Products or markets: what type of experience matters for export survival?

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23 October, 2018

Background

- Building up experience as an exporter has been shown to have a positive effect on export survival at the firm level:
  - Görg et al. (2012), Albornoz et al. (2016), Araujo et al. (2016), Inui et al. (2016) and Aeberhardt et al. (2018).
- We know entering a foreign market or launching a new product is costly and risky:
  - Market-specific standards and regulations,
  - packaging,
  - distribution channels,
  - uncertainty about future conditions and so on...
- And hence most trade spells are very short:
  - Besedeš and Prusa (2006a,b): Median US product-level trade spell lasts just one year, and mean trade spells three years
  - Confirmed by Nitsch (2009), Brenton et al. (2009), Oblashi (2010), Besedeš and Blyde (2010), Besedeš (2013), Besedeš and Prusa (2011, 2013), Hess and Person (2012).

Experience puzzle at product level

- Greater size and existing export scope reduce the risk of failure if the firm moves into new export market.
- However, looking at the survival probabilities of newly introduced export products at the firm level, Lawless and Studnicka (2018) found that as the firm expanded their product range, the benefit to experience began to **decline**.
- But why would experience have a negative effect?
  - As more experienced exporters expand exports, the newly introduced products are less closely aligned to the firm's core competencies.
  - Survival probabilities of these more "marginal" products are therefore lower.
  - Consistent with the predictions of Melitz (2003) exporting threshold model and the Eckel and Neary (2010) and Bernard et al. (2011) models of multi-product firms.

Aim of this paper

- Broader examination of effect of sources of experience.
- Implicit assumption in literature that all experience is of equal weight.
- Combine the product and market dimensions to see whether different types of experience can actually have different effects on the survival of new trade relationships.
- To what extent experience in a particular market facilitates the survival of an additional product being introduced to that market by a firm?
- Does having previous experience with a product make it more successful if the firm goes to launch this same product in a new market?

Data

- **Trade:** Detailed trade records at the firm-product-destination (HS-6, constant 1996 classification) level for Ireland from Central Statistics Office.
  - Average of close to 1,000 firms per year.
  - Data covers 1996 to 2015.
  - We start analysis of new product-destination launches from 2006 to 2015.
  - This allows us to use information on the firm history for ten years, overcoming limitation generally posed by data censoring.
- **Firm:** Firm characteristics from the Census of Industrial Production - employment, labour productivity, ownership nationality.
- **Product:** Use indicator of product "proximity" to the core product of the firm (from Hidalgo, Klinger, Barabási and Hausmann, 2007).
- **Country:** Standard gravity variables (distance, contiguity, common language) as well as the reliability of the buyer (GDP, GDPpc rule of law).

Data

Table: Summary statistics 2006-2015

	Mean	Standard dev.	Min	Max
No of firms	990.6	63.9	891.0	1,115
No of products per firm	12.3	17.4	1.0	196.3
No of destinations per firm	11.3	15.3	1.0	128.9
Productivity	360	938	6	15,510
Employment	123	357	1	7,543
Exports	860,602	4,946,057	1	105,348,997

Source: Own calculations based on the CSO data (2016)

