Stability through value chains? Role of participation in production networks participation in export duration

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Abstract

There is growing empirical evidence on the short duration of export spells at both the product and firm level. While the empirical studies attributed export duration mostly to diversification, export market heterogeneity and information networks, this paper also looks at the effect participation in production networks has on different dimensions of exporting longevity. Despite the widely accepted view that there is a strong correlation between export and FDI patterns, to our knowledge the role of FDI on the persistence of export product-destination mix has not yet been explored. In this paper we explicitly focus on FDI as a determinant of export-spell duration, by controlling for the role played by both inward and outward FDI in the duration of export spells covering all extensive margins of exporting. We use transaction-level data on the population of firms in Slovenia (2002-2011), matched with detailed information of origin/direction of inward/outward FDI and firm balance sheets. Our results indicate that bilateral FDI flows with the export destination country have a strong positive effect on the duration of a firms exporting presence in that market as well as on the duration of related product-market spells. Additionally, there are pronounced market and product related trade complementarities as either exporting or importing experience with the relevant market/product substantially improves the chances of an export spell continuing. Finally, we find convincing if indirect evidence that participation in production networks greatly improves exporting survival at the product-destination level.

Keywords: export duration, MNEs, FDI, sunk costs, survival, product-market spells

JEL: F23, F14, L25, C23, C41

Introduction

During the recent global economic and financial crisis and its immediate aftermath export success has come to play an even greater role in economic wellbeing of nations. With sagging domestic demand most of the economies on the EU's periphery have had to rely on exports to boost their overall economic performance. Continuing exporting success was hence relied upon to supplement lows in domestic demand. While new exporters continually enter foreign markets, their initial contribution to export volume is generally small, with incumbent exporters accounting for the vast majority of the export turnover. Duration of export-market relationships is therefore one of the key factors impacting the long-run export performance of countries.

Until relatively recently, the focus of empirical research on trade flows was mainly on the existence and size of particular trade flows. Low survival rates of new exporters do not necessarily entail welfare losses assuming they reflect experimentation at the extensive margin (Cadot et al. 2013). If sunk costs of export entry and exit are substantial, high turnover of exporters is inefficient.

It was not until the issue of the prevalence of short-lived trade flows was brought to attention by Besedeš and Prusa (2006a, 2006b, 2007) and Brenton & Newfarmer, (2007) that the emphasis of empirical research started to shift. This line of research showed the importance of the sustainability margin of exporting in addition to the classical margins: the intensive (growth in volume) and the extensive (diversification of products and markets). Since then, several studies have confirmed very low survival rates of new trade flows on very diverse datasets (Besedeš, Prusa, 2006a on the US, Nitsch, 2009 on Germany, Hess and Persson, 2011 on the EU, Besedeš and Blyde, 2010 on Latin America, countries at different stages of development Brenton et al. 2011, Fugazza and Molina 2011, Besedeš and Prusa, 2011 and Obashi 2010 on intra-zone trade in East Asia).

Gradually, further details emerged on the factors determining the survival of trade spells. Besedeš (2008) found that the majority of trade relationships at the country-product level start comparatively small and last a short time which conforms to the predictions of the search cost model of bilateral trade relations. Furthermore, Besedeš and Prusa (2006b) and Brenton et al. (2011) show that differentiated products have a longer median duration of a trade relationship as well as a higher probability of survival than homogenous products. Córcoles et al. (2012) compare the survival rates of intermediate and final products and discover that exports associated with global production networks are more stable and exhibit higher rates of survival compared to goods destined for the consumer market. Finally, Córcoles et al. (2014) find that product sophistication, measured by Hausman's sophistication index and Hidalgo-Hausman product complexity index decreases the risk of interruption to trade relationships.

Almost without exception (see for instance Esteve-Pérez et al. 2011, Volpe & Carballo, 2009), trade duration studies are based on aggregate country/product level data and therefore speak to the broader issue of trade links between markets. While the advantage of this approach is that it can generally rely on almost global coverage of trade data and even offer some insight into the inter-firm trade for a subset of industries, its primary disadvantage is that it aggregates over a number of issues pertinent to trade between firms (length of individual firm trade spells, firm-level determinants of trade duration, substitutability of export spells at the firm level, etc.). Our study aims to fill this void in the literature.

We adopt survival analysis approach to study export duration based on transaction-level data for the population of Slovenian firms in 2002-2011 period, matched with detailed information of origin/direction of inward/outward FDI and firm balance sheets. As an open CEE economy with considerable involvement of its companies in production networks[1] Slovenia provides, we believe, adequate setting for the export duration study.

We contribute to the literature in two ways. First, it is, to the best of our knowledge, the first study to explore transaction level data (i.e. firm-product-destination) in analyzing the duration of firm-specific trade spells explicitly. Secondly, using information on inward and outward foreign ownership stake as well as product category (intermediate and final goods) we explore the role of membership in global production networks on the longevity of firm overall trade spells, firm market specific trade spells, firm product specific trade spells and, ultimately, firm market product specific trade spells.

The rest of the paper is organised as follows. Section 2 provides literature review summarising factors and evidence on persistence of firm export performance and adjustments in export product-market mix. Section 3 describes the transaction-level data and provides descriptive statistics on export duration. In Section 4 we present empirical methodology for survival analysis of firm product-market export spells. Section 5 shows the estimates and discusses the results of export survival specifications while Section 6 provides some robustness checks. Section 7 concludes the paper.

Literature review

Since the late 1990s improved access to firm-level data has sparked a flurry of research looking into the performance of exporting firms. The early studies focused primarily on the observed productivity gap between exporters and non-exporters (Bernard and Jensen, 1997, 1999, Bernard and Wagner, 1997, Clerides et al. 1998) finding that (i) exporters are in the

[1] According to WTO (2016) Slovenia is classified among the high-GVC (global value chain) participation economies with recorded GVC participation index of 58.7 in 2011 which is significantly above average value for developed and developing countries, i.e. 48.6 and 48.0, respectively, mostly on account of strong backward participation.

minority; (ii) they tend to be more productive and larger; and (iii) tend export only a small fraction of their output. Subsequent research found corroborating evidence for a variety of different country datasets, at the same time providing far more detail on the very fundamental differences between exporters and firms that only sell locally (see Wagner 2007, Greenaway, Kneller, 2007 for surveys). Exporters were found to be more innovative, more capital intensive in production, pay higher wages, have a better employee skill structure, be less financially constrained, etc.

Another empirical regularity across a number of very diverse firm-level datasets has also been the persistence of exporter status (Bernard and Jensen, 2004; Andersson and Lööf 2009). This fact has been attributed to the existence of substantial sunk costs of exporting, learning-by-exporting and/or firm heterogeneity (Roberts and Tybout, 1997, Timoshenko 2015). In spite on a fast growing empirical literature on different country datasets, evidence on firm duration patterns in specific foreign markets with distinct products remains scarce.

