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Success and Failure of African Exporters

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Abstract
Using a novel dataset with transactions level exports data from four African countries (Malawi, Mali, Senegal and Tanzania), this paper uncovers evidence of a high degree of experimentation at the extensive margin associated with low survival rates, consistent with high and middle income country evidence. Consequently, the authors focus on the questions of what determines success and survival beyond the first year and find that survival probability rises with the number of firms exporting the same product to the same destination from the same country, pointing towards the existence of cross-firm synergies. Accordingly the evidence is consistent with the hypothesis that those synergies may be driven by information spillovers. More intuitively and consistently with multi-product firms models, the analysis also finds that firms more diversified in terms of products, but even more in terms of markets, are more likely to be successful and survive beyond the first year.

Keywords: Africa, export survival
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1 Introduction

In spite of great strides since the late 1990s, low-income country exports are still marginal in world trade and suffer from various vulnerabilities, ranging from low unit values to volatility, concentration and low survival (see for example Fugazza and Molina 2009). Low survival is not necessarily a sign of welfare loss if it reflects strong experimentation at the extensive margin, but it can be inefficient if sunk costs of entry and exit are substantial, as suggested by the work of Das, Robert and Tybout (2007). In particular, the weak contribution of the extensive margin to overall export growth (Besedes and Prusa 2007) may be explained by high failure rates, the flip side of low survival. Thus, identifying drivers of the 'sustainability margin' of exports is important for our understanding of the constraints to low-income country export growth. This is what the present paper sets up to do, using a new transaction-level export dataset obtained from Customs authorities in four African countries.

The key contributions of this paper are twofold. First, we document, for a sample of four low income African countries, a set of stylized facts on export survival that is broadly consistent with the emerging firm-level literature, so far confined to OECD or middle-income countries. Second, we provide novel evidence on a key outcome of interest, namely survival beyond the first year after entry into export markets. In particular, we identify a cross-firm "synergy effect" suggestive of external economies in export survival, a potential driver of sustainability that has been hitherto overlooked in the literature. Increasing the number of exporters of similar products to the same destination exerts a positive externality on new entrants. That is, the more similar they are, the higher the survival probability of new entrants. When evaluating the mechanisms behind these results we find evidence consistent with the existence of information spillovers driving them. For a Senegalese exporter, for instance, the probability of surviving past the first year (22% in 2001) would rise to 26% if the number of national competitors selling the same product (product identified at HS 6 digits) on the same destination market were to double from the baseline 22 to 44.

Our results may help explain a finding highlighted in Easterly, Resheff and Schwenkenberg (2009), namely, that national export success often takes the form of 'big hits', with one narrow export item suddenly growing rapidly.

If a sufficient number of exporters target one market simultaneously, our results imply that their chances of surviving increase, possibly triggering a virtuous cycle of entry, survival and growth.

Like Eaton et al. (2008), we also find that export spells that survive tend to grow. For instance, in Senegal, products that entered a market in 2001 and survived till 2008 had reached, by then, four times their entry volume.

Lastly, export scale and scope at the firm level, by which we mean respectively destinations per product and products per destination, both evaluated at the time the firm launches a new product-destination combination, matter for its survival.

From a policy perspective, our findings could be construed as contributing to a possible rationale for using public funds to promote national exports abroad. The synergy we identify is akin to external economies, as the presence of competitors from the same countries exporting the same product to the same destination provides potential new entrants with information on the profitability of these exports ventures, help identifying potential buyers as well as provide information about the consumers' preferences and therefore increases their likelihood of surviving. Similarly, this information becomes available to financial institutions and ease financial constraints of new exporters as shown by the fact that these 'synergy effects' are especially important for firms in sectors that are more dependent from the financial sector. However, these external economies may not be fully internalized by exporters as incumbents have not sufficient incentives to explicitly assist new entrants, leading to a market failure. Public intervention, in the form of export promotion, through market-product specific information and "matching with buyers" services, could possibly help overcome these market failures, although the record of publicly-financed export promotion is patchy, especially in developing countries (see Lederman, Olarreaga and Payton 2010), and the effects we identify even if statistically robust are quantitatively small.

The paper is organized as follows. Section 2 discusses the recent literature related to this paper. Section 3 presents qualitative evidence based on a recent survey of African exporters conducted by the World Bank that motivates the consequent analysis and presents a brief description of the data. Section 4 discusses the estimation strategy and the result, Section 5

concludes.

2 Export survival: What do we know?

At the product level, the determinants of export survival have been explored by a small but growing literature. Besedes and Prusa (2006) used two panels of U.S. imports, one spanning 1972-88 with tariff-schedule data, the other spanning the 1989-2001 period with 10-digit data (the Feenstra-NBER dataset). In both cases, they found that half of all trade relationships lasted only one year and three quarters lasted three years or less. Once censoring was taken into account, median duration was two years. Most strikingly, this pattern of short duration was robust to aggregation at HS6, even though one would expect interruptions to be smoothed out by aggregation. They also found negative duration dependence, meaning that the hazard rate fell as export spells grew older. This finding, however, has been recently contested by Brenton, Saborowsky and von Uexhull (2010).[1] In terms of survival determinants, Besedes and Prusa (2006) found that industrial-country exports lasted longer, and so did exports of machinery, a finding confirmed by the analysis of Asian trade flows by Obashi (2010).

Besedes and Prusa (2006) explored the determinants of export survival further by testing the implications of a search model proposed by Rauch and Watson (2003) in which importers search for low-cost suppliers and exporters invest optimally in production capacity in the face of moral hazard (risk of non-payment). Such model implies that, in general, smaller initial transactions have a lower life expectancy; however, differentiated goods, where moral hazard is highest, involve both smaller initial transactions *and* longer life expectancy. The model's predictions are upheld by Cox regressions on U.S. import data using Rauch's (1999) index of product differentiation as a regressor. That is, the hazard rate is 23% higher for homogenous products than for differentiated ones, although initial transactions are 40% to 350% larger. In related work, Besedes (2008) also finds supports for the Rauch-

[1] Brenton et al. argue that the assumption of proportional hazards, which is needed for Cox regressions to be valid, typically does not hold in export-duration samples (this can be verified using a Schönfeld test). Using the alternative Prentice-Gloeckler (1978) estimator, they find no duration dependence. Brenton et al.'s critique applies to the quasi-entirety of the export-survival literature.

Watson hypotheses on a restricted sample of Rauch-differentiated products where he proxies search costs by the number of potential suppliers and reliability by income levels.

Evidence on trade flows from other countries largely confirmed these early findings. The determinants of export duration were explored by Nitsch (2009) using Cox regressions on a ten-year panel of German imports at the HS8 level. He found that gravity variables (distance, exporter GDP, common language, common border, etc.) influenced the duration of trade flows pretty much the same way they influenced trade volumes. Interestingly, he found that the short duration of trade flows held even when flows below 10'000 euros were excluded. Fugazza and Molina (2009) extended the exploration to a nine-year panel of HS6 bilateral trade flows between 96 countries using, as regressors, gravity variables and time required for export procedures (based on the World Bank's *Doing Business* surveys) as proxies for fixed costs. Besides usual findings on the effect of gravity variables and income levels, they also found that fixed costs reduced survival.[2] A similar exercise was carried out on Asian trade flows by Obashi (2010) with largely convergent results. In particular, the 2-to-3 year median survival seems to hold across all samples studied. Obashi also found that vertical trade relationships (involving the sale of semi-finished product) have hazard rates one-third lower than those involving the sale of final goods, and that they are less sensitive to trade costs (e.g. distance or exchange-rate fluctuations).

