One-Off Exporting: New Evidence from Colombian Data

Preliminary

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Abstract

One-off export events, i.e. single-month episodes with positive exports centred in a 49-month window of no exports, are the outcome of more than 50 percent of new export spells at the firm-buyer-destination-product level in Colombian data from 2010-2017. This paper explores the phenomenon of one-off exporting, it proposes a theoretical framework for one-off export events building on concepts of passive exporting and unsolicited export orders, and based on 185,871 new export spells it explores what can and *cannot* explain whether a new export spell is one-off using a non-linear probability model with high dimensional fixed effects. The paper complements – finding similar results – and extends the finding of a high prevalence of one-off export events in Danish data by Geishecker et al. (2019) as it builds on more granular monthly trade data (accounting for buyer identity) and by showing that relevant firm-level export experience as well as the import pattern of the buyer matter for whether an export spell is one-off.

Keywords: Passive exporting, proactive exporting, unsolicited export orders, export duration, monthly data, firm-to-firm transactions data, firm-level data, heterogeneous firms.

JEL: F14, F12, L10, D40.

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1 Introduction

Firms' export dynamics are complex and shaped by uncertainty, substantial sunk entry costs, experimentation, and persistent heterogeneity across firms (Alessandria et al., 2021). Drawing on detailed microdata, recent research reveals that exporting is not merely a one-time, forward-looking decision but an evolving process influenced by firm experience, destination-specific frictions, and shipment patterns. These findings challenge the assumptions of standard heterogeneous-firm trade models (e.g., Melitz, 2003), which often abstract from dynamic margins such as temporary market participation, gradual expansion across destinations and products, and short-lived trade relationships. In particular, Alessandria et al. (2021) emphasize that many firms enter and exit export markets rapidly, export infrequently, and exhibit considerable heterogeneity in shipment intensity and persistence.

A robust empirical finding across the literature is the path dependency of exporting: prior export experience not only increases the likelihood of continued market participation, but also facilitates expansion into new export markets. These dynamic patterns have been linked to different underlying mechanisms: learning about foreign demand and profitability (Albornoz et al., 2012; Berman et al., 2019, Timoshenko, 2015; Schmeiser, 2012), learning about export partner (distributor) type (Araujo et al., 2016), and the amortization of sunk or fixed entry costs that make repeated or expanded exporting more profitable over time (Morales et al., 2019; Sheard, 2014).

It is noteworthy that dynamic export expansion takes place in an environment where most export relationships are in fact short-lived. A large share of export spells, particularly at the firm-product-destination level, lasts only a single year—or even a single shipment (Besedeš & Prusa, 2006a; Békés & Muraközy, 2012; Görg et al., 2012; Van Den Berg et al., 2022). The transience of new trade relations has also been documented at the firm-to-firm level, see e.g. Monarch & Schmidt-Eisenlohr (2023) documenting survival probability to the next *year* below 40 percent for new importer-supplier relationships among US importers, while Eaton et al. (2021) document high *first-year* separation rates for matches between Columbian exporters and US importers (although declining with initial sales they start above 80 percent for the first quartile).

Export spells are, thus, frequently sporadic, interrupted, and short-lived. Granular transaction-level customs data reveals that many export transactions are isolated occur-

rences—neither preceded nor followed by further exports to the same destination-product pairing (Geishecker et al., 2019). These episodic patterns, which we define more precisely as "one-off" events, are often obscured in aggregated *yearly* data but comprise a significant share of firms' export activity. A one-off export event is defined as a single *month* of exports centered in a 49-month window of otherwise no exports.[1]

From a modeling perspective, such short-lived, one-off export spells challenge standard assumptions about dynamic exporting behavior. Rather than entering a market to build a lasting presence, many firms appear to engage in one-time transactions. Some of these episodes may reflect failed experimentation or poor match quality. Some may reflect random productivity and cost shocks. Others may result from buyer-initiated transactions, a phenomenon consistent with models that emphasize the buyer margin and endogenous matching (Carballo et al., 2018; Bernard et al., 2018; Egger et al., 2019; Monarch, 2022; Antràs & Chor, 2022; Gimenez-Perales, 2024).

Despite the empirical relevance of these one-off export spells, we still lack a systematic understanding of the determinants of one-off exporting. Are one-off transactions concentrated among inexperienced exporters, capacity-constrained firms, or firms with low productivity? Do they serve as stepping stones to more sustained export engagement, or are they symptomatic of failed entry attempts? Understanding the drivers of one-off exports is essential to assess the role of experimentation, learning, and market frictions in shaping firms' export portfolios, mostly engaged in one-off exports, and to identify factors associated with the occurrence of one-off exporting. By leveraging monthly customs data and distinguishing between persistent and non-persistent export spells, we shed light on a previously underexplored margin of export dynamics and provide new insights into the mechanisms that govern firms' export behavior.

The present paper considers newly established export links and shows that a strikingly large fraction (above 50 percent at the firm-buyer-destination-product level and above 40 percent if the firm dimension is interacted with either the buyer, product or destination dimension) of such new links terminate immediately within a calendar-month; i.e. are one-off export events, and therefore have no long run effects on firm-level and aggregate exports.[2] Motivated by this fact, we (i) develop a theoretical framework and derive

[1]This paper is not the first to consider immediately terminated export links and the striking prevalence thereof. The definition of immediately terminated export links in the present paper follows Geishecker et al. (2019), who coined these links "one-off export events".

[2]Geishecker et al. (2024) argue that such immediately terminated export links may have persistent

testable hypotheses with regards to the determinants of exports events being one-off and (ii) test these hypotheses and explore what can as well as what *cannot* explain the likelihood that a newly started export link terminates immediately.

Our theoretical framework relies on the notions of (random) unsolicited export orders and passive exporting which are highly recognized in the International Business literature[3] as well as market-specific fixed marketing costs – thereby generalizing the theoretical framework in Geishecker et al. (2019). Nevertheless, other theoretical frameworks, which we perceive as complementary, may be able to generate similar findings. This could e.g. be search-and-matching frameworks as in Eaton et al. (2021) with ex-ante uncertainty about firm-buyer match-specific quality, where the first month of exports (partly) reveals this uncertainty and the relation stops if the signal about this quality is sufficiently adverse (testing-the-waters at the firm-buyer-product level).