This is even more surprising given the fact that what little evidence there is on export duration it suggests that average export spells tend to be exceedingly short with very low initial survival rates for new exporters. Eaton et al. (2008) show that about half of new exporters discontinue their exporting activity within the first year. Esteve-Pérez et al. (2007) report a median duration of 6 years for export spells of Spanish manufacturing firms, with 25% of the spells ending after the first year of service. Similarly, Volpe and Carballo (2009) report that the median export duration for Peruvian firms is only one year, while noting an exporting death rate of 54.5% in the first year of exporting. Crucially, from the perspective of this paper, Estéve-Perez et al. (2007) find that the median duration for *export-destination* spells falls to 2 years, with 47% of spells of ending after the first year. Albornoz et al. (2016) likewise find a survival rate of only 24% after two years for exporters entering a new export destination. As we are primarily interested in export-product-destination survival, we can expect the survival rates to be even lower in our data.

Several recent studies have looked into the determinants of export survival. Görg et al. (2012) exploit a panel of Hungarian exporters finding that firm productivity is positively related to the duration of a new export experience and that multi-product exporters are more successful in exporting their core product. Cadot et al. (2013) find that firms from Malawi, Mali, Senegal, and Tanzania benefit from informational spillovers from exporting. The probability of survival upon entry in a new market increases in the number of competitors from the same country already serving that market. Békés and Muraközy (2012) show that productivity, financial stability, and GDP of the destination country are key determinants of export survival. Albornoz et al. (2016) use Argentinian customs data to show that the probability of survival decreases with distance and is higher for experienced firms.

Finally, there has been a recent emergence of empirical studies linking

longevity in export markets to participation in global production chains. Most of these analyses are based on, aggregate, country data. Obashi (2010) shows that trade spells of East-Asian nations at the product-level are more stable for intermediate inputs than for final goods. Namely, compared to machinery-finished products, machinery parts & components are traded through longer-lived and more stable relationships among East Asian countries. Corcoles et al. (2014) focus on the automotive industries and find that the risk of trade interruptions decreases with the complexity of products, geographical and economic proximity, previous export experience and with the degree of integration in the international-scale networks.

To the best of our knowledge, there are no firm-level studies on export duration through global value chains (GVC hereafter) participation. We analyze the role of the participation in global production networks by exploring information on inward and outward foreign ownership stake as well as product category (intermediate, capital and final goods). Almost by a rule, firms with their own affiliates in a particular destination are also exporting to a given destination. In Grossman, Helpman and Szeidl (2006) complex strategies that involve a mix of FDI and exports and are chosen by more productive firms are in most situations neither purely horizontal nor purely vertical and involve the export of intermediates and/or final products. In this setting, a multi-product firm's exports positively correlates to FDI if there are horizontal or vertical complementarities across product lines.

One of the theoretical arguments in support of expected longer duration of the exports of vertically integrated firms is offered by Békés and Muraközy (2012) and rests on exporter's endogenous choice between variable and sunk cost trade technologies. Likelihood of permanent trade is higher for exporters opting for the sunk cost trade technology characterized by an initial up-front sunk cost investment leading to subsequent reduction in trade cost what is typically the case for firms with outward and inward FDI in particular partner country.

Further, for multi-product firms the duration of product-market export spells tend to be correlated across destinations and products. As demonstrated by Albornoz et al. (2012) in their sequential exporting model short duration of export spells is observed predominantly among first-time, single-market exporters of differentiated products implying the existence of a trade externality over time within a market and also across destinations. As regards across product correlations, not only trade externalities but the hierarchy of the products seems to be important as well. In line with Eckel and Neary (2010) when manufacturing technologies are highly flexible, multi-product firms in presence of "cannibalization effect" respond to shocks by downsizing their product range based on their competencies rather in a random manner. Similarly, Bernard, Redding & Schott (2011) showed multi-product firms adjust to trade liberalization pressures by dropping their least-productive products first and focus on their "core competencies".

Data and descriptive statistics

We test the role of FDI and product-market trade externalities for the persistence of product-market export spells on transaction-level data for the population of Slovenian firms in a 2002-2011 period. The dataset we use consists of three distinct databases covering the population of Slovene firms in the period between 2002 and 2011. Detailed transaction level trade data at the 8-digit European Combined Nomenclature (CN8) code is covered by the trade database of the Statistical Office of the Republic of Slovenia (SURS)[2]. Balance sheet data come from the Slovenian business register (AJPES). Finally, we also employ data on direct cross-border financial flows provided by Bank of Slovenia to construct both a complete mapping of foreign-owned enterprises and enterprises with foreign-held assets. We are able to merge the three datasets by the unique firm identifier.

For the purpose of our duration analysis we define products as the 6-digit level product groups of CN classification which is in full compliance with 6-digit HS code. In 2007 the HS classification underwent a substantial revision, therefore a pairing of HS6 2007 to HS6 2002 codes was required. In converting HS2007 to HS2002 codes we lean on Van Beveren, Bernard, and Vandenbussche (2012)'s concordance approach but assign one single code of a HS 2002 edition to each HS 2007 code. This requires certain simplifications in the event that HS 2007 code is the result of either merging (1:n type of relationship) or splitting and merging (n:n relationship) of several codes in the previous 2002 classification. In this case we follow United Nations Statistics Division (2009) and give priority to one subheading among several with the same code as the HS 2007 subheading (if it exists). The retained code rule is based on the general WCO practice to maintain the existing code only if there has been no substantial changes of its scope.

Some of the key characteristics of the data with respect to export duration are shown in Table 1. Crucially, there is a noticeable difference between the average length of product-market specific export spells, compared with the duration of product exports and exports to a specific destination. A point of particular interest, the duration of exporting the same product (to any market) is shorter than that of exporting any product to a particular market. Lastly, the average number of exported HS6 products is 47.55, with the median substantially smaller at 18, while the average number of export markets is 5.71.

[2] The reporting threshold (officially known as the exemption threshold) for intra-EU trade flows of Slovene firms is set at 200.000 EUR for dispatches and 120.000 EUR for arrivals annually, but had been set at 200.000 and 85.000 before 2009. Before Slovenia EU accession (2004) there were no reporting restrictions either for intra- or extra-EU trade.

Table 1: Export duration and extensive export margins for 2010

	Average (median)
Export duration product-market (in years)	3.80 (3.00)
Export duration product (in years)	6.47 (7.00)
Export duration country (in years)	7.06 (8.00)
Export duration total (in years)	9.06 (10.00)
Number of HS6 products exported	47.55 (18.00)
Number of export markets	5.71 (2.00)

Source: Slovenian Statistical Office, Bank of Slovenia

Properties of the sample with respect to the number of product-destination specific spells are presented in Table 2. The median spell length is one year, with only 40% of the spells exceeding three years. The longest product-destination specific spells in our sample are seven years long and occur in 2.17 per cent of cases. The vast majority of firm-product-destination triplets only occur once, meaning that firms do not re-enter the same market with the same product within the sample time frame, but in 17.18 per cent of the cases we notice re-entry of firms into the same product-destination node. At most there were four entries by firms with the same product in a single destination.