Methodology: definitions

Duration of trade

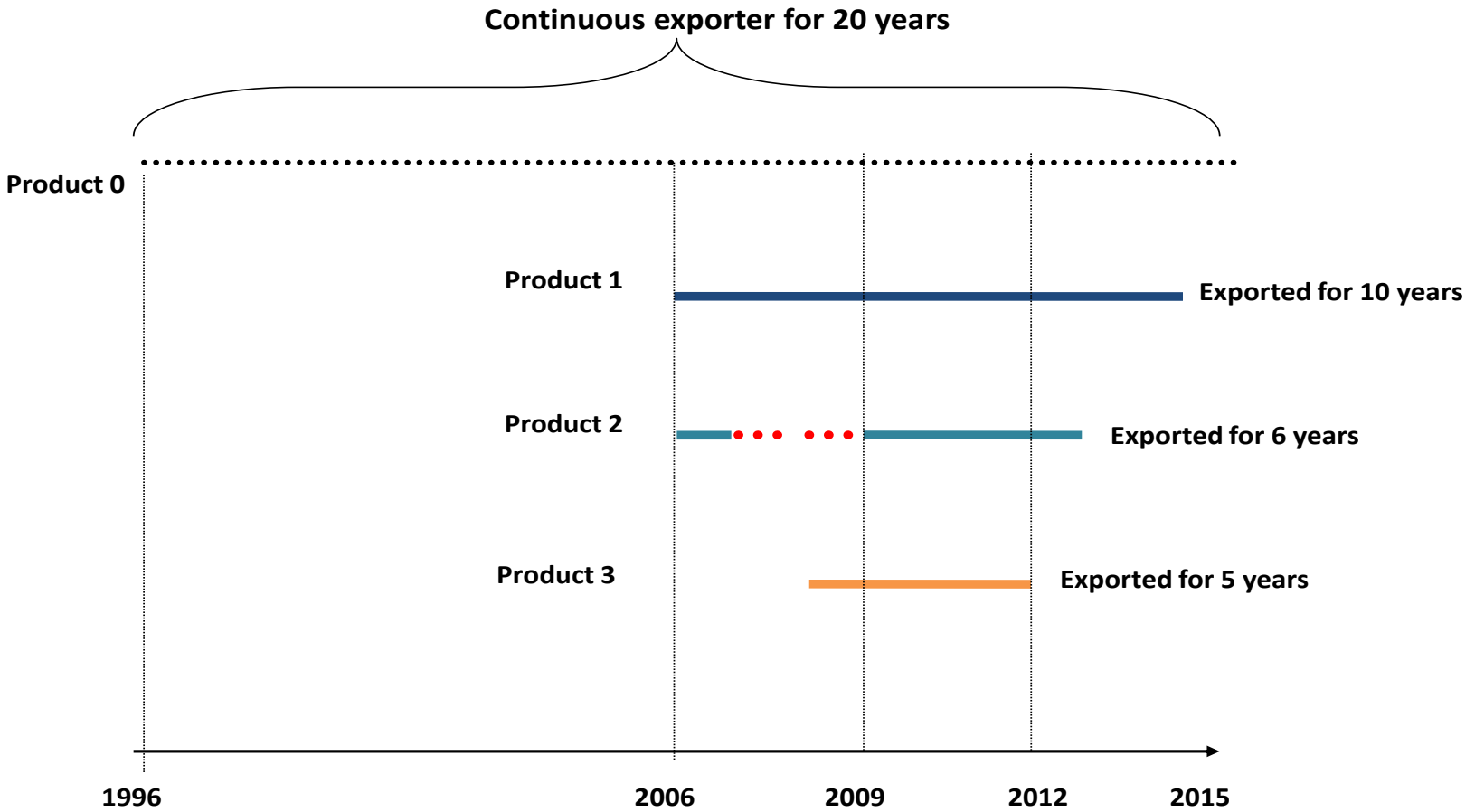
The number of years a particular firm-product-destination export flow was active (starting in 2006).

- We treat treat spells as continuous (ignore breaks between them).

Experience

The number of years a firm has been an active exporter (starting from 1996) or has exported an individual product or to a specific country.