Our main empirical result is to explore what can and cannot explain whether a newly started export spell becomes a one-off export event. It shows that firm, destination, product, and buyer characteristics all matter. In particular, firm-level experience from recurrently serving related export "markets" (sharing either product, destination, or buyer) reduces the likelihood of a new spell being a one-off export event, and buyers' import patterns from Colombia also matter. However, the predictive power of these is limited (even jointly). The vast majority of the variation in whether a new export spell turns out to be a one-off event or not is driven by firm-buyer idiosyncrasies. Hence, theories to explain the phenomenon must allow for granular features and, in particular, shocks at the firm-buyer level.

Finally, we show that the findings from Geishecker et al. (2019) for Denmark, a developed European high-income economy, broadly hold for Colombia, a South American emerging market economy. This suggests that their findings and those in the present paper are indeed general features of firm-level export dynamics that one would expect to hold for other countries as well.

effects on exports as they are associated with the appearance of future new and *lasting* export links in related markets (same product or same destination).

[3]Passive exporting has been emphasized in the export development models and exporter stages models starting with Johanson & Vahlne (1977) and features prominently already in the synthesis of Bilkey (1978). Based on case studies and survey-based methods, the international business and international marketing literature has developed the concept of passive (reactive) exporting for almost 50 years (see the reviews of Leonidou et al., 2007 and Leonidou et al., 2010). For example, the meta-study of Leonidou et al. (2007), p. 751, concludes: "*Of all the motives to export, the most common is the receipt of an unsolicited order from a customer abroad (...).*"

This paper contributes to an extensive literature on firm dynamics in international markets, specially to Besedeš & Prusa (2006a), Besedeš & Prusa (2006b), Besedeš (2008), Nitsch (2009), Besedeš & Prusa (2011), Macchiavello & Morjaria (2015), Geishecker et al. (2019), Monarch (2022), Martin et al. (2023), Geishecker et al. (2024), and Gimenez-Perales (2024). Our contribution to this literature is twofold. First, while we consider "one-off export events" as Geishecker et al. (2019), our data allow us to explore export links at a more granular level, as the Colombian data includes the identity of the foreign buyer and therefore allows export links to be defined at the firm-*buyer*-destination-product level. Second, contrary to the existing papers in the literature, we explore empirically what can and cannot explain whether a newly started export spell becomes a one-off export event.

The remainder of the paper is structured as follows. Section 2 describes the data and provides descriptive evidence regarding one-off exporting. Next, Section 3 provides a theoretical framework with two modes of exporting (proactive and passive) and derives testable hypotheses regarding one-off exporting. Section 4 presents the empirical model, results, as well as a battery of robustness checks. Finally, Section 5 concludes.

2 Data and Empirical Facts

2.1 Data

The present paper exploits data on Colombian firms for the years 2008 to 2019. The data come from two main sources. The first source is the customs data provided by the Colombian Statistical Office (DANE). This dataset is a transaction-level register of all foreign goods traded by Colombian firms between 2008 and 2019. In each transaction, there is information about the Colombian firm, partner firm,[4] importing country, the product at a 10-digit product category, the value and quantity traded, and the concrete month and year of shipment. The second source is the *Sistema de Información y Riesgos Empresariales* (SIREM), provided by the *Superintendencia de Sociedades*. The SIREM is a firm-level register with yearly frequency for all major Colombian firms and contains business account information such as sales, assets, and inputs.

We start by restricting the sample to firms having yearly sales exceeding 80 million

[4]Colombian firms are identified with their tax number and foreign firms are identified by their names. The procedure for matching their names is explained in Appendix A.

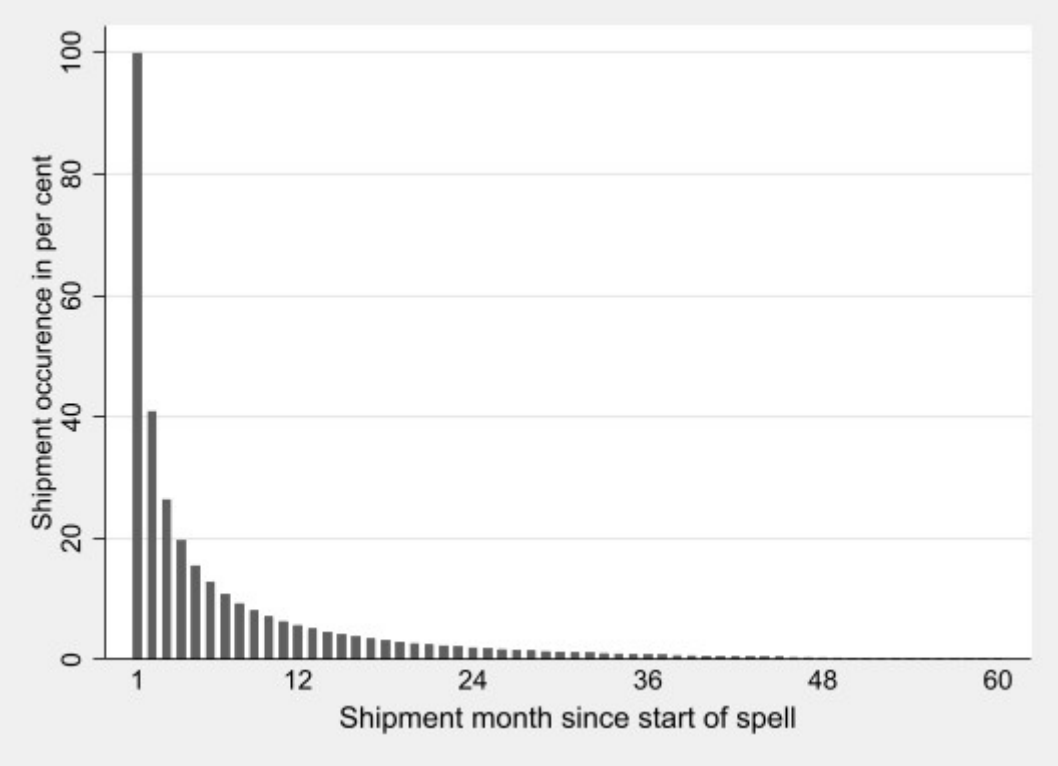
Pesos (about USD 19,500 in constant December 2018 prices) for at least 5 years to exclude small firms and to be able to match at least 49 months of potential export activity needed to code one-off export spells. For our analysis, we focus on manufacturing firms. We merge both datasets using the firms' unique tax ID identifier (NIT) and disregard all firms that appear only in one of them.