Table 2: Composition of product-destination exporting spells

Longest spell per firm-product-destination			# of export spells per firm-product-destination		
Length of export spell	# of observations	Share of total	Number of spells per firm	# of observations	Share of total
1	370,470	41.97	1	731,131	82.82
2	176,205	19.96	2	140,006	15.86
3	112,797	12.78	3	11,516	1.3
4	74,424	8.43	4	144	0.02
5	74,090	8.39			
6	55,680	6.31			
7	19,131	2.17			
Total	882,797	100	Total	882,797	100

Figures 1 and 2 show the Kaplan-Meier survival estimates for the sample split between BEC categories and across foreign-owned and domestic firms (Figure 1) and firms that did not make outward direct investments and those that did (Figure 2). Foremost, it is evident that the hazard rates in export survival are higher for foreign-owned and firms investing abroad. Outward-investing firms, in particular, exhibit more than 10 percentage point higher survival rates after the first year of the product-destination exporting spell.

Additionally, exports of intermediate and consumption goods to a particular market appear less likely to seize, while the likelihood of exit is substantially higher for capital goods. This may be an artifact of the specific nature of trade in capital goods, which may be more intermittent compared with consumer and intermediate goods. Lastly, apart from the initial year, where the difference is minimal, intermediate products appear to display the lowest risk of export failure.

Figure 1: Kaplan-Meier survival estimates by BEC and foreign ownership status

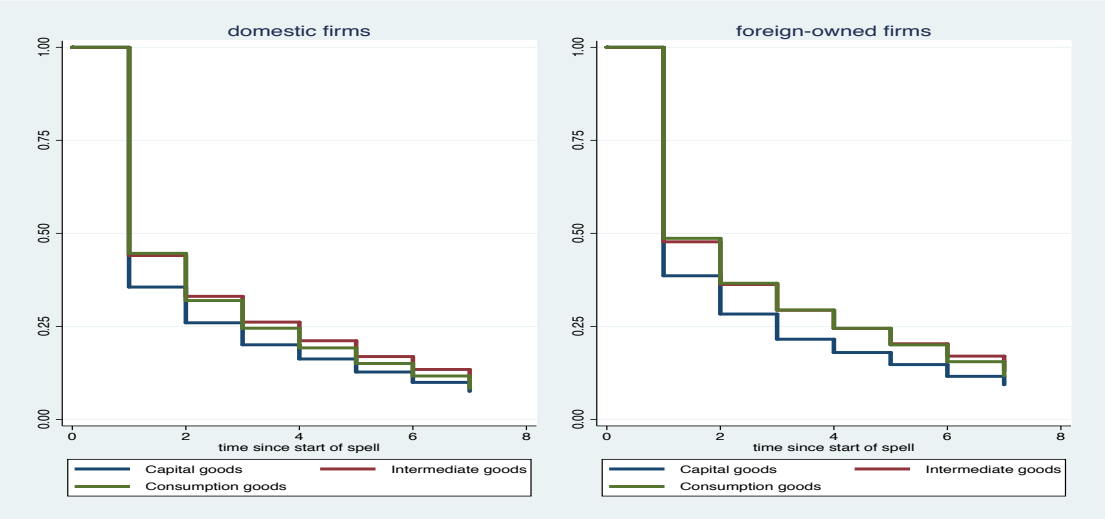
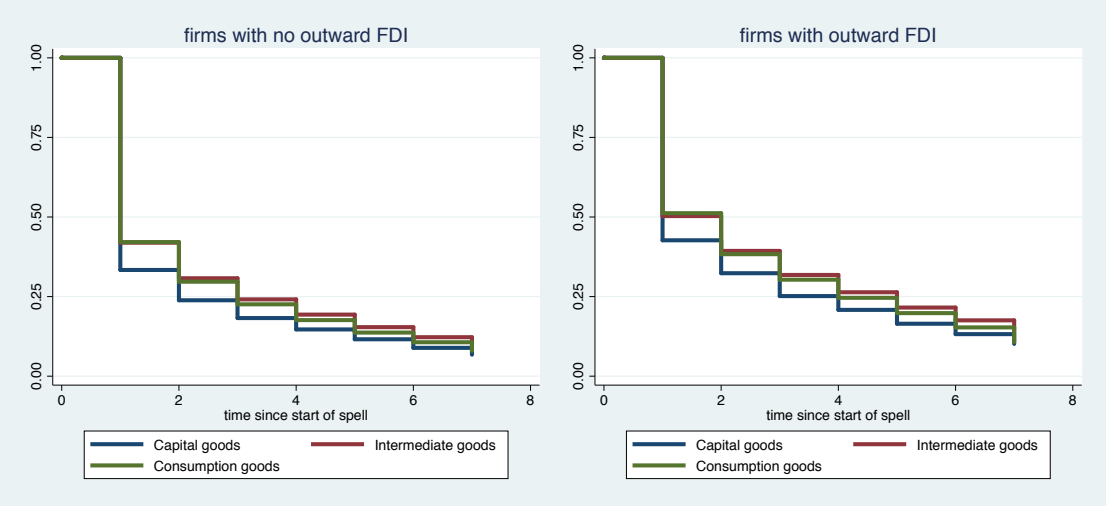


Figure 2: Kaplan-Meier survival estimates by BEC and outward direct foreign investment



Empirical methodology

The primary estimation method we employ in the remainder of the paper is survival analysis. We use survival techniques to analyze the determinants of export duration in a particular product-destination node. Our unit of

observation is a firm's export spell of a particular product to a particular market. We define an export spell as a period of exporting, that is, the number of years of exporting of a given HS6 product to a specific market between the first and last observed year of the firm's particular product-market export spell in our database. We consider only those export spells that started within our period and, hence, exclude those spells observed already in the initial year of our period, i.e. in the year 2002.

We perform robustness tests by imposing restrictions regarding interruptions of the export spells. We start with no tolerance for the interruptions of the export spells, i.e. a spell is considered to end in year *t* if a firm is no longer exporting in *t+1* irrespectively of eventual later positive exports of the same product to the same market. Further, we allow for one- and two-year gaps in the export spell, respectively, and accordingly shorten our effective period under investigation.

Related to firm exit from a particular product-destination node, we define the hazard rate as the probability of cessation of exports conditional on export survival (in a particular product-destination pair) up to that period. As with any sample period, our data are subject to left- and right-censoring. Left-censoring occurs for firms that are already exporting in the initial year of the sample, meaning that we cannot establish the duration of a particular spell. Right-censoring, on the other hand, occurs at the end of the sample as we cannot determine when or whether the spell ended. We deal with the issue by only considering export spells that start and end within our sample period. This, inevitably, reduces the size of our sample by two years.