Export spells



Different sources of experience

- Experience measures are all at the launch time of a new product-destination trade relationship:
  - Years of total firm export experience
  - Dummy for if a product is already exported elsewhere
  - Dummy of if a destination is already exported to
  - Years of experience with a product (in other markets)
  - Years of experience of existing destination (with other products)
  - Number of destinations by product
  - Number of products by destination

Summary statistics of experience

Table: Summary statistics

	Obs	Mean	Std. Dev.	Min	Max
Total time as exporter	206,451	10.6	5.3	1	20
Experience of existing product	206,451	5.4	5.2	1	20
Experience of existing destination	206,451	7.5	5.6	1	19
Number of destinations by product	206,451	11.1	16.1	1	134
Number of products by destination	206,451	11.3	17.4	1	242

Proximity

- Potential explanation for different levels of impact on experience is that it depends on product characteristics.
- We measure the proximity of each new product introduced by a firm to its core product (defined as the product with the largest export value).
- We use a proximity measure developed by Hidalgo et al. (Science 2007).
  - This is based on the idea that two products that require similar institutions, capital, infrastructure, technology, etc. are likely to be produced in tandem (similar goods).
  - Formally the proximity ϕ between products i and j is the minimum of pairwise conditional probabilities of a country exporting a good given that it exports another at the SITC 4-digit level.

$$\phi_{i,j} = min\{P(RCAx_i \mid (RCAx_j), P(RCAx_j \mid (RCAx_i)\} \quad (1)$$

Key Findings

- Important differences in the effects on export survival of different types of experience.
- Experience built up from previously exporting a particular product has a consistently more positive impact than experience within a market.
- Diminishing returns appear to set in rather rapidly at the firm level if it adds more products to an existing market.
- We argue that these findings are consistent with a number of the features of models of multi-product firm.
- Firms tend to begin exporting by launching the products closest to their core competency and selling them across a broad range of markets.
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- Distance of the new products to the core competency (proxied by the largest export sales) of the firm plays an important role.

Regression analysis

- We use a complementary log-log (cloglog) model - a discrete-time version of the propotional hazard models.
- Estimate the following equation:

$$cloglog[h(j, X)] = \beta' X + \gamma_j \tag{2}$$

- h is the hazard rate, X is a vector of time-varying covariates and γ_j is a set of spell length dummies (to capture the duration dependence).
- Dependent variable is a dummy equal one for an ending spell.
- We treat spells as continuous and ignore breaks between then.

Baseline

Table: Baseline results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Experience by firm		1.153***	1.159***	1.142***	1.212***		1.195***
Number of destinations by firm	0.912***		0.913***				
Number of products by firm	0.930***		0.924***				
Dummy existing destination				1.062***		1.220***	1.092***
Dummy existing product				0.674***	0.701***	0.672***	
Proximity	0.569***	0.603***	0.573***	0.611***	0.671***	0.685***	0.684***
Initial value	0.951***	0.958***	0.954***	0.958***	0.958***	0.955***	0.958***
Employment	1.013***	0.963***	1.009***	0.962***	0.972***	0.971***	0.970***
Productivity	1.022***	1.000	1.032***	0.999	1.013***	0.997	1.011***
Lag GDP	0.964***	0.974***	0.964***	0.972***	0.952***	0.949***	0.949***
Contiguity	0.818***	0.861***	0.821***	0.861***	0.825***	0.829***	0.824***
Common language	1.127***	1.160***	1.137***	1.159***	1.107***	1.097***	1.104***
Distance	1.123***	1.117***	1.122***	1.115***	1.122***	1.117***	1.119***
Lag rule of law	0.856***	0.859***	0.852***	0.859***	0.858***	0.862***	0.857***
Lag GDP per capita	1.087***	1.088***	1.092***	1.087***	1.084***	1.077***	1.083***
Observations	206,451	206,451	206,451	206,451	206,451	206,451	206,451
Spell length dummies	YES	YES	YES	YES	YES	YES	YES
log likelihood	-124329	-124532	-123936	-124517	-123323	-123796	-123290

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The table shows exponentiated coefficients. Dependent variable is a dummy equal to one when a spell ends. All continuous variables are in logs.