A smaller number of recent papers have made use of the growing availability of firm-level datasets to shed new light on the determinants of export survival. For instance, Görg et al. (2008) tested the implications of the heterogeneous-firm model of Bernard et al. (2006) on a rich panel of 2,043 Hungarian firms spanning the transition from centrally-planned to market economy (1992-2003). Their data contained firm characteristics and exports at the firm-HS6 level. They found large product turnover during the period as firms constantly rearranged their product portfolios. They also found longer survival for products located close to the firm's core competencies and to the country's comparative advantage. These results are consistent with those

[2]This is unintuitive: in microeconomics, the shut-down point depends on average *variable* costs, not on fixed costs. However the fixed export costs they consider are incurred for each transaction, although they do not depend on transaction size. They are therefore not really fixed when looking at flows aggregated to the annual level.

of Iacovone and Javorcik (2010) who showed the importance of churning at the firm level in response to exogenous opportunities provided by increased globalization. Alvarez and López (2008) used Tobit regressions to study the determinants of industry-level rates of entry and exit into exporting using a 10-year panel of 5'000 Chilean plants. They found that within-industry heterogeneity, measured (inter alia) by the dispersion of firm-level productivity levels, played an important role in explaining firm turnover in and out of exporting. By contrast, trade costs, factor intensities, and exchange-rate fluctuations were found to have only marginal impacts. Carballo and Volpe (2008) used a 6-year panel of firm-level Peruvian exports at the HS10 level to explore how diversification strategies (in terms of products and markets) affected the survival of firm-level exporting activity. They found that both geographical and product-wise diversification raised survival, but geographical diversification more so—presumably because it proxies for product quality.

3 Data

3.1 Qualitative evidence from a World Bank survey

Preliminary indications on how African exporters venture and survive (or not) on foreign markets can be gleaned from a 2009 survey focusing on export survival conducted by the World Bank in four African countries.[3] The survey, which had three sections (basic information on the firm, constraints on survival, and opportunities and plans for future expansion), asked exporters specific questions on their initial entry into and survival on export markets. On the basis of the information provided, respondents were classified into three categories: (i) current exporters, (ii) past exporters (who failed), and (iii) intermittent exporters.

As shown by Table 7 in the appendix, roughly two thirds of the respondents (a bit more among regular exporters) identified their first client through relatives, friends, intermediaries and suppliers. More formal or technology-related channels (e.g. trade fairs or online research) came only second, and

[3]The countries are Malawi, Mali, Senegal and Tanzania. See Appendix 1 for more background information on the survey.

only a tenth of the initial contacts were made through export promotion agencies or exporters' associations. This highlights the importance of informal networks and suggest that the "thickness" of a certain network where there are many firms exporting similar countries to similar destination may help to expand the chance of identifying appropriate buyers among through contacts with relatives, friends, intermediaries and suppliers.[4]

Product experience, whether through domestic or foreign sales, appears as a strong driver of geographical export expansion. A majority of respondents reported that their initial export product was one they were already selling domestically, as opposed to starting a new line taylored to the foreign customer's needs. This suggests that experience matters and indirectly, it also could imply a natural 3-step expansion strategy: first the domestic market, then regional markets with similar preferences (so domestically sold products can be tried there), finally more differentiated markets. This is consistent with results in Cadot, Carrère and Strauss-Kahn (2009) who showed that the survival of LDC exports was higher when export to OECD markets was preceded by a small number of years of exports to regional markets. Moreover, when asked whether their most recent export product in a given destination was a new one or one that had previously been exported elsewhere, respondents overwhelmingly indicated the latter.

When asked how the opportunity to export a new product came about in the first place, the majority of regular exporters answered that they were approached by an existing buyer asking for a new product, suggesting that *export* experience matters beyond domestic experience in terms of establishing a "network" of buyers to identify market opportunities.

Finally, in an open question about constraints on export (or export expansion in the case of the current exporters), a large proportion of respondents (31%) identified access to finance as the main factor limiting their operations. Moreover, the percentage was higher (42%) among past (failed) exporters, suggesting that credit constraints are not just a perception, but a reality effectively hurting the survival of exports.

[4]The role of networks for trade is a theme largely developed in the writings of Rauch (1999)

3.2 Customs data

Our export dataset is generated from raw data files collected by customs authorities containing export flows at the transaction level. The files were provided by the customs authorities of Malawi, Mali, Senegal and Tanzania. Each of them contains information on products exported at the highest level of disaggregation of the HS code used by these administrations: 10-digit for Mali and Senegal and 8-digit for Malawi and Tanzania. In addition to product information, each file contains information on destination market, FOB shipment value, net weight, port used and date of transaction. Original names and tax IDs identifying the individual firm were replaced by 'dummy' digital IDs so as to preserve confidentiality. We aggregated transactions up to annual totals at the 6-digit level, the standard level used in cross-country comparisons. Finally, for consistency, we filtered out years with different port coverage. For instance, for Malawi we have information from 2004 onward; however, as fewer ports were covered in 2004 than in other years, we excluded 2004 from our sample for that country. Sample periods are 2005-2008 for Malawi and Mali, 2000-2008 for Senegal, and 2003-2008 for Tanzania.

Table 1 presents some basic descriptive statistics. Tanzania has the largest number of exporters (1,359), followed by Malawi (856), Senegal (715), and Mali (280); however, they are less diversified than those of other countries in our sample in terms of markets. Mali's exporters are, on average, the most diversified in terms of products.

Our variables of interests are indexed as follows. Let f be a firm, d a destination, p a product (at HS6), t the starting year of an export spell, and v^c_{fpdt} the dollar value of exports of product p to destination d in calendar year t by firm f from country c. Because there are no multi-country firms in our sample, indexing observations by firm eliminates the need to index them by origin country. We aggregate transactions to annual (f, p, d, t) quartets, our primary sample unit.

Table 1: Descriptive statistics

	Nr firms	Nr prod.	Nr dest.	Nr prod/firm		Nr dest/firm		Nr firms/prod		Nr firms/dest		Init. value (USD)	
				Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Mali	280	575	99	2.54	2	3.89	2	1.89	1	7.18	2	219,694	5,373
Malawi	856	932	102	1.57	1	4.10	2	3.76	1	13.19	3	106,475	571
Senegal	715	1,653	100	3.10	1	6.76	2	2.92	2	22.17	5	47,111	3,446
Tanzania	1,359	1,689	137	2.49	1	3.62	1	2.91	1	24.69	7	83,078	2,858

This table shows, for each source country: The number of firms, products, destinations, the number of products per firm, number of destination per firm, number of firms per product, number of firms per destination and the value of those firms that entered the export market. All values are computed for the year 2006.