Survival methods take into account the evolution of the exit risk and its determinants over time since they account for both whether and when an event takes place. They are based on the concept of conditional probabilities that an export flow will last *t* periods, given that it already lasted *t-1* periods, rather than unconditional probabilities of the flow lasting exactly *t* periods.

To investigate the factors determining the duration of export spells, we carry out a multivariate analysis to assess the impact of each covariate on the hazard risk of export spell termination, controlling for the effect of other observed explanatory variables, and unobserved heterogeneity. Although firm exit from a product-market node may occur at any particular instant in time (as the stochastic process occur in continuous time), the annual format of the dataset causes survival times to be grouped into discrete intervals (interval-censored data) of one year. That is, survival times include a set of positive integers j=1,2,3..., and the observations on the transition process are summarized discretely rather than continuously[3]. In estimation, to better single out the pattern of duration dependence (i.e. the effect of the passage of survival time on export spells persistence), we allow for a flexible specification of the baseline hazard by considering both log(time) functional form and fully non-parametric specification of the baseline hazard function

[3] This is known as interval censored data (Jenkins 2005)

with duration-interval-specific dummy variables. Further, we control for firm export spells' unobserved heterogeneity by using the random effects *cloglog*.

We estimate complementary log-log model (*cloglog*) which is the discrete time representation of the following underlying continuous time proportional hazard model:

$$\theta\left(j, x_{ij}\right) = \theta_0\left(j\right)\exp^{\beta_0+\beta x_{ij}} v_i \tag{1}$$

where j is survival time in years, $\theta(j, x_{ij})$ is the hazard function, $\theta_0(j)$ is the baseline hazard function (that is a function of the number of the years of continuous exporting), and x_{ij} is a vector of spell, firm and industry covariates. Here unobserved heterogeneity (υ_i) incorporated multiplicatively, so that it measures a proportional increase or decrease in the hazard rate of a given firm, relative to an average firm. We assume that the unobserved heterogeneity follows a random distribution.

Log linearizing (1), we get:

$$\log\theta\left(j, x_{ij}\right) = \log\theta_0\left(j\right) + \beta_0 + \beta x_{ij} + \log(v_i) \tag{2}$$

As argued by Jenkins (2005) the complementary log-log model is the most commonly used discrete-time model for dealing with intrinsically continuous but grouped data. Following Prentice and Gloeckler (1978) and Jenkins (2004) the discrete-time hazard function takes the following form when complementary log-log distribution is assumed:

$$h\left(j, X_{ij}\right) = 1 - \exp\left[-\exp\left(\beta_0 + \beta' X_{ij} + \gamma_j\right)\right] \tag{3}$$

where $h(j,X_{ij})$ indicates the interval hazard for the period between beginning and the end of the j^{th} interval (year) and γ_j is interval baseline hazard defined as log of the difference between the integrated baseline hazard $\theta_0(t)$ evaluated at the end of the interval (a_{j-1};-a_j) and the beginning of the interval,

$$\gamma_j = \log \int_{a_{j-1}}^{a_j} \theta_0(t)dt \tag{4}$$

The dependent variable in our regressions is a binary variable $dEXexit_{ikmt}$ taking value 1 for the survival period in which the firm i exits from a market m with a specific 6-digit HS product k and 0 as long as it remains exporting to the destination with that product. The spells that are no longer active in $t+1$ are assumed to suffer an exit shock in t (assume value 1 in period t). Right-censored observations, where the exporting spell is on-going at the last

period of our sample or left-censored spells, which are continuing from the pre-sample period are both treated as missing.

The explanatory variables are split into four groups. The first set includes varied **trade complementarities**, such as binary indicators for whether the firm serves the (i) same market with other products ($d\_prod\_ex\_other_{ikmt}$) and (ii) exports the same product to other markets ($d\_mar\_ex\_other_{ikmt}$), (iii) the revenue share of the respective market in total export revenue ($ex\_mar\_share_{imt}$), and (iv) the revenue share of the respective product in total export revenue ($ex\_mar\_share_{ikt}$). In order to control for the possibility of pass-on-trade[4], we also account for firms that (v) import the same product from the export partner country ($d\_im\_prod\_mar_{ikmt}$), (vi) import the product in question from any source country ($d\_im\_prod_{ikt}$), and (vii) import any product from the export destination market ($d\_im\_mar_{imt}$).
The second set of variables accounts for the possible **involvement in production networks**, with indicator variables for (*i*) foreign ownership ($dInFDI_{it}$) and (*ii*) ownership of foreign affiliates ($dOutFDI_{it}$). We also explicitly control for inward and outward FDI at the bilateral level. That is, we introduce binary indicator variables for (*iii*) inward/(*iv*) outward FDI matching the trade destination, $dInFDI\_bilat_{imt}$ and $dInFDI\_bilat_{imt}$, respectively.
We control for a broad set of **firm characteristics** deemed as principal for firm's (export) performance, e.g. a firm's size, age and productivity. The size of a firm (emp_{it}) is measured by the number of employees, while age_{it} is defined with reference to the formation year according to the Business Register of the Republic of Slovenia. Productivity is measured in terms of as value added per employee (va_emp_{it}). Specifications further include capital-intensity (k_emp_{it}), measured by fixed assets per worker, and firm's financial leverage, defined as debt to assets ratio ($debt\_asset_{it}$). We expect that in line with general firm survival smaller and younger firms are less likely to survive in export markets. Also firm productivity and its capital-intensity are expected to improve the learning process and information management about the foreign market and, hence, negatively affect the likelihood of an exit from exporting. However, these firm-level variables may not be entirely exogenous because if the firm starts downscaling its product-market export portfolio before closing, these variables may change, and this change could be a predictor for the export exit decision. Therefore, we use lagged values of these variables in model specifications. *Ln* prefixes in variable names denotes the natural logarithm of a particular variable.

As is commonplace in the literature, we also control for the length of the spell, as the hazard rate tends to diminish with the length of time a firm is

[4] We expect that imported products that are passed on to export markets would, all thing considered, tend to have higher survival probabilities in those markets.

present in a particular market. We consider both log (time) functional form (*lnex_spell* in Table 3) and fully non-parametric specification of the baseline hazard function with duration-interval-specific dummy variables (*i.ex_spell* in Table 4). All regressions also include sets of annual, destination-country, and 1-digit level HS product group dummy variables as well as broad economic category indicators (*i.bec_cat*).

Empirical results

In Table 3 we report results of export product-market spell survival in aggregate sample, while the Table 4 presents results separately for three broad categories of products according to their broad economic purpose (BEC classification), i.e. intermediates, capital and consumer goods.

For all estimated specifications of the exit model Wald's test of a full versus a constant only model indicates that the full model is significant at negligible risk. Also, in all specifications standard errors are adjusted for firm-market-product clusters. The coefficient on *lnex_spell* is negative and significant indicating that the baseline hazard decreases with elapsed survival time. The results are robust to alternative functional forms for the baseline hazard function.