Two different sources of experience

Table: Effects of length of destination and product experience

	(1)	(2)	(3)	(4)	(5)	(6)
Experience existing destination	1.102***		1.142***	1.136***		1.121***
	(0.004)		(0.005)	(0.005)		(0.005)
Experience existing product		0.881***	0.859***		0.969***	0.929***
		(0.003)	(0.003)		(0.004)	(0.004)
Number of destinations by product					0.716***	0.725***
					(0.003)	(0.003)
Number of products by destination				0.867***		0.846***
				(0.003)		(0.003)
Observations	206,451	206,451	206,451	206,451	206,451	206,451
Spell length dummies	YES	YES	YES	YES	YES	YES
log likelihood	-124592	-124292	-123752	-123913	-120037	-118987

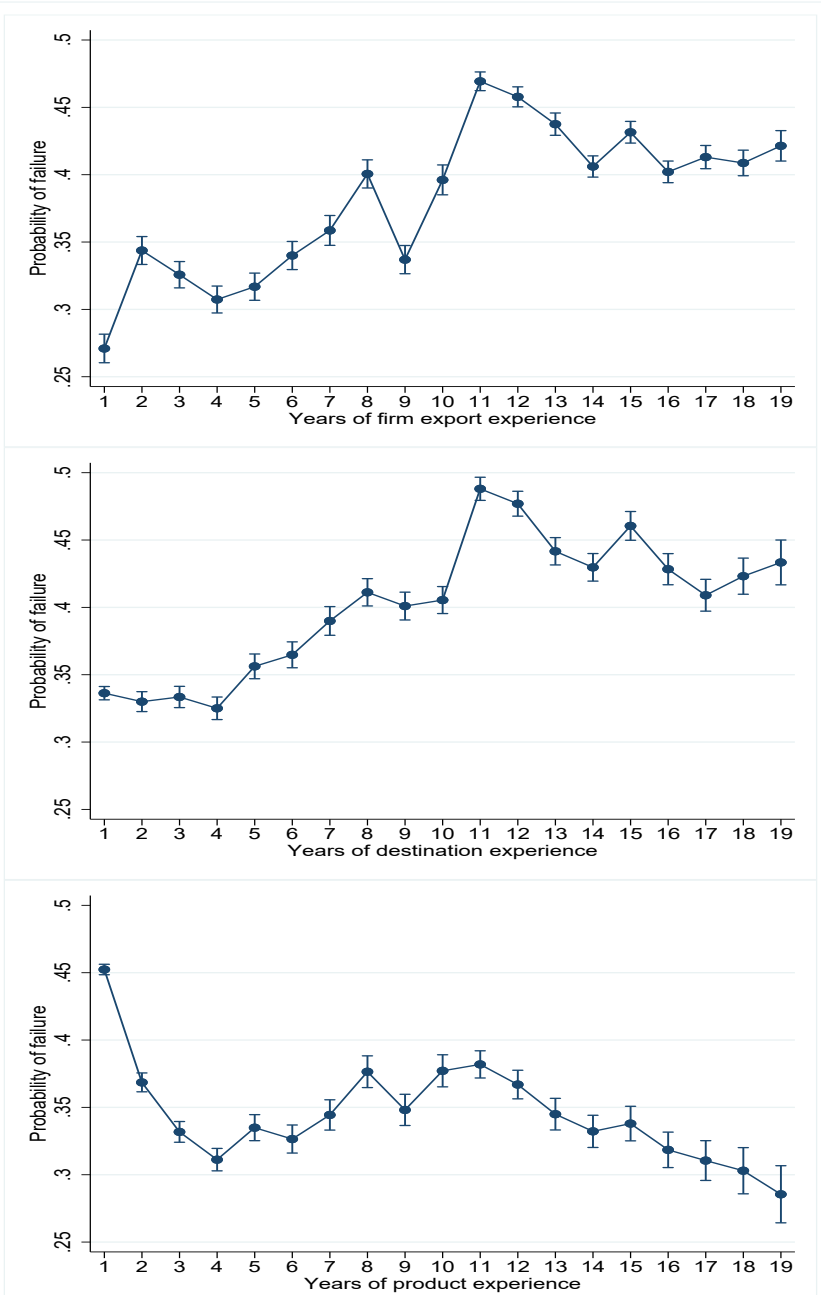
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The table shows exponentiated coefficients. Dependent variable is a dummy equal to one when a spell ends. All continuous variables are in logs. Please note that firm and country controls are included in the specification (as in Table 3), but not reported here.