The resulting five-dimensional panel data contain monthly firm-, partner-, destination-, and product-specific export information for each sampled firm from the SIREM database, which covers all measurable export and import activities of Colombian firms and allows us to identify newly started export spells as well as past export experience. In doing so, there are two related categorisations to be made. The first refers to the grouping of monthly firm-partner-destination-product-specific export shipments into ongoing export spells. In light of previous studies documenting shipment patterns and the lumpiness of trade (see, Alessandria et al., 2010; Hornok & Koren, 2015), we allow a given firm-partner-destination-product spell to be interrupted by up to 24 consecutive months without exports. After 24 months or more of non-exporting, a new export spell for the same firm-partner-destination-product combination may begin. An export spell is therefore not necessarily a stream of continuous export shipments in each and every month. Figure 1 summarises the occurrence of export shipments by month since the first shipment (i.e. by spell-specific time) and illustrates how important it is to allow for interruptions in export activity when defining spells. Obviously, all export spells have a shipment in their respective first month. However, in any subsequent month, at least 59 percent of export spells actually do lack a shipment which, of course, does not indicate that there will be no subsequent shipment later.

Furthermore, Figure 1 shows that there is not much seasonality. Accordingly, we can rule out that seasonality of shipments in conjunction with the aforementioned allowance of a 24-month interruption is in any way decisive for the identification of newly started spells. Put plainly, allowing for an interruption period of say 23 or 25 months would yield very similar spell delimitations.

Once all export spells are identified and delimited, we move on to the second categorisation, namely distinguishing between one-off spells and recurrent spells. In order to do so, we build on the classification developed in Geishecker et al. (2019). However, unlike Geishecker et al. (2019), our register data now include an additional dimension,

Figure 1: Shipment Timing



namely the partner firm in an export transaction, i.e., the importing firm. We classify a firm-partner-destination-product-specific export episode as a one-off event when we observe a single-month trade transaction that is preceded and followed by 24 months of non-trade, i.e., a 49-month window of non-exporting with a single export transaction in the centre month. Export episodes that are not identified as one-off are labelled as recurrent spells. This categorisation is, of course, to some degree arbitrary but motivated by the observation that it is indeed single-month export spells that dominate among export spells that may be considered short term (with e.g. a duration of less the 12 months), as shown in Figure 2.

At the same time, conditioning on 24 months of non-exporting before and after the single month export event accommodates even the most sporadic export patterns within recurrent export relations that are known from the lumpiness of trade literature (see e.g., Alessandria et al., 2010; Hornok & Koren, 2015) and, thus, prevents them to be associated with one-off exports. Our categorisation, therefore, yields fairly conservatively identified one-off episodes. We, however, also apply even stricter definitions of one-off exports conditioning on longer intervals of non-exporting (see Table 3) to check the sensitivity of our categorisation.

Figure 2: Export Spell Duration in Months

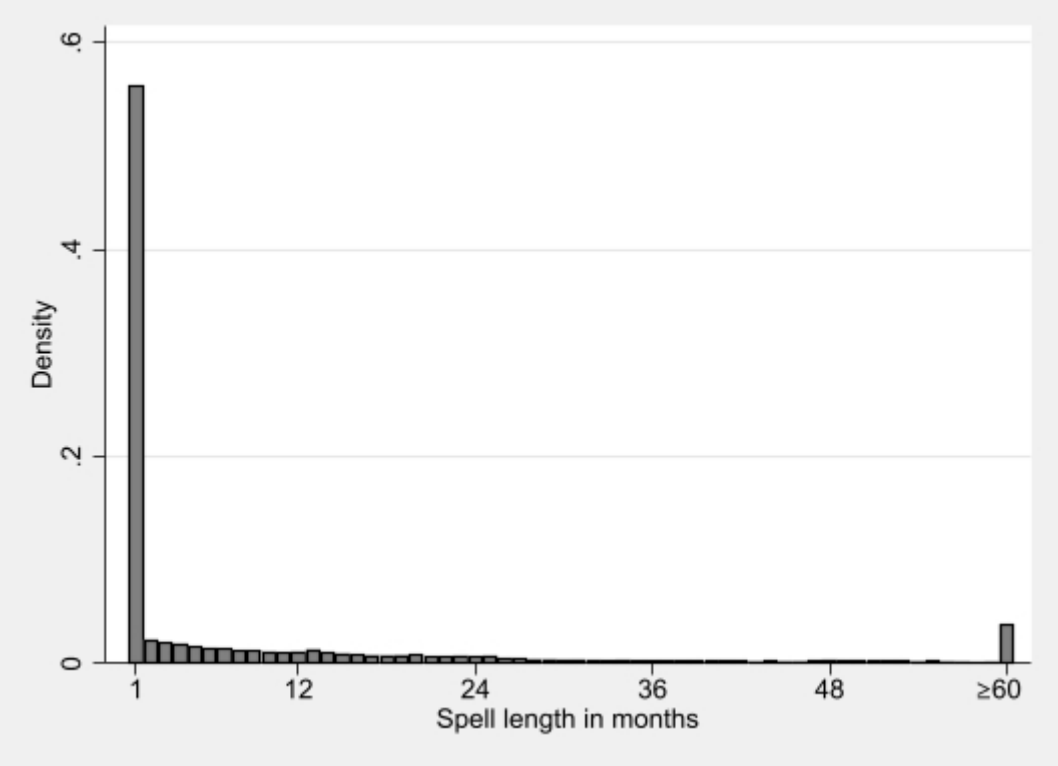


Table 1: Firm Sample and Constraints

	All Industries		Manufacturing	
	Firms	Observations	Firms	Observations
Customs Data, 2008-2019	32,479	3,704,666		
merged with Balance Sheet Data	8,346	2,645,759	3,510	1,845,879
annual sales $\geq$ 80 million Pes, for $\geq$ 5 years	6,287	2,482,626	2,753	1,756,563
new spells, first year, 2010-2017	5,017	279,965	2,321	185,871

Notes: Observations across firms, partner firms, export destinations, CN 6-digit products, months.