Results confirm that, with all else being equal, survival chances of a firm's particular product-market export spell increase by around 6 per cent when a firm serves distinct market with other products and even more, almost by 50 per cent, when it exports the same product to other markets confirming trade externalities predicted by Albornoz et al. (2012). We find support for the Eckel and Neary (2010) and Bernard, Redding & Schott (2011) predictions that export termination risk is lower for core export products in core markets, i.e. higher the export share to particular country and higher the export share of certain product higher the duration of particular product-market export spell. Moreover, a strong relation between export survival and imports is also evident. Probability of export survival is higher when firms are (i) importing the same product from the export partner country; (ii) importing the product in question from any source country; and (iii) import any product from the export destination market.

The significant impact of inward and outward FDI on export survival likelihood confirms the importance of firms' vertical integration and participation in international production networks for export duration, which is in line with Córcoles et al. (2012). Outward FDI ("upstream position") increases likelihood of export survival both in an affiliate's host country market by around 7 per cent and as well in general in any partner market on average by 3 per cent as indicated by negative and significant coefficients for general and bilateral outward FDI dummy variables in specifications from Tables 3 and 4. The effect is stronger for the group of intermediate goods as confirmed by significantly negative interaction term of

this product category with outward FDI. The survival enhancing effect of inward FDI is detected, however, only for exports to foreign owner's origin country - with twice the size of the effect of outward FDI, i.e. 14 per cent, – while in fact inward FDI contributes to higher hazard rate of terminating exports to other markets. Our results thus suggest that inward FDI contributes to increased regional concentration of the exports of foreign-owned firms while the opposite conclusion may be drawn for the outward FDI.

As far as the product specific characteristics are concerned, export duration proves to be highest for intermediates and lowest for capital goods. The core firm-specific determinants of export survival are largely in line with the theoretical expectations. Results indicate that larger and more productive firms with lower financial leverage are more likely to survive in exporting which is in line with Békés nad Muraközy (2012)'s finding that firm productivity and financial stability increase the likelihood of permanent trade. On the other hand, results suggest that likelihood of export exit is increasing in firm age suggesting that learning effects are product- and market-specific rather than general related to overall length of firm's operations.

Table 3: Complementary log-log export exit model at firm-market-product level

	Clog-log (1)	*Clog-log (2)*	*Clog-log (3)*
$Ln(ex\_spell_{it-1})$	*-0.792***	*-0.791***	*-0.791***
	(0.003)	*(0.003)*	*(0.003)*
Firm characteristics			
$Ln(va\_emp_{it-1})$	-0.081***	-0.079***	-0.079***
	(0.003)	(0.003)	(0.003)
$Ln(k\_emp_{it-1})$	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)
$Ln(emp_{it-1})$	-0.035***	-0.033***	-0.034***
	(0.001)	(0.001)	(0.001)
$(Debt/asset)_{it-1}$	0.103***	0.104***	0.105***
	(0.007)	(0.007)	(0.007)
Age_{it}	0.004***	0.004***	0.004***
	(0.0002)	(0.0002)	(0.0002)
Trade characteristics			
$d\_prod\_ex\_other_{it}$	-0.065***	-0.066***	-0.066***
	(0.008)	(0.008)	(0.008)
$d\_mar\_ex\_other_{it}$	-0.637***	-0.641***	-0.641***
	(0.004)	(0.004)	(0.004)
$ex\_mar\_share_{it}$	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)
$ex\_prod\_share_{it}$	-0.003***	-0.003***	-0.003***
	(0.0001)	(0.0001)	(0.0001)
$d\_im\_prod\_mar_{it}$	-0.404***	-0.402***	-0.402***
	(0.007)	(0.007)	(0.007)
$d\_im\_prod_{it}$	-0.437***	-0.437***	-0.437***
	(0.00369)	(0.00369)	(0.00369)

d_im_mar $_{it}$	-0.0678***	-0.0614***	-0.0614***
	(0.00417)	(0.00421)	(0.00421)
Direct capital flows			
dOutFDI $_{it}$	-0.0307***		
	(0.00434)		
dInFDI $_{it}$	0.020***		
	(0.004)		
doutFDI_bilat $_{it}$		-0.072***	-0.024**
		(0.006)	(0.012)
dinFDI_bilat $_{it}$		-0.152***	-0.124**
		(0.025)	(0.057)
Broad economic categories			
2.bec_cat	-0.127***	-0.128***	-0.118***
	(0.005)	(0.005)	(0.005)
3.bec_cat	-0.066***	-0.066***	-0.065***
	(0.006)	(0.006)	(0.006)
2.bec_cat#1.doutFDI_bilat			-0.077***
			(0.013)
3.bec_cat#1.doutFDI_bilat			-0.017
			(0.015)
2.bec_cat#1.dinFDI_bilat			-0.103
			(0.066)
3.bec_cat#1.dinFDI_bilat			0.126*
			(0.075)
Constant	0.787***	0.754***	0.751***
	(0.0405)	(0.0404)	(0.0405)
Time eff. Incl.	YES	YES	YES
Product eff. Incl.	YES	YES	YES
Country eff. Incl.	YES	YES	YES
Log pse.likelihood	-580071.54	-580006.19	-579974.97
Wald test	chi2(121) = 2.06e+05***	chi2(121) = 2.05e+05***	chi2(121) = 2.06e+05***
Observations	1036173	1036173	1036173
Zero outcomes	628182	628182	628182
Nonzero outcomes	407991	407991	407991

Notes: Robust standard errors in parentheses; Std. Err. adjusted for clusters in firm-market-product; *** p<0.01, ** p<0.05, * p<0.1

Results for the subsamples of different product categories according to BEC in Table 4 confirm our expectation that participation in international production networks contributes to increased stability and duration of exports predominantly on account of vertical trade. More specifically, export persistence reinforcing effect of outward FDI is driven by intermediate goods that experience 10 per cent lower export exit hazard in affiliate's host country, while in case of inward FDI both intermediate and capital goods benefit from increased likelihood of export survival in markets of foreign owners' origin in range of 21 and 15 per cent, respectively. On the other hand, export and import complementarities seem to bear more homogenous impact on the duration across different product categories, with the notable exception of importing from the export-destination country that reduces export termination hazard for intermediate and capital goods but not for consumer goods. Likewise, firm-specific factors exhibit relatively uniform

effects on export exit hazard crosswise different BEC product groups with the sole exception of capital intensity that varies from significantly positive in case of intermediates and capital goods to significantly negative for consumer goods.