Before turning to survival analysis (next section), a few observations are important. Following the literature on the intensive and extensive margins (e.g. Evenett and Venables 2003 or Brenton and Newfarmer 2007), we group our primary sample units into new firms, new products (for existing firms), new destinations (for existing firm-products), and continuing firm-product-destinations. Items labeled 'new' refer to units that are present in the data at time t but not at time $t-1$.[5] These groupings create four mutually exclusive categories. The 'new-firm' category includes all product-destination combinations served at time t by an exporter appearing in the data in that year (except the first year). The 'new-product' category includes all product-destination combinations served at time t by an existing exporter —one that already exported at $t-1$— who did not export that product anywhere at $t-1$. The 'new-destination' category includes all product-destination combinations served at time t by an existing exporter who did not serve that destination with any product at $t-1$. The 'existing product-destination' category includes all product-destination combinations served at time t by an exporter who was also serving that product-destination at $t-1$. More formally, let $v_{f,t-1}$ stand for f's exports of any product to any destination at $t-1$, $v_{fp,t-1}$ for its exports of product p to any destination, $v_{fd,t-1}$ for its exports of any product to destination d, $v_{fpd,t-1}$ for its exports of product p to destination d. Our four categories are

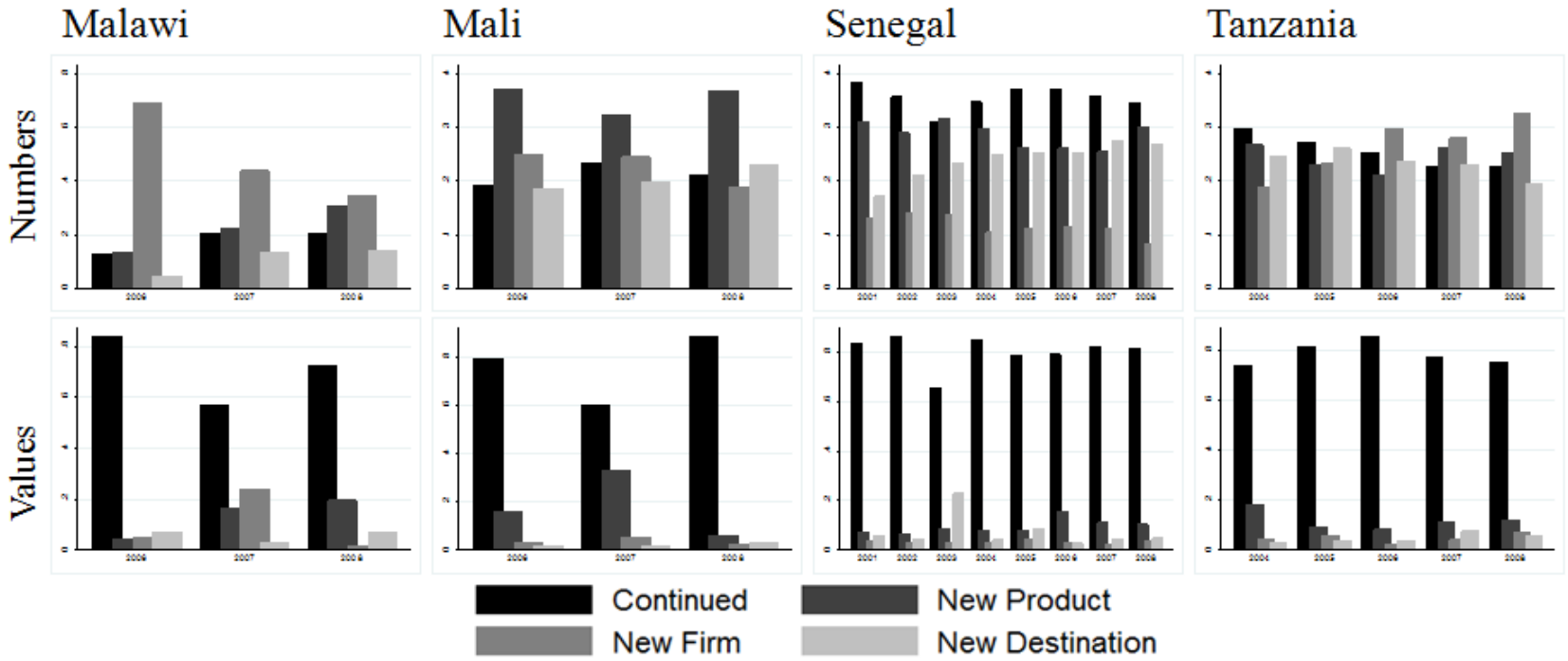
$$\begin{aligned}
\text{NF} &= \{(f,p,d,t)\text{s.t.}v_{fpdt}>0 \text{ and } v_{f,t-1}=0\},\\
\text{NP} &= \{(f,p,d,t)\text{s.t.}v_{fpdt}>0, v_{f,t-1}>0 \text{ and } v_{fp,t-1}=0\},\\
\text{ND} &= \{(f,p,d,t)\text{s.t.}v_{fpdt}>0, v_{f,t-1}>0 \text{ and } v_{fd,t-1}=0\},\\
\text{EPD} &= \{(f,p,d,t)\text{s.t.}v_{fpdt}>0 \text{ and } v_{fpd,t-1}>0\}.
\end{aligned}$$

The dollar value of export sales in the first three categories can only go from zero at $t-1$ to some positive value at t; these variations add up to the extensive margin. Changes in the dollar value of exports in the last category form the intensive margin.

Figure 1 decomposes the exports flows into these four categories both in terms of their number, i.e. count of trade flows, and value.

[5]Observations in the sample period's initial year are considered left-censored and not used.

Figure 1: Decomposition of exports flows



Note: This graph classifies each of the origin-firm-product-destination observations into one of four mutually exclusive groups: *New Destination* includes units of existing firms which export an existing product to a new destination; *New Products* includes existing firms that add a product to their portfolio, *New Firms* includes all units from firms that did not export before, while *Continued* includes all other units. The first set of graphs displays the share of observations, and the second set the share of total values of each category.

Analyzing the export values, existing products sold in existing destinations (i.e. observations for which firm, destination and HS6 at time t are all the same as they were at time t-1) dominate in dollar value, although not always in the count of observations. For example, in Tanzania, continued firm-product-destinations accounted for 90 percent of export value in 2006 but only for 25% of the observation count. This suggests that our countries experiment substantially. This fact is consistent with the findings of Cadot, Carriere and Strauss-Kahn (2010) for low-income countries, Freund and Pierola (2010) for Peru and Iacovone and Javorcik (2010) for Mexico. Continuing firm product destinations make up a relatively small number of export transactions, but a large share of export values. This confirms the findings of Besedes and Prusa (2007) and Brenton and Newfarmer (2007), who also show the importance of the intensive margin in explaining export growth in developing countries (see also Evenett and Venables 2002).

Another interesting stylized fact, consistent with existing firm-level literature modeling exporters dynamics (Rauch and Watson 2003), confirms that when a firm's product manages to survive in a given destination market beyond its first year, it will grow significantly over time. Conditional on survival, Senegalese firm-product-destinations that appeared in 2001 (we don't know the initial year of those appearing in 2000, the sample's initial year, because they are censored) grew by a factor of over four between 2001 and 2008. Similarly, Tanzanian firm-product-destinations that appeared in 2005 grew by a factor of over three by 2008.