Naturally, when identifying one-off export spells, we need to avoid left and right truncation and thus have to observe each firm's potential export activities for at least 24 months before and after any shipment. As a consequence, the sample that can actually be used for the analysis is reduced and starts not earlier than 2010 and ends not later than 2017. Furthermore, since we are mainly interested in export dynamics, much of the analysis focuses on newly started export spells in their respective first year, which further limits the sample. Table 1 gives an overview of the different sample constraints and their consequences.

Once one-off export events are identified there is no additional insight to be gained

from the monthly information and we aggregate our monthly to yearly data to ease computational requirements.

Obviously, and as further discussed in Section 2.2, the identification and prevalence of one-off exports must depend on the aggregation level of data. Our present analysis is mainly at the six-digit product level. To account for several changes in the commodity classification during our sample period, we apply the concordance scheme of Van Beveren et al. (2012) adapted to the Colombian commodity classification and to the 6-digit and, when necessary, to the 8, 4 and 2-digit commodity level. Note that all concording steps make our one-off export identification more conservative. We consolidate a number of small trade destinations that we consider to be closely connected politically or geographically with a larger entity. Examples are Gibraltar, which, although a British territory, is consolidated with Spain, and French Guiana and Reunion, which are overseas departments and thus consolidated with France. The key point is that such a consolidation makes our definition of one-off exporting, explained in what follows, more conservative as several trade spells are aggregated.[5]

2.2 Empirical Facts

We start by describing the prevalence of one-off exports among all newly started export spells of Colombian manufacturing firms. By focusing on newly initiated export spells rather than the stock of all existing export spells over the sample period, we can gain a more nuanced understanding of the relevant export dynamics and the significance of one-off exporting. Our granular data allows us to observe monthly firm-partner-product-destination-specific export activities.[6]

We start by quantifying the frequency of one-off exports relative to the frequency of

[5]The 6-digit commodity level differentiates between 4,004 concorded product categories that are exported by Colombian firms but not specific brands or makes of products. To assess the robustness of our one-off export definition, we also apply the definition at the 8, 4, and 2-digit commodity level, which respectively differentiate between 5,327, 1,094, and 85 exported concorded product categories. We use the terms product, product category, and commodity interchangeably.

[6]Section 2.1 describes in more detail the definition of export spells and the identification of one-off export activities. As already stated, a one-off export is an isolated one-month export event (X) preceded and followed by 24 months of non-exporting (0): 000000000000000000000000X000000000000000000000000. Importantly, one-off export events are nested within temporary exports as defined in Békés & Muraközy (2012) but must meet much stricter restrictions, consider, for example, the following export sequence: 000000000000X000000000000X000000000000000000000000. Such an export sequence of two isolated one-month export events would be classified as a temporary export spell if one followed Békés & Muraközy (2012), but not as a one-off export according to our definition.

all newly started export spells:

$$\Psi = \frac{\sum_{s \in S \cap S^{one}} 1}{\sum_{s \in S} 1} \cdot 100 \quad , \tag{1}$$

with s representing a firm-partner-product-destination-specific export spell, S^{one} the set of all one-off export events, and S the set of all newly started export spells during our sample period.[7]

Similarly, we can quantify the volume of one-off export events relative to the volume of all newly started exports. Obviously, we need to avoid setting the volume of singular export events in relation to the overall volume of all export spells that last for months or even years and, thus, focus on the first year in which new export spells start:

$$\Upsilon = \frac{\sum_{s \in S \cap S^{one}} ex_s}{\sum_{s \in S} ex_s} \cdot 100 \quad , \tag{2}$$

with s representing a firm-partner-product-destination-specific export spell, S^{one} the set of all one-off export events, and S the set of all export spells during our sample period. The volume of a specific newly started export spell in its first year is denoted as ex_s.

Fact 1: One-off exports are relevant across aggregations and definitions - At the most disaggregate 8-digit concorded product level, Table 2 reports a total of 193,907 newly started export spells of which $\Psi = 56$ per cent are identified as one-off, accounting for about $\Upsilon = 23$ per cent of the volume of all newly started exports in the starting year.

Interestingly, when aggregating the product classification to the six, four or even two-digit level, which, naturally, will reduce the total number of identified export spells, the relative frequency share of one-off exports is only mildly affected ranging between 52 and 56 percent of all newly started export spells and also the volume share hardly changes and remains between 23 and 24 per cent (see rows 2 to 4 of Table 2). This illustrates that the phenomenon of one-off exports is unlikely to be driven by a potential misreporting of product categories in firms' export declarations. Thus, regardless of the aggregation level, one-off exports account for a very significant proportion of Colombian manufacturing firms' newly started export activities. Furthermore, as becomes apparent in the lower panel of Table 2 the prevalence of one-off exporting is not driven by potentially rare exports

[7] By definition, all one-off export events are newly started. See Section 2.1.

Table 2: Prevalence of One-off Events Among Newly Started Export Spells

Product Code	Total # of spells	One-off Freq.Share in %,Ψ	Total Volume (US$)	One-off Vol.Share in %, Υ
CN8	193,907	55.98	10,571,345,625	23.48
CN6	185,871	56.01	9,831,908,614	24.69
CN4	137,338	55.54	9,210,947,331	23.75
CN2	84,794	53.51	8,446,260,317	23.42
CN6 No capital goods	170,061	55.13	8,761,641,164	22.92
CN6 Core products	91,534	52.31	6,443,226,968	23.18

Notes: One-off: an isolated one-month-only export spell in the center of a 49-month interval of non-exporting. All product-codes are concorded following Van Beveren et al. (2012). See Section 2.1 for further details on the data generation. Volume refers to the export volume of newly started export spells in their respective first year.

of capital goods, nor by the carry-on export of goods that the firm does not produce itself. Even when excluding capital goods and even when focusing on core products, i.e. products that are associated with firms' two-digit manufacturing industry, the relative frequency of one-off exports remains above 52 per cent and the associated volume share is higher than 22 per cent.