Table 4: Complementary log-log export exit model at firm-market-product level for BEC categories

	All products (1)	Intermediates (bec=2) (2)	Consumer goods (bec=3) (3)	Capital goods (bec=1) (4)
2.ex_spell	-0.716***	-0.759***	-0.590***	-0.751***
	(0.005)	(0.007)	(0.010)	(0.013)
3.ex_spell	-0.920***	-0.960***	-0.807***	-0.934***
	(0.007)	(0.009)	(0.013)	(0.016)
4.ex_spell	-1.126***	-1.154***	-0.987***	-1.218***
	(0.008)	(0.011)	(0.015)	(0.020)
5.ex_spell	-1.191***	-1.220***	-1.051***	-1.272***
	(0.009)	(0.012)	(0.018)	(0.023)
6.ex_spell	-1.310***	-1.349***	-1.151***	-1.380***
	(0.011)	(0.015)	(0.022)	(0.028)
7.ex_spell	-1.379***	-1.406***	-1.193***	-1.519***
	(0.015)	(0.019)	(0.028)	(0.038)
8.ex_spell	-1.372***	-1.392***	-1.238***	-1.443***
	(0.024)	(0.031)	(0.049)	(0.058)
Firm characteristics				
$Ln(va\_emp_{it-1})$	-0.079***	-0.093***	-0.073***	-0.048***
	(0.003)	(0.004)	(0.005)	(0.007)
$Ln(k\_emp_{it-1})$	0.001	0.007***	-0.013***	0.009***
	(0.001)	(0.002)	(0.003)	(0.003)
$Ln(emp_{it-1})$	-0.033***	-0.027***	-0.054***	-0.019***
	(0.001)	(0.002)	(0.002)	(0.003)
$(Debt/asset)_{it-1}$	0.106***	0.095***	0.114***	0.124***
	(0.007)	(0.009)	(0.014)	(0.016)
Age_{it}	0.004***	0.004***	0.004***	0.003***
	(0.0002)	(0.0003)	(0.0005)	(0.001)
Trade characteristics				
d_prod_ex_other	-0.061***	-0.031***	-0.035**	-0.156***
	(0.008)	(0.011)	(0.017)	(0.016)
d_mar_ex_other	-0.637***	-0.625***	-0.637***	-0.671***
	(0.004)	(0.006)	(0.009)	(0.010)
ex_mar_share	-0.002***	-0.002***	-0.002***	-0.001***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)
ex_prod_share	-0.003***	-0.004***	-0.003***	-0.001***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
d_im_prod_mar	-0.394***	-0.388***	-0.394***	-0.431***
	(0.007)	(0.009)	(0.014)	(0.017)
d_im_prod	-0.436***	-0.414***	-0.481***	-0.422***
	(0.004)	(0.005)	(0.007)	(0.009)
d_im_mar	-0.060***	-0.092***	0.009	-0.058***
	(0.004)	(0.005)	(0.009)	(0.010)
Direct capital flows				
doutFDI_bilat	-0.068***	-0.106***	-0.020*	-0.018
	(0.006)	(0.007)	(0.011)	(0.013)

dinFDI_bilat	-0.156***	-0.241***	0.0597	-0.157***
	(0.025)	(0.033)	(0.049)	(0.059)
Broad economic categories				
2.bec_cat	-0.127***			
	(0.005)			
3.bec_cat	-0.0650***			
	(0.00576)			
Constant	0.757***	0.881***	0.707***	1.078***
	(0.0404)	(0.0670)	(0.0721)	(0.292)
Time eff. Incl.	YES	YES	YES	YES
Product eff. Incl.	YES	YES	YES	YES
Country eff. Incl.	YES	YES	YES	YES
Log pse.likelihood	-579144	-334311.96	-150028.95	-93461.81
Wald test	chi2(127) = 2.08e+05**	chi2(124) = 1.22e+05***	chi2(125) = 47319.53***	chi2(118) = 37705.40
Observations	1036173	604084	263869	168216
Zero outcomes	628182	376411	160252	91518
Nonzero outcomes	407991	227673	103617	76698

Notes: Robust standard errors in parentheses; Std. Err. adjusted for clusters in firm-market-product; *** p<0.01, ** p<0.05, * p<0.1

Table 5 presents estimates of (4) with exponentiated coefficients. These can be interpreted relative to unity, as those smaller than unity have a positive effect on the probability of survival, while those larger than 1 have a negative effect on firm survival. Column 1 presents the basic model, in column 2 we forgo destination fixed effects in favour of "gravity parameters" (destination country's GDP and distance between Slovenia and the destination country), while we control for the unobserved heterogeneity with random effects complementary log model. Lastly, column 4 presents the estimates of the second stage IV regression, where outward and inward FDI are instrumented by their respective probabilities.

Table 5: Complementary log-log export exit model at firm-market-product level (exponentiated coefficients)

	(1)	(2)	(3)	(4)
VARIABLES	basic	gravity	RE	IV
lnex_spell	0.451***	0.433***	0.449***	0.416***
	(0.001)	(0.002)	(0.003)	(0.002)
Firm characteristics				
$Ln(va\_emp_{it-1})$	0.924***	0.936***	0.932***	0.954***
	(0.002)	(0.003)	(0.002)	(0.004)
$Ln(k\_emp_{it-1})$	1.003***	1.001	1.000	0.969***
	(0.001)	(0.001)	(0.001)	(0.002)
$Ln(emp_{it-1})$	0.968***	0.977***	0.976***	0.954***
	(0.001)	(0.001)	(0.001)	(0.004)
$(Debt/asset)_{it-1}$	1.115***	1.119***	1.125***	1.057***
	(0.007)	(0.008)	(0.007)	(0.009)

Age_{it}	1.004***	1.004***	1.005***	0.996***
	(0.000)	(0.000)	(0.000)	(0.000)
Trade characteristics				
d_prod_ex_other	0.925***	0.946***	0.898***	0.908***
	(0.007)	(0.008)	(0.007)	(0.008)
d_mar_ex_other	0.533***	0.545***	0.541***	0.516***
	(0.002)	(0.002)	(0.002)	(0.002)
ex_mar_share	0.998***	0.998***	0.997***	0.998***
	(0.000)	(0.000)	(0.000)	(0.000)
ex_prod_share	0.997***	0.997***	0.997***	0.997***
	(0.000)	(0.000)	(0.000)	(0.000)
d_im_prod_mar	0.677***	0.673***	0.664***	0.742***
	(0.004)	(0.004)	(0.005)	(0.005)
d_im_prod	0.648***	0.651***	0.651***	0.637***
	(0.002)	(0.003)	(0.003)	(0.003)
d_im_mar	0.936***	0.920***	0.860***	0.938***
	(0.004)	(0.004)	(0.003)	(0.004)
Direct capital flows				
doutFDI_bilat	0.943***	0.890***	0.909***	0.944***
	(0.005)	(0.006)	(0.005)	(0.006)
dinFDI_bilat	0.841***	0.838***	0.852***	0.787***
	(0.021)	(0.022)	(0.021)	(0.046)
dOutFDI_gen_n	0.990**	1.023***	1.018***	
	(0.005)	(0.005)	(0.005)	
dInFDI_gen_n	1.023***	1.029***	1.019***	
	(0.004)	(0.005)	(0.004)	
ofdi_hat				1.066***
				(0.007)
ifdi_hat				0.898***
				(0.006)
Gravity features				
lnGDP		0.985***		
		(0.001)		
lndist		1.093***		
		(0.002)		
Constant	2.224***	2.646***	4.718***	9.887***
	(0.087)	(0.118)	(0.137)	(0.683)
Time effects included	YES	YES	YES	YES
Product effects incl.	YES	YES	NO	YES
Country effects incl.	YES	NO	NO	YES
Log pse. likelihood	-747266	-601437		-581730
Wald test	Chi2(121)= 216218***	Chi2(35)= 171429***	Chi2(24)= 203630***	Chi2(119)= 162346***
Observations	1109716	901086	1110339	862174
Zero outcomes	664804	552228		513581
Non-zero outcomes	444912	348858		348593