Following Brooks (2006), Table 2 shows the number of firms, firm-products, and firm-product-destinations by a given year of entry and tracks the survival of this cohort over time for each origin country. Naturally, the numbers decrease because of the exit. What is remarkable, however, is how large the attrition is in the first year and how quickly it slows down over time. For instance, in Senegal, of the 206 firms that started exporting in 2001, only 84 made it to 2002 (a death rate of 59%); however, of the 24 still around in 2007, only 3 had failed by 2008 (a death rate of "just" 12%). To make this point more clear, the third column of Table 2, calculated from the second one, shows the survival rate with respect to the previous year (i.e. one minus the annual death rate). Survival rates increase over time. For instance, 59 percent of firms that entered in 2001 dropped out by 2002, while 13 percent of firms that survived until 2007 survive also until 2008. This casual obser-

Table 2: Survival cohorts

	Senegal Entry:2001			Tanzania Entry:2004			Mali Entry:2005			Malawi Entry:2005		
	Nr	Y-Exit	Exit	Nr	Y-Exit	Exit	Nr	Y-Exit	Exit	Nr	Y-Exit	Exit
Firm												
2001	206											
2002	84	0.59	0.59									
2003	57	0.32	0.72									
2004	40	0.30	0.81	420								
2005	35	0.13	0.83	194	0.54	0.54	273			670		
2006	29	0.17	0.86	118	0.39	0.72	159	0.42	0.42	217	0.68	0.68
2007	24	0.17	0.88	85	0.28	0.80	123	0.23	0.55	154	0.29	0.77
2008	21	0.13	0.90	75	0.12	0.82	103	0.16	0.62	126	0.18	0.81
Product												
2001	2055											
2002	449	0.78	0.78									
2003	192	0.57	0.91									
2004	117	0.39	0.94	2656								
2005	94	0.20	0.95	497	0.81	0.81	1047			3322		
2006	78	0.17	0.96	200	0.60	0.92	305	0.71	0.71	325	0.90	0.90
2007	61	0.22	0.97	106	0.47	0.96	166	0.46	0.84	174	0.46	0.95
2008	54	0.11	0.97	71	0.33	0.97	123	0.26	0.88	127	0.27	0.96
Product destinations												
2001	3326											
2002	718	0.78	0.78									
2003	356	0.50	0.89									
2004	245	0.31	0.93	4908								
2005	167	0.32	0.95	837	0.83	0.83	1391			3828		
2006	129	0.23	0.96	295	0.65	0.94	286	0.79	0.79	509	0.87	0.87
2007	101	0.22	0.97	167	0.43	0.97	122	0.57	0.91	316	0.38	0.92
2008	84	0.17	0.97	113	0.32	0.98	82	0.33	0.94	224	0.29	0.94

Note: In the columns labelled *Nr* we document for each origin country the number of firms products and destinations in the first available year, and follow this cohort of units over time. Column *Y-Exit* shows the exit rate (ie. the share of units that left) with respect to the previous year, and column *Exit* the exit rate with respect to the entry year.

vation is consistent with Besedes and Prusa's decreasing-hazard rate finding (annual death rates are discrete-time approximations to instantaneous hazard rates) although, as noted, this finding must be taken cautiously. Comparing the upper panel (firms) with middle and lower ones (products and product-destinations respectively), there is less stability at more disaggregate levels.

Additionally, the fourth column shows cumulative death rates relative to the first year. In all cases these rates are high, and above 80% in 2008 in most cases (with the only exception of Mali at the firm level). In all four countries, the very high death rates after the first year suggest that a binary coding of survival based on second-year outcomes is a good summary measure of survival.

Overall, the results presented in Figure 1 and Table 2 suggest that there is substantial churning in export products and destinations within firms; in other words, firms continuously experiment with products and destinations. Thus, Hausman and Rodrik's 'self-discovery' process (Hausman and Rodrik 2003) seems to hold not only at the national level, but also—quite naturally—at the firm level. This pattern is also consistent with the notion that firms face uncertainty about export costs or demand parameters, a notion that is central to the heterogeneous-firms literature.

In sum, the preliminary evidence presented above confirms existing findings about export growth and survival: a) the intensive margin represents the largest share of export growth in terms of values, however these values are concentrated over a small number of transactions and firms; b) there is substantial experimentation in the exporting activity in the form of entry by new firms or the introduction of new products or destinations each year; c) one-year survival rates are low; past the first year, death rates significantly slow down and transaction volumes grow.

4 Estimation strategy and results

4.1 Estimation strategy

After aggregating the transactions to cumulated annual totals, the primary sample remains a panel, as each firm-product-destination (f, p, d) triplet is

observed repeatedly over several years. However, as we are interested in the survival past the first year, the data needs to undertake a second transformation. We define a *new* (f, p, d, t) quartet as one that appears for the first time in the database, and say that this quartet 'survives' if it lasts more than one year. The quartet is then associated to a survival dummy (our dependent variable) equal to one. If it lasts only one year, the survival dummy is set equal to zero for that quartet. If it has already appeared in the sample or if it is left-censored (i.e. already active the first year of the sample), we drop it. Multiple spells account for only a very small number of observations, since our sample periods are only a few years except for Senegal. Thus, we reduce our panel to a quasi-cross-section, even though each observation has an initial-year tag allowing us to control for calendar time. Doing so allows us to bypass the issue of how long a spell break should be to be considered a 'death', an issue that has been discussed at length in the survival literature and that has no clear-cut answer. Two additional reasons make this binary definition of survival attractive. First, our panels are too short to carry out a full-fledged survival analysis. Second, as the descriptive analysis above showed, once a firm has survived the first year, its survival probability dramatically increases; so understanding survival beyond the first year is especially important.[6]

As already noted, firm and country indices are redundant, so we use either a country superscript c or a firm subscript f, but not both, and run our regressions on a pooled cross-country sample.[7] Our dependent variable is

$$s_{fpdt} = \begin{cases} 1 & \text{if} v_{fpdt} > 0, v_{fpd,t-\ell} = 0 \,\forall\, \ell > 0, \text{and} v_{fpd,t+1} > 0 \\ 0 & \text{if} v_{fpdt} > 0, v_{fpd,t-\ell} = 0 \,\forall\, \ell > 0, \text{and} v_{fpd,t+1} = 0. \end{cases} \tag{1}$$

In 1, the expression "$\forall\ \ell > 0$" means "over the sample period" as a single spell over the sample period could be a multiple one over an (unobserved) longer sample. The estimating equation is

[6] This choice comes with both a cost and a benefit. On one hand, we lose information, as a two-year spell is treated as equivalent to a 3- or 4-year one; on the other hand, we gain robustness, as the probability of wrongly treating a two-or-more year spell as a one-year one is fairly low.

[7] We also ran, for robustness, separate regressions by origin country. The results of these regressions are available upon request. They are qualitatively similar to those of cross-country (pooled) regressions reported here.

$$\Pr(s_{fpdt} = 1) = \phi\left(\mathbf{x}_{fpdt}\beta + \delta_i + \delta_{cd} + \delta_t + u_{fpdt}\right) \tag{2}$$

where ϕ is the probit function and u_{fpdt} is an error term. Our specification includes industry fixed effects at HS2 (δ_i), origin-destination fixed effects (δ_{cd}), and spell-start year fixed effects (δ_t). The vector of regressors $\mathbf{x}_{fpdt}$ includes measures of the firm's scale and scope as well as proxies for agglomeration and market attractiveness. These proxies are counts of (i) n^c_{pdt}, the number of firms from origin country c exporting product p to destination d; (ii) n_{fpt}, the number of destinations to which firm f exports product p; (iii) n_{fdt}, the number of products that firm f exports to destination d; (iv) n^c_{dt}, the number of (product $\times$ firm) combinations active in the bilateral trade between origin c and destination d; they also include (v) v_{fpdt}, the initial value of firm f's export spell (product p to destination d); and (vi) z_{fp}, the share of product p in firm f's overall export sales. That is, the notation convention is to omit the index of the dimension over which the count is summed. All counts are put in logs, and we use robust standard errors clustered at the product-destination level throughout.