Naturally, the prevalence of one-off exporting must depend on the concrete definition of the window of non-exporting when assessing whether an export event is indeed isolated. So far, we consider a single month of export activity in the centre of a 49-month interval of non-exporting to be one-off. Making the definition of one-off exporting stricter by extending the 49-month window of observation will decrease the number of export episodes that are identified as one-off. At the same time, the total number of export spells for which such a distinction can be made in our unbalanced panel is reduced due to left and right truncation. Table 3 reports the prevalence of one-off export spells for manufacturing firms, with one-off exporting being defined as an isolated one-month export spell in the middle of a 73-, respectively, 121-month interval of non-exporting. For the 73-month interval, our sample is reduced to the years 2011 to 2016; for the 121-month interval of non-exporting, the sample is reduced to the years 2013 and 2014. However, even for these much stricter definitions, we find the frequency share of one-off exporting to be $\Psi_{73} = 46$ respectively $\Psi_{121} = 38$ per cent when applying the 73-month and 121-month filtering rule. And while the volume share of one-off exporting is considerably reduced

Table 3: Newly Started Export Spells, Stricter Definition

73 month interval , sample 2011 - 2016		
Total	One-Off Freq.Share	One-Off Vol.Share
# New Spells	Ψ	Υ
145,946	46.07	20.10
121-month interval, sample 2013 -2014		
Total	One-Off Freq.Share	One-Off Vol.Share
# New Spells	Ψ	Υ
44,474	37.71	13.55

Notes: Manufacturing sector. With partner-firm dimension. At six-digit product code. One-off: an isolated one-month-only export spell in the center of a 73,121-month interval of non-exporting. See Section 2.1 for further details on the data generation. Volume refers to the export volume of newly started export spells in their respective first year.

when applying these much stricter definitions, it remains quite relevant with $\Upsilon_{73} = 20$ respectively $\Upsilon_{121} = 14$ per cent for the 73-month and 121-month filtering rule.

Fact 2: One-off exports are important across all industries - Importantly, even though our analysis focuses on manufacturing firms, which are most important in terms of export activities, the phenomenon of one-off exporting is by no means confined to the manufacturing sector. Table 4 reports Ψ and Υ sector by sector at the CN6-digit product level. Across all sectors, the frequency share Ψ of one-off exports is at least 41 per cent or higher and the corresponding volume share Υ is at least 19 per cent or higher. For the Wholesale sector, which is second only to manufacturing in terms of overall export activity, one-off prevalence is with $\Psi = 60$ and $\Upsilon = 27$ per cent even more pronounced than in manufacturing.

Fact 3: One-off exports are important across all data dimensions - An interesting question is what dimension is mostly relevant for an export spell to be classified as one-off. Is it the prevalence of one-off relationships with partner firms, is it products that are exported in a one-off fashion, is it countries that are only served once, or a combination of all?

Table 4: Sector-by-Sector Prevalence of One-off Events Among Newly Started Export Spells

Industry	ISIC rev.3	Total # of spells	One-off Freq.Share Ψ	One-off Vol.Share Υ
Agriculture, Hunting, Forestry	A	19,161	41.36	19.31
Fishing	B	110	53.64	26.82
Mining and Quarrying	C	13,267	71.76	33.53
Manufacturing	D	185,871	56.01	24.69
Construction	F	1,414	81.90	45.63
Retail Motor Vehicles	50	5,540	69.89	42.86
Retail (excl. Motor Vehicles)	51	8,820	62.90	48.68
Wholesale	52	40,659	60.46	27.10
Hotels and Restaurants	H	121	77.69	82.45
Transport, Storage, Commun.	I	868	75.81	52.49
Real Estate, Renting	K	3,821	74.25	41.89
Other Community Services	O	243	80.66	79.79
Else	E,J,M,N,P	70	87.14	90.58

Notes: One-off: an isolated one-month-only export spell in the center of a 49-month interval of non-exporting. All product-codes are at the CN 6-digit level and are concorded following Van Beveren et al. (2012). See Section 2.1 for further details on the data generation. Volume refers to the export volume of newly started export spells in their respective first year.

Table 5 gives an overview of how the one-off frequency Ψ and volume share Υ are altered when subsequently disregarding one or more dimensions in our data. When considering all dimensions (firm i, partner j, product p, country c) we identify 185,871 newly started export spells. Obviously, if panel dimensions are not taken into account, i.e. the data becomes more aggregated, the number of identifiable export transactions must decrease. If the country dimension, the partner dimension, or the product dimension is omitted, the number of identified export spells falls to 172,642, 94,757, and 53,356, respectively. However, the first aspect to note in Table 5 is that even when aggregating over these dimensions, the frequency and volume share of one-off exports remain very sizeable, above 50 respectively 23 per cent. Thus, neither the country, partner, nor product dimension alone is solely responsible for the one-off phenomenon.

At the same time, and this is the second aspect to note from the bottom four rows of Table 5, it is not merely the interactions of these dimensions, i.e. new combinations of existing countries, partners, or products, that are mainly responsible for the prevalence of one-off exporting. Even when solely focusing on the country, partner, or product dimension, the frequency and volume share of one-off exporting is at least 41 and 18 per cent, respectively. Thus, one-off exporting materializes as firms export to genuine one-off

Table 5: Dimensionality of One-off Export Spells

	All # Total	One-Off # Total	Frequency share Ψ	Volume share Υ
All Dimensions, i,j,p,c,t	185,871	104,107	56.01	24.69
No Country, i,j,p,t	172,642	94,926	54.98	23.97
No Partner, i,p,c,t	94,757	49,366	52.10	47.90
No Product, i,j,c,t	53,356	26,934	50.48	23.17
only firm, country, i,c,t	46,739	22,610	48.38	22.26
only firm, product, i,p,t	31,116	16,325	52.46	24.35
only firm, partner, i,j,t	11,481	4,759	41.45	17.84
only firm, i,t	738	237	32.11	10.74

Notes: Manufacturing sector, newly started export spells. At six-digit product code. One-off: an isolated one-month-only export spell in the center of 49-month interval of non-exporting. See Section 2.1 for further details on the data generation.

partners, and export one-off products as well as export to one-off countries. Moreover, part of the phenomenon of one-off exporting even is accounted for by 738 firms that transition from non-exporters to exporters, of which 237 only do so in a one-off fashion (see bottom row of Table 5). In summary, we conclude that each and every dimension matters in its own right.