Table: Additional measures of firm export scale

	(1)	(2)	(3)
Experience existing destination	1.168***	1.107***	1.066***
	(0.005)	(0.005)	(0.007)
Experience existing product	0.868***	0.925***	0.914***
	(0.003)	(0.004)	(0.004)
Experience by firm			1.077***
			(0.006)
Number of destinations by firm	0.932***	1.064***	1.065***
	(0.005)	(0.006)	(0.006)
Number of products by firm	0.900***	1.062***	1.060***
	(0.005)	(0.007)	(0.007)
Number of destinations by product		0.703***	0.707***
		(0.003)	(0.003)
Number of products by destination		0.811***	0.814***
		(0.004)	(0.004)
Observations	206,451	206,451	206,451
Spell length dummies	YES	YES	YES
log likelihood	-123127	-118788	-118748

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The table shows exponentiated coefficients. Dependent variable is a dummy equal to one when a spell ends. All continuous variables are in logs. Please note that firm and country controls are included in the specification (as in Table 3), but not reported here.

Figure: Predictions of product-destination failure by experience type



Assessing the risk of new launches

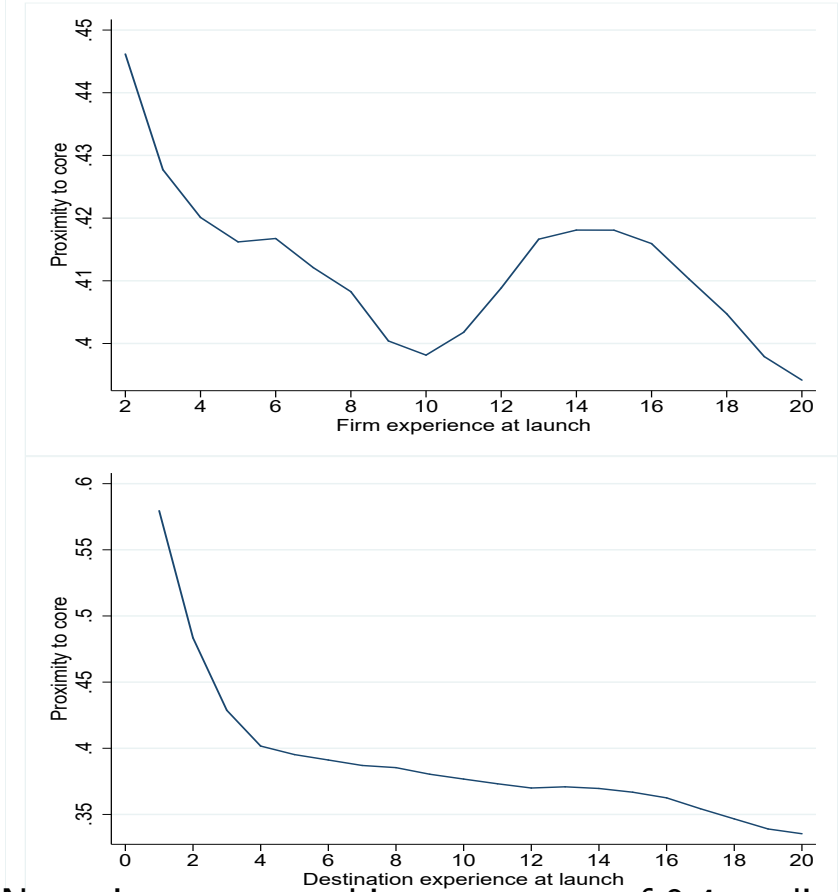
- What mechanisms might be at play for experience in a market to have such different effects to experience built up at a product level?
  - A lowering of destination-specific costs $\Longrightarrow$ more exports.
  - Differing thresholds at which it is profitable to export individual products to different destinations.
  - Hence, the success of a new product-destination flow can be simplistically thought to be driven by the position of the product in the firm's productivity distribution and the threshold at which that product can make profits within a market (including covering its fixed costs of entry).
- Hence in the next step we look for evidence that firms are launching riskier products in markets where they have built up greater experience.