In customs data, E.U. countries are entered as separate destinations rather than as a whole. We have kept this convention, so a destination should be taken, as far as the E.U. is concerned, as a member state. This creates an asymmetry in the treatment of destinations between the U.S., which is taken as a whole, and the E.U., which is broken down. However, as African exports tend to be heavily concentrated on E.U. markets, the alternative assumption (bundling all E.U. destinations together) would have drastically reduced the number of destinations and potentially obfuscated some geographical diversification issues, as marketing channels are, in spite of the Single Market, still somewhat separate across E.U. member states.

We estimate equation 2 by probit, reporting marginal effects. Typically, marginal effects of a probit estimation can be interpreted like the coefficient in a linear probability model, and also in the present case a robustness check reveals that quantitatively the difference between the results from a linear probability model and the probit's marginal effects at the mean are very small.[8]

[8]Results of a comparison of the linear probability model and Probit estimates are available upon request.

4.2 Baseline results

Baseline regression results are shown in Table 3. Before turning to their detailed interpretation, it is important to stress that the effects to be discussed are simultaneously present in each regression and so are conditional on each other. Also, it is important to note that these must be interpreted as conditional on starting to export. The probability of survival beyond the first year t can be estimated only for those trade flows that started at $t-1$, so we exclude left-censored spells (those already active at the start of the sample) and multiple ones.[9] The first column presents the baseline results. The second differs from the first in that all right-hand side (RHS) variables are lagged by one year. The third and the fourth include one additional control each, the share of product p in firm f's export portfolio in the third and origin country c's revealed comparative advantage (RCA) in product p in the fourth. The fifth runs a counterfactual experiment which is discussed below.

Consider first the results in Column (1). The first regressor of interest is $\ln n^c_{pdt}$, the log of the number of firms selling the same product (p) in the same destination (d). That is, if spell (f, p, d, t) is mens' t-shirts sold in France by a Senegalese firm in 2006, $\ln n^c_{pdt}$ is the log of the number of Senegalese firms exporting mens' t-shirts in France in 2006. The effect is positive and significant at the 1% level in all specifications. That is, more companies from the same country selling the same product in the same destination together raise each other's survival probability. This is a striking network effect, to which we will come back at some length later on. How large is the effect? Let us write the probability of survival as $\pi_{fpdt} = \Pr(s_{fpdt} = 1)$. Recalling that the coefficients reported in Table 3 are marginal effects, using the point estimate of of 0.0566 in the first cell of Column (1), and the average number of Senegalese firms selling to each destination ($n^{SEN}_{pdt} = 22$) we can write

[9] The number of multiple spells is very limited and their inclusion does not influence our results.

Table 3: Determinants of survival past the first year

Regressors (log)		(1)	(2)	(3)	(4)	(5)
n^c_{pdt}	Firm count	0.0566***	0.0431***	0.0544***	0.0563***	
		(0.00283)	(0.00306)	(0.00282)	(0.00285)	
n^{-c}_{pdt}	Firm count					0.00449
						(0.00727)
n_{fpt}	Dest. count	0.125***	0.0820***	0.125***	0.125***	0.116***
		(0.00270)	(0.00296)	(0.00269)	(0.0027)	(0.00397)
n_{fdt}	Prod. count	0.0375***	0.0224***	0.0478***	0.0375***	0.0301***
		(0.00163)	(0.00152)	(0.00184)	(0.00163)	(0.00218)
v_{fpdt}	Init. value	0.0304***	0.0332***	0.0277***	0.0304***	0.0335***
		(0.000898)	(0.000889)	(0.000921)	(0.000898)	(0.00125)
n^c_{dt}	Prod. × firm	-0.00477	-0.0213***	-0.00723	-0.00472	-0.00131
		(0.00594)	(0.00397)	(0.00595)	(0.00594)	(0.0084)
z_{fp}	Prod. share			0.0771***		
				(0.00640)		
RCA_{cp}					<0.0001	<0.0001
					(<0.0001)	(<0.0001)
RHS vars lagged		No	Yes	No	No	No
HS2 FE		Yes	Yes	Yes	Yes	Yes
Origin-dest. FE		Yes	Yes	Yes	Yes	Yes
Time effects		Yes	Yes	Yes	Yes	Yes
Obs.		57,063	57,063	57,063	57,063	11,185

Note: Probit estimations, marginal effects reported. Origin-destination, hs2 and year fixed effects. Robust standard errors clustered by origin-destination-product.

$$\begin{aligned}\Delta\pi_{fpdt} &= 0.0566\,[\ln(n^c_{pdt}+1)-\ln(n^c_{pdt})] \\ &= 0.0566\,[\ln(23)-\ln(22)] \\ &= 0.0025.\end{aligned} \tag{3}$$

Using the illustrative attrition rates in Table 2, a Senegalese firm entering in 2001 has a first-year attrition rate of 0.78 (78%) at the product-destination spell level, implying a survival probability of 0.22. We take this number as our baseline probability of survival, π_{fpdt}. Raising it by 0.0025 means a negligible increase of 0.2 percentage points. Doubling the number of national competitors on a given product-destination niche, from the baseline of 22 to 44, would raise the first-year survival probability by 3.9 percentage points, from 0.22 to 0.26 (a proportional increase of 18%).

Skipping the second regressor which is a placebo used in Column (5) and discussed later on, the second regressor in Column (1) is $\ln n_{fpt}$, the count of destinations to which product p is exported by firm f, a proxy for the scale at which the firm exports, and thus probably produces, product p. Scale significantly raises the probability of survival in all regressions. This may reflect either more robust production lines (say, a larger number of machines, meaning that failure of one of them is more easily made up by others), better information about the cross-country drivers of a product's demand, or, alternatively, higher product quality. How large is the effect? Using a calculation similar to that in (3), an additional destination[10] raises the probability of survival by

$$\Delta\pi_{fpdt} = 0.125\,[\ln(2.55)-\ln(1.55)] = 0.062.$$

That is, the baseline first-year probability of survival of a spell goes up by 6.2 percentage points, from 0.22 to 0.28, when the mean Senegalese exporter adds one destination to his portfolio at the product level. If she was to double the number of his destinations for that product, the first-year survival probability would rise by 8.7 percentage points, from 0.22 to 0.31 (a proportional rise of 39%).

[10]The average number of destinations per product, for a Senegalese firm, is 1.55. This is lower than the number appearing in Table 1 which is the total number of destinations per firm, not per firm-product.