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

Apart from indebtedness, age and distance to destination markets only foreign direct investment, both outward and inward, decrease the probability of product-destination spell survival. The latter result may be surprising at first, but it is conditional on controlling for bilateral inward and outward FDI. In other words, firms that have either incoming or outgoing bilateral capital flows with the country of export destination experience substantially higher rates of survival of product-destination specific export spells. Direct investments with third countries (either incoming or outgoing) though are likely to cause an end to some of the "incumbent" product-destination spells. Cross-border capital flows with countries that are not directly involved with the export spell in question likely introduce new trade connections, which are, ceteris paribus, likely to displace the existing ones.

More productive and larger firms find it easier to maintain export spells. Firm size and efficiency increase the resilience of exporting spells to demand shocks and provides a larger buffer against momentary losses. The importance of the product and market in question as measured by their share in total export revenue also increases the longevity of product-destination specific spells. Along the same lines, exporting other products to the same destination market or exporting the same product to other destinations improves the probability of survival by increasing the relevance and relative importance of these products/markets. Furthermore, there are substantial positive externalities from importing as well, as existing imports of the same product from the export-destination substantially improve the probability of the product-destination spell continuing. This phenomenon of two-way trade where firms export virtually the same product as they import and even to the country of origin of the imports was termed pass-on trade (Damijan et al. 2013). Similarly, there is a strong correlation with a binary indicator of importing the same product and importing from the export-destination country.

Lastly, in line with the literature, we find that geographical distance tends to shorten product-destination specific export spells, while destination country GDP tends to improve the likelihood of survival.

Robustness checks

As shown in the Table 2 approximately one sixth of all product-destination specific export spells happen are reoccurring within our sample period. On one hand, observed gaps in exporting may indicate termination of product-market spell subsequently followed by re-entry into the same product-destination node. On the other hand, gaps are not necessarily a sign of export termination, i.e. they might be explained by the specific nature of a

particular good or as purely statistical phenomenon due to reporting ceilings. Since we cannot discriminate between the two cases, we test the robustness of the results to the alternative considerations of such observable gaps in the product-market spells. In column 1 of Table 6, we therefore only consider uninterrupted spells, column 2 includes all spells with up to a one year gap, while (3) allows for breaks of up to two periods in the export spell. Due to the change in the definition of continued export spells, we reduce the sample by the first and last year (2002, 2010) in column 2 and first and last two years (2002, 20003, 2009, 2010) in column 3. This is done to account for the different length of gaps in export spells when capturing the moment and export spell began/ended.[5]

The results shown in Table 6 are in line with the baseline estimates confirming that most of the effects of FDI and trade externalities as well as of firm-specific factors on export survival are not sensitive to these alternative model specifications. As before, the longer the exiting spell, the less likely it is that it will stop. This likely implies that firms learn by staying in a given market and gain a more secure foothold in it the longer they stay in it. However, there are two notable exceptions to this general conclusion. First, the survival enhancing effect of bilateral inward FDI is confirmed only in case of most restrictive definition of survival with no gaps in observation allowed. This could be a reflection of the fact that bilateral capital flows are associated with larger volume continued export flows between the two countries rather than intermittent exporting.

Table 6: Complementary log-log export exit model at firm-market-product level accounting for interrupted spells

VARIABLES	(1) no gaps allowed	(2) 1y gaps allowed	(3) 2y gaps allowed
lnex_spell_gap1	-0.871***	-0.824***	-0.846***
	(0.004)	(0.005)	(0.007)
Firm characteristics			
$Ln(va\_emp_{it-1})$	-0.065***	-0.070***	-0.069***
	(0.003)	(0.003)	(0.004)
$Ln(k\_emp_{it-1})$	0.000	-0.002	0.000
	(0.002)	(0.002)	(0.002)
$Ln(emp_{it-1})$	-0.035***	-0.034***	-0.023***
	(0.001)	(0.001)	(0.002)
$(Debt/asset)_{it-1}$	0.091***	0.110***	0.091***
	(0.008)	(0.008)	(0.011)
Age_{it}	0.003***	0.004***	0.003***
	(0.000)	(0.000)	(0.000)
Trade characteristics			

[5] In Table A2 of the Appendix we only reduce the sample by the initial year (2002) column 2 and the first two years (2002, 2003) in column 3.

d_prod_ex_other	-0.401***	-0.426***	-0.406***
	(0.010)	(0.011)	(0.014)
d_mar_ex_other	-0.663***	-0.742***	-0.760***
	(0.005)	(0.005)	(0.006)
ex_mar_share	-0.004***	-0.004***	-0.003***
	(0.000)	(0.000)	(0.000)
ex_prod_share	-0.005***	-0.005***	-0.006***
	(0.000)	(0.000)	(0.000)
d_im_prod_mar	0.191***	0.183***	0.188***
	(0.007)	(0.008)	(0.011)
d_im_prod	-0.368***	-0.413***	-0.428***
	(0.004)	(0.004)	(0.006)
d_im_mar	-0.054***	-0.069***	-0.067***
	(0.005)	(0.005)	(0.006)
Direct capital flows			
doutFDI_bilat	-0.065***	-0.100***	-0.127***
	(0.006)	(0.007)	(0.009)
dinFDI_bilat	-0.121**	-0.040	-0.057
	(0.054)	(0.060)	(0.086)
Broad economic categories			
2.bec_cat	-0.134***	-0.126***	-0.124***
	(0.005)	(0.006)	(0.008)
3.bec_cat	-0.079***	-0.067***	-0.068***
	(0.006)	(0.007)	(0.009)
Constant	2.341***	1.747***	1.836***
	(0.038)	(0.046)	(0.062)
Time effects included	YES	YES	YES
Product effects incl.	YES	YES	YES
Country effects incl.	YES	YES	YES
Log pse. likelihood	-427402	-387129	-232276
Wald test	Chi2(119)= 127029***	Chi2(118)= 115469***	Chi2(115)= 60639***
Observations	736632	669918	389522
Zero outcomes	368276	297888	180414
Non-zero outcomes	368356	372030	209108

Notes: Robust standard errors in parentheses; Std. Err. adjusted for clusters in firm-market-product; *** p<0.01, ** p<0.05, * p<0.1

Secondly, contrary to the baseline results, export duration tends to be shorter in case of the so-called pass-on trade phenomenon when firms are exporting the same product as they import to the country of origin of the imports, while still - in line with baseline specifications - export spell survival chances are higher for firms involved in importing either the same product or from the export-destination country.

