant effect on export survival, which supports claims that institutional factors such as private property rights and the political environment facilitate the conduct of business.

Exchange rates also have a negative effect on export survival rates, as expected. Rising exchange rates erode any price advantages that firms from a country have in general. That said, firm-specific quality factors may supersede general price effects, as shown in column 3 of the table with firm-product fixed effects. Trade agreements also have a positive and statistically significant relationship with export survival in the specification with firm-product fixed effects, however, the coefficients in the other specifications are negative. The negative coefficients would be surprising if one did not consider the issue of selection into exporting, as described for our measure of financial development.

one if there has been a signed trade agreement between origin and destination country using the dataset constructed by Dür et al. (2014). Our indicator of trade agreements has several limitations. First, we only have information on the year in which the treaty was signed, but we do not have information on whether that treaty ended. We also construct our variable based in the year in which the treaty was signed, which might not be the same year in which the treaty went into effect. We assume a value equal to zero if there is no treaty recorded based on the database of Dür et al. (2014).

Table A.2: Export Flow Survival Past First Year: Country-Level Factors

VARIABLES	(1) Cadot (Baseline)	(2) Synergy	(3) Dest. Scope	(4) Product scope	(5) HHI
Cohort Size (n^c_{fpdt})	0.034***	-0.033***	-0.038***	-0.012***	-0.032***
	(0.001)	(0.004)	(0.005)	(0.004)	(0.004)
Destination Count (n_{fpt})	0.115***	0.119***	-0.091***	0.132***	0.119***
	(0.004)	(0.004)	(0.006)	(0.002)	(0.003)
Product Count (n_{fdt})	0.034***	0.037***	0.092***	-0.052***	0.047***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Firm-Product Count (n^c_{dt})	-0.010*	0.023***	0.009	0.067***	0.021***
	(0.005)	(0.006)	(0.006)	(0.010)	(0.006)
Log(Value)	0.039***	0.040***	0.038***	0.029***	0.039***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Share of Firm Exports (z_{fp})	-0.002***	-0.002***	-0.015***	0.009***	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)
HHI_{HS6}					0.187***
					(0.026)
$(HHI_{HS6})^2$					-0.126***
					(0.023)
Log(GDPi x GDPj)	0.003***	0.001	0.004***	-0.002***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fin. Dev.	-0.201***	-0.233***	-0.255***	-0.269***	-0.234***
	(0.017)	(0.016)	(0.018)	(0.017)	(0.015)
Law and Order	0.071***	0.073***	0.084***	0.083***	0.071***
	(0.007)	(0.005)	(0.008)	(0.006)	(0.005)
Exchange Rate	-0.017***	-0.019***	0.014***	-0.030***	-0.018***
	(0.007)	(0.005)	(0.005)	(0.008)	(0.005)
Treaty	-0.008*	-0.011***	-0.004	-0.019***	-0.011***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)
Observations	1,997,130	1,882,945	693,296	1,708,133	1,882,945
R-squared	0.184	0.262	0.599	0.444	0.263
Origin-Dest. FE	Y	–	–	–	–
Origin-Product-Dest. FE	N	Y	Y	Y	Y
Firm-Product FE	N	N	Y	N	N
Firm-Dest. FE	N	N	N	Y	N

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The unit of observation in the reported regressions is a origin-firm-product-destination-year combination. The dependent variable is an indicator of whether an export flow continues into the next year. The main variables are described in the paper and are drawn from country-level databases. All estimations include HS2-product and year fixed effects.