The next regressor, $\ln n_{fdt}$, is the log of the number of products firm f exports to destination d, a proxy for its 'scope' in that destination. The effect is, again, positive and significant. As for its magnitude, if our Senegalese firm adds one product to its average destination d, from a baseline of 3.48 products,[11] the usual calculation gives a rise of just 1 percentage point in the survival probability. With a doubling of the number of products, the survival probability rises by 2.5 percentage points, from 0.22 to 0.245, a proportional rise of 11%.

Thus, adding one product to a given destination has a smaller effect on spell survival (1 percentage point) than adding an additional destination for that product (1.7 percentage point). This is somewhat natural, as our analysis is at a disaggregated level in terms of products (5,000 products at HS6), so the additional product sold on destination d can be very close to the original; by contrast, destination countries are much fewer, so adding one more shipping destination for product p is a substantial move (although it may involve adding one E.U. member state which would mean expanding within the Single Market space). An alternative explanation goes as follows. Increasing either scope or size raises the firm's visibility and therefore has a positive demand effect. However, there may be supply effects running at cross-purposes. When a firm adds one export destination to a given line of products, it expands production, potentially making the value chain more robust to accidental fluctuations. By contrast, when it adds one product to a destination, the firm diversifies production and therefore spreads managerial attention and risk management over a wider range of activities, potentially resulting in more accidents. In that case, the supply effect runs against the demand effect, resulting in a lower net change in spell survival.

The next regressor is a control for the export spell's initial value, v_{fpdt}, which has been shown to correlate with spell survival at the product (multi-firm) level. This is confirmed at the firm level, although the effect is, again, small. Using the coefficient in Table 3 (0.0304), a doubling of the initial value of the Senegalese firm's average export spell ($47'111 from Table 1) would raise the probability of spell survival by 0.021, or 2 percentage points, from 0.22 to 0.241.

[11] Again, this number differs from the one appearing in Table 1, which is the total number of products per firm, not per firm-destination.

The last regressor, $\ln n^c_{dt}$, is a count of the firm-product pairs from country c active on destination d. If c is Senegal and one Senegalese firm sells two HS6 products in the E.U. and another one sells three, $n^c_{dt} = 5$ for all five observations with $c =$ Senegal and $d =$ E.U. in year t. It is a proxy for the size of the bilateral trade relationship.This variable is never significant except in Column (2).

Column (2) of table 3 is very similar to Column (1) except that all the explanatory variables are lagged by one period. Results are essentially unchanged, except for n^c_{dt} whose coefficient becomes negative and significant. What that means is that more firm-product combinations from a given origin to a given destination are associated with a lower probability of survival past the first year. Without making too much of this result, one can interpret it as follows. Given that we include origin-destination fixed effects, n^c_{dt} picks up only the time-variant component of bilateral shocks, like booms in the destination market. The negative coefficient suggests that a growth expansion (a boom) in $t-1$ triggers crowding in followed by retrenchment.[12]

Column (3) introduces an additional regressor. The literature on multiproduct firms suggests that firms have core and marginal products, and that they have a stronger competitive advantage in the former (see for instance Eckel and Neary 2010 for a theoretical model and Iacovone, Rauch and Winters 2010 for an empirical test of this hypothesis). For each multiproduct firm f and product p, we proxy how close is that product from the firm's 'core' by $\ln z_{fp}$, the log of its share in the total firm's export sales. Results suggest that it correlates positively with first-year survival probability even after controling for dollar initial value; that is, the probability of survival for 'core' products is substantially higher than for others. For instance, a product representing 80% of the firm's export sales (all destinations together) would have a first-year survival probability on a given destination higher by

[12]Confirming this interpretation, when we exclude the destination fixed effects, the coefficient on this variable becomes positive, suggesting that *permanently* more attractive markets are associated with longer survival, which is consistent with our interpretation. This "crowding-in" result is also consistent with a finding by Bussolo, Iacovone, and Molina (2010) who found, using firm-level data from the Dominican Republic, that the reduction of tariffs following the signature of CAFTA led to some over-crowding of Dominican exports, followed by retrenchment.

10 percentage points than a product representing 20% of the firm's export sales.

In column (4) of table 3, we control for a potential omitted variable that could bias our results if country c had a comparative advantage in product p, explaining both that it had more exporters of that product (in destination d or elsewhere) *and* that product p had a better survival outlook. As a control for this, we use the initial (sample-start) value of Balassa's revealed comparative advantage (RCA) index defined, for product p, as

$$RCA_{pc} = \frac{v_{pc}/\sum_p v_{pc}}{v_{pw}/\sum_p v_{pw}} \tag{4}$$

where v_{pc} stands for country c's exports of product p and x_{pw} for world exports of that good. Balassa's index measures the ratio of the share of product p in country c's export basket relative to it share in the world's export basket. The higher it is, the more that country is revealed to have a comparative advantage in that product. We compute it at HS6 from mean exports for 1999, 2000 and 2001. Results are robust to the inclusion of this control.

Finally, Column (5) provides a key test of whether our synergy effect is spurrious by replacing it with a 'placebo'. Namely, we replace $\ln n^{c}_{pdt}$, the number of firms exporting the same product to the same destination from the same country, by $\ln n^{-c}_{pdt}$, the number of firms exporting the same product to the same destination from *other* countries. For instance, consider an export spell of boys' swimwear (HS611239) to Germany by a Senegalese firm. On the right-hand side of the equation, instead of the number of other Senegalese firms exporting HS611239 to Germany, we will now have the number of firms exporting HS611239 to Germany from other countries in our sample (Tanzania, Malawi and Mali). This variable may be positive or zero. It may also be missing, as our national samples have some non-overlapping years, so the sample size is substantially lower. It should also be kept in mind that the placebo we are using is neither random nor "matched", being dictated by data availability. It is thus not a rigorous counterfactual. Be that as it may, whereas the synergy effect comes out very strongly in all specifications, whether pooled across countries (as reported in Table 3) or run separately by country, the placebo effect is never significant. This test contributes to increase our confidence that are "synergy effect" is not identi-

fying some spurious correlation; it also suggests that there is some national element in the synergy we identify (recall that regressions include bilateral origin-destination fixed effects).

4.3 Interpreting the synergy effect

4.3.1 Extended networks and "institutional production capabilities"

We now turn to possible interpretations of the synergy effect that we identified. We first explore if the synergy effect we identified in Table 3 carries over to extended networks of exporters of "similar" products. This has the advantage of reinforcing our attempt to filter out omitted-variable bias, as extended networks at the industry level may pick up the effect of comparative advantage, infrastructure, and intermediation channels in a more robust way than Balassa indices calculated at the HS6 level do.

First, we define a new regressor, which we will call HS4 for simplicity, equal to the number of products other than p exported by firm f to destination d and belonging to p's HS4 heading. Table 4 reports results with HS4 added to the main specification. The new variable has a positive and significant effect on survival, but it does not affect the significance or magnitude of our synergy effect. In column (2), we interact this variable with n^c_{pdt}, the synergy effect. Again, the synergy effect itself remains positive and significant, but the coefficient on the interaction term is negative. What this means is that the more there are firms selling "similar" (same HS4 but different HS6) products, the less firm f is sensitive to the 'network' of firms selling the exact same product (at HS6)— intuitively networks of identical and "similar" products are somewhat substitutes.