Fact 4: There is a large firm heterogeneity in one-off exports - So far, we have looked at aggregate figures when describing the prevalence of one-off exporting. But how are one-off exporting activities distributed across firms? To assess this, we adapt Equations 1 and 2 and construct the frequency share Ψ_i and volume share Υ_i of one-off exports for each firm i. Table 6 shows mean values and various moments of the distribution. On average across all firms, one-off exports account for $\Psi_i = 61$ per cent of newly started export spells and for $\Upsilon_i = 45$ per cent of the associated export volume in the respective first year of newly started spells. These are very sizeable figures that point to the relevance of one-off exporting for the average firm. However, there is also considerable heterogeneity across firms. While for the median firm one-off exporting accounts for $\Psi = 60$ per cent of all export spells and $\Upsilon = 35$ per cent of the associated export volume, the bottom decile firm only has a one-off frequency and volume share of $\Psi = 32$ per cent and $\Upsilon = 4$ per cent, respectively. The top decile firm, however, even has a one-off frequency and volume share of 100 per cent, i.e., 10 per cent of all firms solely

Table 6: One-Off Exports across Manufacturing Firms

	Mean	SD	Bottom Decile	Median	Top Decile
All, 2321 firms, with average 80.08 (SD=234.97) export spells per firm					
One-off Frequency-Share Ψ_i	61.23	26.45	31.87	59.69	100.00
One-off Volume Share Υ_i	44.52	34.44	3.75	34.70	100.00
No capital goods, 2248 firms, with average 75.65 (SD=227.05) export spells per firm					
One-off Frequency-Share Ψ_i	60.76	26.59	30.77	58.62	100.00
One-off Volume Share Υ_i	43.87	34.64	3.18	33.17	100.00
Core products, 1546 firms, with average 59.21 (SD=182.75) export spells per firm					
One-off Frequency-Share Ψ_i	58.61	28.78	22.73	55.94	100.00
One-off Volume Share Υ_i	44.38	36.06	1.10	33.38	100.00

Notes: Shares in per cent. Manufacturing sector, newly started export spells. At six-digit product code. One-off: an isolated one-month-only export spell in the center of 49-month interval of non-exporting. See Section 2.1 for further details on the data generation.

export in a one-off fashion. As reported in the lower panel of Table 6, this heterogeneous picture of one-off export activity persists even when excluding capital goods or focusing on core products.

3 Theoretical Model

How can we explain the prevalence of one-off exporting and its importance for export dynamics? We set up a stylized framework capturing an export decision of a firm, which extends the framework of Geishecker et al. (2019). The firm has two modes of exporting, namely proactive exporting and passive exporting. Proactive exporting implies that the firm actively engages in building up an export relationship that is meant to last. Passive exporting occurs when a firm serves (random) unsolicited orders from foreign buyers and thereby is much more sporadic and short-term.[8] Notably, the associated probability of an export spell being one-off is assumed to be larger for unsolicited orders (passive exporting) than for proactive exporting. We show within this stylized framework how firms select into the two export modes and how the probability that a specific export spell is passive (and therefore also the probability that an export spell is one-off) relates to the existing export portfolio of the firm. To gain simplicity, we abstract from dynamic optimization, i.e. we assume bounded rationality of firms, which for most firms may be a better approximation of reality than complete rationality, and firms take productivity as well as the export status in other cells as exogenously given. This one-shot approach is the reason why the model does not include time-subscripts.

Firm i considers exporting product p to buyer j in country c; i.e. exporting to cell $\{jpc\}$. In addition to marginal costs - decreasing in productivity of the firm (φ_i) and increasing in variable trade costs (τ_{pc}) - there are various types of fixed costs associated with such a trade relation. The fixed costs, F_{ijpc}, are given by

$$F_{ijpc} = F^M_{ijpc} + F^X_{ijpc},$$

where F^M_{ijpc} denotes fixed "marketing" costs, while F^X_{ijpc} denotes fixed "export" costs. The firm may either export product p to buyer j in country c in a proactive fashion, i.e. the firm proactively decides to approach buyer j in country c with product p, or rely on unsolicited (random) orders, i.e. that buyer j from country c approaches firm i and places an unsolicited order for product p. The latter happens with probability $z_{pc} < 1$. The "marketing" fixed costs are only to be paid when the firm proactively exports, while the

[8] See Békés & Muraközy (2012) for another model of the duration of export spells including endogenous export mode.

fixed "export" costs must be paid irrespective of export mode. The fixed costs may be further decomposed as

$$F_{ijpc}^{l} = F_{ip}^{l} + F_{ic}^{l} + F_{ij}^{l} \text{ for } l = M, X,$$

i.e., the fixed costs contain components related to the product, the country, and the buyer.