Conclusions

In this paper we test several theoretical predictions linking firm internationalisation modes to export duration at firm-product-market level. Using a comprehensive dataset on Slovene firms (2002-2011) at the level of trade transactions coupled with detailed firm accounting information and data on cross-border ownership we explore the effects of participation in production networks on the durability of firm-HS 6 product-destination export spells. In contrast to most of the empirical literature on global value chains, we do not focus on the profitability or division of value added along the production chain, but rather on the effect on duration of the related production spells..

Overall, we find robust support for the role of production networks in maintaining supply-chain trade and therefore the duration of product-destination specific export spells. As ownership ties (either inward or outward) may be an indication of participation in global value chains or membership of a production network, we interpret the positive correlation between spell duration and foreign-ownership indicators as evidence in favor of trade stability within production networks. Outward FDI reduces export hazard rates in an affiliate's host country market on average by 5 to 11 per cent, mostly because of enhanced persistence of intermediate goods exports. Less robust, but of higher magnitude, is the effect of inward bilateral direct capital flows with the country of export destination where firms exporting intermediate and capital goods experience around 21 and 15 per cent higher rates of survival of product-destination specific export spells, respectively. However, the positive effects of inward and outward FDI on export duration tend to be country-specific, since we find higher hazard rates of terminating exports to other markets. These results suggest that the effect might be transmitted through a bias towards foreign-owned-firm sunk-cost trade technologies rather than being an outcome of learning/efficiency effects in general.

Furthermore, we show that export termination risk decreases with increasing share of a particular product and particular destination market in firm's exports supporting the importance of firm focus on its core competencies and markets for export survival. Estimates also confirm the existence of significant positive market-specific and product-specific synergies resulting from both exporting and importing experiences. We find that export product-market spell's survival probability on average increases by up to 10 per cent when a firm serves particular market with other products and even more, almost by 50 per cent, when it exports the same product to other markets. We detect these positive effects of export complementarities for all broad economic categories.

Substantial positive externalities are materialising from importing as well, as existing imports of the same product reduces its export hazard rate by

approximately 35 per cent, while the probability of terminating exports is lower in range of 6 to 14 per cent when firms have established import relations with export-destination country. We find the latter import complementarity to be present only for intermediate and capital goods but not for consumer goods. With respect to impact of the pass-on trade phenomenon on longevity of exports, our results are not robust to alternative considerations of observable gaps in the export spells.

The finding that export spells for new exporters are often very brief not only signaled a rethink of the way economists thought about the evolution of trade links, but also fundamentally changed the approach to trade policy. In terms of policy advice, we believe that there is a clear need for policies aimed at helping firms maintain reliable trade relationships by reducing the uncertainty inherent in international trade. The broad areas that require policy makers' attention are strengthening contract enforceability between exporters and their suppliers, addressing market imperfections in trade financing, improving transport efficiency and logistic systems and finding mechanisms to reduce the uncertainty of new trade relationships.

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Appendix

Table A1: Description of the values of the regression variables

VARIABLES	N	mean	sd
dinFDI_bilat	11103339	0.00549	0.0739
doutFDI_bilat	11103339	0.137	0.344
dexit_ex	11103339	0.401	0.490
ex_mar_share	11103339	28.02	33.48
ex_prod_share	11103339	8.170	20.65
d_im_prod_mar	11103339	0.175	0.380
d_im_prod	11103339	0.671	0.470
d_im_mar	11103339	0.530	0.499
lnex_spell	11103339	0.615	0.672
age	11103339	16.95	8.946
debt_asset_Eur_1	11103339	0.602	0.509
lnva_empEur_1	11103339	10.33	0.692
lnk_empEur_1	11103339	10.42	1.313
lnemp_1	11103339	4.002	2.081
dOutFDI_gen_n	11103339	0.391	0.488
dInFDI_gen_n	11103339	0.200	0.400
d_prod_ex_other	11103339	0.926	0.262
d_mar_ex_other	11103339	0.601	0.490

Table A2: Complementary log-log export exit model at firm-market-product level accounting for interrupted spells

VARIABLES	(1) no gaps allowed	(2) 1y gaps allowed	(3) 2y gaps allowed
lnex_spell_gap1	-0.871***	-0.790***	-0.781***
	(0.004)	(0.004)	(0.005)
lnva_emp_1	-0.065***	-0.071***	-0.075***
	(0.003)	(0.003)	(0.003)
lnk_emp_1	0.000	-0.001	0.001
	(0.002)	(0.002)	(0.002)
lnemp_1	-0.035***	-0.037***	-0.036***
	(0.001)	(0.001)	(0.001)
debt_asset_1	0.091***	0.106***	0.107***
	(0.008)	(0.008)	(0.008)
age	0.003***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)
d_prod_ex_other	-0.401***	-0.431***	-0.448***
	(0.010)	(0.010)	(0.011)
d_mar_ex_other	-0.663***	-0.733***	-0.750***
	(0.005)	(0.005)	(0.005)
ex_mar_share	-0.004***	-0.004***	-0.004***
	(0.000)	(0.000)	(0.000)
ex_prod_share	-0.005***	-0.005***	-0.006***
	(0.000)	(0.000)	(0.000)
doutFDI_bilat	-0.065***	-0.069***	-0.056***
	(0.006)	(0.006)	(0.007)
dinFDI_bilat	-0.121**	-0.144***	-0.227***
	(0.054)	(0.055)	(0.061)
d_im_prod_mar	0.191***	0.186***	0.206***
	(0.007)	(0.007)	(0.008)
d_im_prod	-0.368***	-0.414***	-0.431***
	(0.004)	(0.004)	(0.004)
d_im_mar	-0.054***	-0.064***	-0.066***
	(0.005)	(0.005)	(0.005)
2.bec_cat	-0.134***	-0.131***	-0.137***
	(0.005)	(0.005)	(0.006)
3.bec_cat	-0.079***	-0.055***	-0.062***
	(0.006)	(0.006)	(0.007)
Constant	2.341***	2.466***	2.534***
	(0.038)	(0.038)	(0.042)
Time effects included	YES	YES	YES
Product effects incl.	YES	YES	YES
Country effects incl.	YES	YES	YES
Log pse. likelihood	-427402	-455578	-392096
Wald test	Chi2(119)= 127029***	Chi2(119)= 134004***	Chi2(118)= 109727***
Observations	736632	788097	674098
Zero outcomes	368276	353874	305432
Non-zero outcomes	368356	434223	368666

Notes: Robust standard errors in parentheses; Std. Err. adjusted for clusters in firm-market-product; *** p<0.01, ** p<0.05, * p<0.1