As an alternative, in column (3) we define a new variable, HK, equal to the weighted sum of the number of firms exporting product $p*$ to the same destination d where the weights are equal to the 'distance' between p and $p*$ in the sense of Hausmann and Klinger (2006).[13] This new variable has no significant effect on the probability of survival, but it does not af-

[13]Hausmann and Klinger's measure of proximity is essentially a measure of the probability that two goods are exported simultaneously by a country.

Table 4: Extended networks

	(1)	(2)	(3)	(4)
n^c_{pdt}	0.0551***	0.0699***	0.0607***	0.0709***
	(0.00364)	(0.00624)	(0.00300)	(0.00362)
n_{fpt}	0.151***	0.151***	0.132***	0.132***
	(0.00374)	(0.00374)	(0.00289)	(0.00289)
n_{fdt}	0.0322***	0.0321***	0.0305***	0.0304***
	(0.00112)	(0.00112)	(0.000916)	(0.000915)
v_{fpdt}	0.0414***	0.0413***	0.0375***	0.0376***
	(0.00199)	(0.00198)	(0.00166)	(0.00165)
n^c_{dt}	-0.0170**	-0.0178**	0.00101	0.00175
	(0.00860)	(0.00858)	(0.00585)	(0.00585)
HS4	0.0113***	0.0170***		
	(0.00285)	(0.00330)		
HS4 $\times n_{pdt}$		-0.00805***		
		(0.00284)		
HK			0.00466	0.0179***
			(0.00419)	(0.00483)
HK $\times n_{pdt}$				-0.0241***
				(0.00553)
Observations	38451	38451	52212	52212

Note: Probit estimations, marginal effects reported. Origin-destination, HS2 and year fixed effects. Robust standard errors clustered by origin-destination-product.

fect it; interacted, in Column (4), the effect is, again, negative, suggesting some substitutability between the networks of identical and "close" products.

In conclusion, in this subsection we evaluated the possibility that our results could be driven not by the "synergy" effects due to the presence of companies exporting same HS6 products to same destination but rather by some "broader" extended networks. In the light of recent work of Hidalgo et al (2007) we could be concerned that a key omitted variable driving our results is indeed the existence of some broader "institutional capabilities". For this reason, we added to our baseline specifications two new variable capturing these potential "institutional capabilities" and found that, while indeed

these are important and there seems to be some substitutability between these and the "synergy effect", nevertheless the inclusion of these variables does not alter our previous results.

4.3.2 Information and access to finance

We now turn to an exploration of the mechanisms that could explain our results, primarily focusing on the hypothesis that the "synergy effect" is driven by the existence of some "information spillovers".

First, this synnergy effect could indicate the presence of information externalities. For instance, when technical regulations or buyer policies change in the destination market, exporters may share information about upcoming changes, improving their ability to anticipate and adapt to these changes. Alternatively, buyers may take suppliers from a given country more seriously (and therefore share more information with them or show more flexibility in the face of glitches) when there is a critical mass of them and improve their reliability. If this conjecture is correct, we should expect a stronger synergy effect for products characterized by higher quality heterogeneity for which information asymmetries between buyers and producers are potentially more important. We proxy product p's quality heterogeneity by ρ_p, the coefficient of variation of its FOB unit value across exporters in 2000 (the initial value in our sample) using COMTRADE data, with a higher ρ_p meaning more heterogeneous quality.[14] The results are presented in column (1) of Table 5. The coefficient on the interaction term $\rho_p \times \ln n_{pdt}$ is positive, although significant only at the 10% level, suggesting that the synnergy effect is stronger for products with a high unit-value dispersion, where information is more important.

Given the importance of finance, as shown by the survey discussed in Section 3, an alternative hypothesis could be that while information is still a key determinant of the synergy effect the mechanism behind it could be instead different. Consider the following scenario. A Senegalese firm is approached by a US buyer to provide a small trial order of t-shirts. Upon successful delivery and sale, the buyer is happy and contacts again the Senegalese firm for a larger order. Now the Senegalese firm has to ramp up capacity and,

[14] We explored results on sub-samples split by Rauch's categories in a table that is available upon request.

Table 5: Mechanisms behind the synergy effect

	(1)	(2)	(3)	(4)	(5)
n^c_{pdt}	0.0552***	0.0512***	0.0932***	0.0455***	0.0816***
	(0.00437)	(0.00496)	(0.0112)	(0.00577)	(0.0121)
n_{fpt}	0.132***	0.132***	0.138***	0.132***	0.137***
	(0.00290)	(0.00289)	(0.00343)	(0.00289)	(0.00343)
n_{fdt}	0.0375***	0.0377***	0.0369***	0.0378***	0.0370***
	(0.00166)	(0.00165)	(0.00183)	(0.00165)	(0.00183)
v_{fpdt}	0.0305***	0.0307***	0.0290***	0.0307***	0.0291***
	(0.000916)	(0.000918)	(0.00104)	(0.000918)	(0.00104)
n^c_{dt}	0.00110	0.00131	-0.00275	0.00142	-0.00234
	(0.00585)	(0.00585)	(0.00635)	(0.00585)	(0.00635)
ρ	-0.00610			-0.00641	-0.0194***
	(0.00500)			(0.00499)	(0.00565)
$\rho_p \times n^c_{pdt}$	0.00954*			0.00971*	0.0139**
	(0.00561)			(0.00553)	(0.00653)
r_p		0.0114*		0.0115*	
		(0.00640)		(0.00640)	
$r_p \times n^c_{pdt}$		0.0140**		0.0141**	
		(0.00586)		(0.00584)	
κ			0.168***		0.174***
			(0.0451)		(0.0451)
$\kappa_p \times n^c_{pdt}$			-0.115***		-0.107***
			(0.0346)		(0.0347)
Obs.	52212	52212	37838	52212	37838

Note: Probit estimations, marginal effects reported. Origin-destination, HS2 and year fixed effects. Robust standard errors clustered by origin-destination-product.

for that, it needs support from financial institutions. But the financial institutions may not take letters of credit from the buyer at face value, because are aware of all sorts of glitches – quality or other – that may emerge down the line. Anecdotal experience suggests that, in Sub-Saharan Africa, the banks' response will typically be 'no' irrespective of the "proofs of profitability" that the exporter shows, and the trade relationship with the US buyer will end before it had a chance to bear fruit. However, if several Senegalese firms already sell t-shirts on the US market, the same financial institutions may be more easily convinced about the chances of success of this venture and better evaluate the potential risks involved in this transaction. If this scenario is representative, the synergy effect should be stronger for products that are especially dependent on external finance than for others as initial financial constraints would be more binding in these sectors. In order to test this conjecture we interact our variable identifying the synergy effect with the measure of dependence from external finance proposed by Rajan and Zingales (1998).[15] We construct our r_p variable at the product level by using concordance tables between ISIC3 and HS6 classification, and assigning to each HS product the Rajan-Zingales index of the ISIC code to which that product belong. Column (2) of Table 5 shows that the interaction term $r_p \times \ln n_{pdt}$ is positive and significant.