Table: Proximity of new product-destination to core product

	(1)	(2)	(3)
Experience existing dest.	-0.051***		-0.050***
Number of destinations by firm		0.064***	0.038***
Number of products by firm		-0.081***	-0.036***
Number of products by destination	-0.050***		-0.045***
Employment	0.013***	0.012***	0.012***
Productivity	0.005**	0.004*	0.006***
Lag GDP	-0.004***	-0.020***	-0.004***
Contiguity	-0.005	-0.007	-0.004
Common language	-0.003	-0.023***	-0.004
Distance	-0.007***	-0.001	-0.006***
Lag rule of law	-0.001	-0.008***	-0.002
Lag GDP per capita	-0.000	-0.005***	-0.000
Constant	0.576***	0.963***	0.569***
Observations	107,719	107,719	107,719
R-squared	0.245	0.219	0.247
HS6 fixed effects	YES	YES	YES
Firm fixed effects	YES	YES	YES

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The table shows exponentiated coefficients. Dependant variable is the proximity of new product to the core product. All continuous variables are in logs.

Figure: Proximity of newly launched product to core by experience



Note: Lowess smoothing parameter of 0.4 applied.

Effects by nationality of ownership

Table: Nationality

	(1)	(2)	(3)	(4)	(5)	(6)
	Irish			Foreign		
Experience existing destination	1.093***	1.070***	1.088***	1.222***	1.139***	1.058***
	(0.007)	(0.007)	(0.009)	(0.007)	(0.007)	(0.008)
Experience existing product	0.841***	0.911***	0.919***	0.880***	0.938***	0.914***
	(0.005)	(0.006)	(0.006)	(0.004)	(0.005)	(0.005)
Experience by firm			0.954***			1.172***
			(0.010)			(0.012)
Number of destinations by firm	0.932***	1.055***	1.055***	0.919***	1.071***	1.082***
	(0.007)	(0.009)	(0.009)	(0.006)	(0.008)	(0.008)
Number of products by firm	0.913***	1.036***	1.042***	0.907***	1.082***	1.082***
	(0.008)	(0.011)	(0.011)	(0.006)	(0.009)	(0.009)
Number of destinations by product		0.677***	0.675***		0.712***	0.721***
		(0.005)	(0.005)		(0.003)	(0.004)
Number of products by destination		0.811***	0.809***		0.811***	0.819***
		(0.007)	(0.007)		(0.005)	(0.005)
Observations	78,935	78,935	78,935	127,516	127,516	127,516
Spell length dummies	YES	YES	YES	YES	YES	YES
log likelihood	-45610	-44145	-44136	-77142	-74351	-74223

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The table shows exponentiated coefficients. Dependent variable is a dummy equal to one when a spell ends. All continuous variables are in logs. Please note that firm and country controls are included in the specification (as in Table 3), but not reported here.

Conclusion

- Experience as an exporter has been shown to help a firm enter and survive when it expands into new markets.
- This paper digs more deeply in to the sources and effects of firm experience at a more granular level than the existing literature.
- We find that the effects of experience on survival depend critically on the source of this experience.
- Our central result is that at the launch of a new product-market combination, having built up previous experience in the product is a strong predictor of success.
- Prior experience in the market has the opposite effect.
- It is consistent with a number of the features of models of multi-product firms.
- Exporters that expand their number of products in a particular market do so by moving away from their core expertise and launching more marginal products.

THANK YOU FOR YOUR ATTENTION