In case of proactive exporting, the variable profits from exporting to cell $\{jpc\}$ are given by

$$\pi_{jpc}\left(\varphi_i, \tau_{pc}, d_j\right)$$

which increases with firm-level productivity φ_i, while variable profits from passive exports to the cell are given by

$$\hat{\pi}_{jpc}\left(\varphi_i, \tau_{pc}, d_j\right) = \theta \pi_{jpc}\left(\varphi_i, \tau_{pc}, d_j\right)$$

with $\theta \leq 1$ capturing lower variable profits from passive exporting (reflecting that, e.g., bargaining power or pricing may depend on exporting mode). Profits increase in the variable d_j, which captures the attractiveness of buyer j (due to e.g., size or lack of bargaining power). The firm chooses the export mode with the highest profits, i.e. the firm chooses proactive exporting *iff*

$$\pi_{jpc}\left(\varphi_i, \tau_{pc}, d_j\right) - F_{ijpc}^{M} - F_{ijpc}^{X} \geq \max\left\{z_{pc}\left[\theta \pi_{jpc}\left(\varphi_i, \tau_{pc}, d_j\right) - F_{ijpc}^{X}\right], 0\right\},$$

and the firm - conditional on not exporting proactively - serves an unsolicited order (passive exporting) iff $\theta \pi_{jpc}\left(\varphi_i, \tau_{pc}, d_j\right) - F_{ijpc}^{X} > 0$.

First, consider sorting into export modes based on firm-level productivity. Profits from proactive exporting as well as the expected profits from passive exporting both increase with firm-level productivity (φ_i). However, the link between productivity and expected profits is weaker for passive exporting as $z_{pc} < 1$ (and $\theta \leq 1$).[9] Due to fixed costs associated with the export relation and larger fixed costs when proactive exporting is chosen it follows that there will be productivity sorting into export modes such that the firm decides on proactive exporting to the specific cell if productivity is sufficiently high (above φ_{ijpc}^{**}),

[9] Formally, we have that $\frac{d\pi_{jpc}(\varphi_i, \tau_{pc}, d_j)}{d\varphi_i} > z_{pc}\theta \frac{d\pi_{jpc}(\varphi_i, \tau_{pc}, d_j)}{d\varphi_i} > 0$.

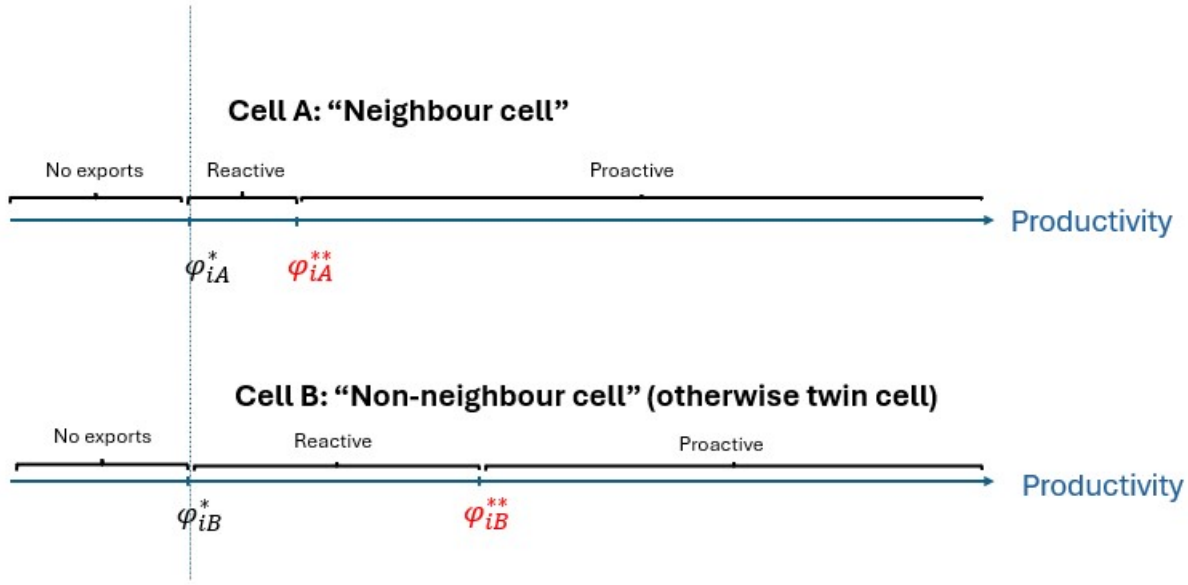


Figure 3: Selection into export modes

relies on unsolicited orders for intermediate productivity levels, $\varphi_i \in \left(\varphi^{*}_{ijpc}, \varphi^{**}_{ijpc}\right)$, and decides to not even serve unsolicited orders if productivity is sufficiently low ($\varphi_i < \varphi^{*}_{ijpc}$).[10]

Second, consider the effects of other export relations on the sorting into export modes. Importantly, we allow for economies of scope in fixed marketing costs and therefore assume that proactive exporting to other cells reduces the fixed marketing costs of exporting proactively to the specific cell, F^{M}_{ijpc}, if other proactively served cells share product (lower F^{M}_{ip}), country (lower F^{M}_{ic}) or partner (lower F^{M}_{ip}) with the specific cell. Such a reduction in F^{M}_{ijpc} lowers φ^{**}_{ijpc}, while having no impact on φ^{*}_{ijpc}. Consequently, the productivity range in which the firm decides on proactive exports ($\varphi_i > \varphi^{**}_{ijpc}$) expands and the range in which it relies on passive exports ($\varphi_i \in \left(\varphi^{*}_{ijpc}, \varphi^{**}_{ijpc}\right)$) shrinks. This, in turn, implies that the probability that the cell will be served via proactive exports increases, while the probability that it will be served via passive exports decreases. Accordingly, the probability that a new export spell is one-off is lower if the cell shares product, country or partner with cells being served via proactive exports by the same firm. Figure 3 below summarizes the findings above

We can thus formulate the following three testable hypotheses:

[The probability that a firm serves a given product-country-partner cell via passive exporting,

[10] Formally, $\theta\pi_{jpc}\left(\varphi^{*}_{ijpc}, \tau_{pc}, d_j\right) \equiv F^{X}_{ijpc}$ and $\pi_{jpc}\left(\varphi^{**}_{ijpc}, \tau_{pc}, d_j\right) - F^{M}_{ijpc} - F^{X}_{ijpc} \equiv z_{pc}\left[\theta\pi_{jpc}\left(\varphi^{**}_{ijpc}, \tau_{pc}, d_j\right) - F^{X}_{ijpc}\right]$. For $\theta < 1$ it may be the case that $\varphi^{*}_{ijpc} > \varphi^{**}_{ijpc}$ and in this case the firm will not - irrespective of productivity level (φ_i) - export passively to the cell.

and thus by one-off exports, declines if the firm]

H1: [...] has previous export experience to the same country.