As an alternative way of getting a handle on the degree of dependence from finance, we use a proxy for 'asset tangibility' proposed by Braun (2003).[16] The idea that firms with more tangible assets presents lower risks as these provides real guarantees for bank loans, and information asymmetries (adverse selection or moral hazard) are less important with good collateral, so synnergy effects should play a lesser role. In accordance with this conjecture, in column (3) of Table 5 we show that the interaction of asset tangibility (r_p)

[15]Rajan and Zingales' measure of financial dependence is an industry-level variable calculated for 27 3-digits ISIC industries and nine 4-digits ones using compustat data for the US. Let k be capital expenditure and x operational cash flow at the firm level. Rajan and Zingales' index for industry j, r_j, is the median value of $(k-x)/k$ across all compustat firms in industry j. Index values, given in Table 1 of Rajan-Zingales (1998), range from -0.45 for tobacco (ISIC 314) to 1.49 for drugs (ISIC 3522).

[16]Braun proxies asset tangibility by the ratio of net property, plant and equipment to market value at the firm level, using US compustat data. The industry-level variable is constructed, like in Rajan-Zingales, by taking the industry median at the ISIC 3-digit level. Index values, given in Table 1 of Braun (2003), range from 0.09 (leather products) to 0.67 (petroleum refineries).

and the synergy effect has a negative and significant coefficient, implying that firms belonging to industries with high asset tangibility (essentially capital-intensive industries) are *less* sensitive to the synergy effect.[17]

Given that these interactions have significant explanatory power, we combine them to address a potential omitted variable bias, and to compare there coefficients in a joint multivariate regression. In columns (4) and (5) we combine one regressors capturing each of the three hypothesis that these interactions try to capture: information, financial constraints or capabilities. We find that typically the same signs, magnitudes and statistical significance levels persist as the ones just discussed, and the interpretations from above are valid when we control for all these effects simultaneously.

5 Concluding remarks

In spite of their growing interest for the profession, firm-level datasets are still rare for low-income countries, and virtually inexistent for African countries. Our exploration of African customs data on firm-level exports revealed a set of stylized facts that are consistent with evidence from previous studies analyzing rich or middle-income countries. We showed that exporters in our set of African countries experiment a lot on export markets, at a low scale and with low survival rates, particularly in the first year. That is, they operate in a difficult environment characterized by very high "infant-mortality rates". Therefore we investigate more in detail what determines if they survive beyond their first year.

The most striking finding coming out of our analysis —and which could not be observed on the product-level data used by previous studies of export survival—is that exporters of similar goods to the same destination exert a *positive* externality on new entrants. That is, the more they are, the higher the survival probability of new entrants—although the effect is relatively small. This finding is at first sight surprising, as one might expect that exporters of a given product to the same destination may crowd out each other, either through price competition or simply by offering more choice to buy-

[17]Similarly as done for the proxy of external dependence borrowed from Rajan and Zingales, we construct the asset-tangibility variable at the product level, κ_p, by assigning to that product the corresponding ISIC3 value of Braun's index.

ers who could them 'hop' from one to the other, reducing survival rates at the individual level. Strikingly, the synergy effect disappears if we measure the network as the number of firms exporting the same product from other origin countries from our dataset. That is, the synergy effect is truly national.

Various conjectures could explain our result. First, it could be driven by omitted-variable bias (e.g. supportive infrastructure at the national level or comparative advantage). We control for this by including the country's revealed-comparative advantage index as a regressor, without altering the results. Relatedly, we follow the idea developed in various papers by Hausmann and Klinger (2006) that product-specific capabilities explain success in export markets and investigate if our synergy effect disappears when controlling for some proxies of these "production capabilities", which would be more likely to be driven by omitted variables. Again, our results are robust, although we also find that synergy effects and production capabilities appear to be substitutes for each other.

Finally, we explore various conjectures drawing on information asymmetries and access to finance. For instance, access to credit may be easier when many exporters of the same product from the same origin simultaneously operate in the same destination, as larger numbers may provide signals about profitability to both new entrants as well as financing institutions. First, our hypothesis is that an exporter may obtain precious information through the network of competitors, potential buyers, relatives or friends involved in the same manufacturing activity and exporting to the same market. Second, our hypothesis is that an isolated exporter might have more difficulties convincing the financial institutions that the risks she faces are manageable given the uncertain environment of export relations. If other firms are successfully in operation, by contrast, the financial institution can use the success of others as a predictor of its client's potential. We verify these conjectures in different ways. First, we interact the synergy effect with quality heterogeneity (proxied by the cross-country dispersion in unit values at the product level). Second, we interact it with indicators of dependence on bank finance and asset structure (as a measure of the scope for moral hazard). In both cases, interaction terms are positive and strongly significant, suggesting that synergy effects are stronger in sectors where informational asymmetries are higher, and dependence on external finance is more intense.

Our results are suggestive of a potential market failure if exporters fail to internalize the positive externality that they exert on new entrants. This may be taken as an argument in support of government-sponsored export promotion. However, policy implications should be interpreted very cautiously, as the record of export promotion in developing countries is highly uneven. In addition it may well be that exporters could internalize the externality through mutual-support professional organizations.

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6 Appendix 1

This survey was conducted over a sample of exporters randomly drawn from the customs data in each country, after applying some pre-established guidelines that took into account the following criteria:

- exporting status of the firm,
- its size,
- its location
- the economic sector (at the 2-digit level of the HS Code)

In particular, all the exporters in each country were classified in four groups according to the evolution of their exporting status: a) regular exporters are those exporters with consecutive exports until 2008 (last year covered by the customs data in all four countries), b) past exporters are the exporters who were exporting consecutively for at least two years and then exited the market before 2008, c) intermittent exporters are those who exported erratically during the period included in the sample and finally, d) new exporters are those exporters who appear for the first time in the sample in 2008.

Over 200 firms were contacted in each country; however, due to low cooperation and identification problems with some of the firms, the final sample by country and exporting group is as follows:

Country	Intermit	New	Reg	Past	Total
Mwi	9	9	59	14	91
Mli	10	18	48	22	98
Sen	15	25	43	39	122
Tza	15	7	48	14	84
Total	49	59	198	89	395

Table 6: Survey Responses on Importance of Networks (in %)

	MLI	MWI	SEN	TZA	All
Question 1: First time exporters: How was the contact with the first client made?					
Research online	14	11	24	35	21
Third party contact	73	68	77	51	67
Competitors' network	8	12	24	11	14
Trade Fair	20	12	19	34	21
Export Promotion Agency	12	11	5	13	10
Exporters' Association	9	7	8	8	8
Another channel	16	24	5	11	14
Question 2: If the company looked for its buyers, how did it approach them?					
Research online	26	31	29	41	32
Third party contact	74	72	76	57	70
Competitors' network	19	18	23	21	20
Trade Fair	40	35	28	52	39
Export Promotion Agency	18	19	11	21	17
Exporters' Association	14	5	6	17	11
Another channel	10	20	15	6	13
Question 3: If the buyers approached the company, how did they approach it?					
Company's website	22	30	29	53	33
Old clients of the company	25	28	33	32	30
Third-party contacts	62	75	75	66	69
Competitors' network	14	28	21	26	22
Trade Fair	34	33	20	55	35
Export Promotion Agency	18	21	7	25	18
Another channel	9	22	15	8	13
Question 4: How did the opportunity to export a new product come about?					
An existing buyer approached the company	54	46	50	68	54
The company saw saw demand in a buyers' market	33	46	50	56	46
The company saw successful competitors	17	27	13	32	22
Success with selling the product domestically	38	42	44	68	48
Through a third party	46	23	25	35	32
Any other type of opportunity?	17	19	13	6	14

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