H2: [...] has previous export experience in the same product.

H3: [...] has previous export experience with the same partner-firm.

The empirical analysis in the subsequent sections of the paper will explore these implications of our model.

Obviously, other - and more complex - frameworks may deliver similar predictions. In reality - and thus in the data - many causes and mechanisms are likely to be simultaneously present. Therefore, we do not think of these alternative frameworks and the mechanisms herein as substitutes for the above framework, but rather as complements to the above and to each other. First, consider the case where there is incomplete information in the form of uncertainty about the value of a trade relation due to e.g. unknown quality of the match between the buyer and the seller. In this case a first shipment may (partly) resolve uncertainty and the trade relation would stop (and thus be one-off) if the signal of the first shipment about match quality is sufficiently low.[11] However, if seller, buyer or both have relevant experience - exporting the same product, exporting to the same country, exporting to the same buyer, importing from the same country, etc. - then uncertainty prior to the first shipment may be lower and the likelihood that an initiated trade relation stops after first shipment is accordingly reduced. Second, one-off export may result in a process where a buyer (repeatedly) searches for (better) suppliers. In that case a trade relation may be one-off if the attractiveness of the supplier is below other/previous suppliers or if the buyer meets a more attractive supplier; Eaton et al. (2021) captures the latter as an exogenous event. In this setting broadness of the export portfolio of the supplier may indicate quality of the supplier (perhaps specific to preferences of certain destinations and within certain products) and thus reduce the likelihood of an export spell being one-off. Third, one-off trade relations may simply be the outcome of fluctuations in demand, trade costs etc. However, it is questionable - in particular if some of the export costs are sunk - if this channel alone would be able to generate the substantial fraction of one-off episodes observed in the data.

[11] Eaton et al. (2021) include one-off exports in a search-and-matching framework by assuming an exogenous exporter-market specific probability (market specific product appeal) that the importer is not satisfied with the trade relation and additionally allow the exporter to endogenously – based on expected continuation value to the seller of the trade relation given the current state of nature – terminate the trade relation at any point in time.

4 What explains whether an export spell is One-Off or recurrent?

We proceed by turning our attention to individual firm-partner-product-destination export spells. Specifically, we take our theoretical model to the data and strive to identify determinants that are decisive for whether a newly started export spell turns out to be one-off or recurrent.

There are several modeling options, each with its own advantages and disadvantages, for assessing the probability of whether a newly started export spell is one-off and its determinants. Assuming a logistic distribution, we could estimate a logit model where we partial out firm-time, country-time, product-time and potentially partner-time fixed factors using the algorithm described in Stammann (2018) and the corresponding *R*-package *ALPACA*. To accommodate the associated incidental parameter bias, we would need to employ some analytical bias corrections for binary choice models as developed in Hinz et al. (2021). However, bias correction may not be perfect and simultaneously allowing for fixed effects across all panel dimensions (i, j, c, p) is computationally unfeasible. Furthermore, in such a non-linear model, we would need to exclude a substantial number of observations due to perfect identification. In comparison, a linear probability model with high-dimensional fixed effects is computationally much simpler and coefficients can be directly interpreted as marginal effects. However, that comes at the cost of assuming marginal effects to be constant and potentially having predicted probabilities outside [0, 1].

We, thus, chose a third option, namely a Poisson Pseudo Maximum Likelihood (PPML) model with high-dimensional fixed effects. As shown in Gourieroux et al. (1984), Poisson pseudo-maximum likelihood (PPML) yields consistent estimates of the conditional mean parameters even when the outcome is binary, i.e., even if the data-generating process is not Poisson, as long as the conditional mean function is correctly specified. Moreover, as recently shown by Silva & Winkelmann (2024), even when the conditional mean function is misspecified, PPML yields an optimal approximation to the true conditional expectation in the sense that the weighted mean squared error is minimized. While PPML is, thus, very robust to misspecification, it also allows for a high number of fixed effects and is computationally inexpensive without assuming linearity. So far, PPML has rarely been

used in the economics literature for modelling binary outcomes. However, in epidemiology, drawing on the seminal paper of Zou (2004), PPML has become an established modelling option for binary outcomes with literally thousands of clinical studies relying on this method due to its robustness and ease of interpretation. We thus estimate the following PPML model:

$$\begin{aligned} E[ex_{ijpct}^{one}] &= \exp(\beta_1 xpr_{ijt}^{partner} + \beta_2 xpr_{ipt}^{product} + \beta_3 xpr_{ict}^{country} \\ &+ \beta_4 PrtNew_{jt} + \beta_5 \Upsilon_{(-i)jt} + \alpha_{it} + \varphi_{pt} + \chi_{ct}) \cdot \epsilon_{ijpct} \\ with \quad & E[\epsilon_{ijpct} | \ . \ ] = 1 \end{aligned} \tag{3}$$

The dependent variable ex_{ijpct}^{one} is an indicator variable for whether a newly started export spell is one-off for firm i, partner firm j, product p, export destination c and time t. The corresponding sample consists of 185,871 newly started export spells for 2,321 firms across 3,489 concorded 6-digit products, 29,733 distinct partners, across 179 countries with 104,107 newly started export spells being one-off.

The set of explanatory variables includes controls for firm-specific characteristics and dimensions of experience that potentially are related to firms' capabilities to bear the partner-, product-, and country-specific fixed costs of proactively – rather than passively – penetrating a new market laid out in the theoretical model in Section 3. More concretely, the variable $xpr_{ijt}^{partner}$ indicates whether firm i has previous experience in exporting another product to the same partner j within any recurrent and ongoing export-spell, i.e. whether partner-specific fixed (and sunk) marketing costs already have been covered.[12] The respective coefficient is identified conditional on firm-time-specific productivity and other firm-time specific characteristics as captured by α_{it}. Similarly, $xpr_{ipt}^{product}$ relates to product-specific fixed marketing costs and indicates whether i has experience in exporting the same product p to some other destination/partner within a recurrent ongoing export spell. And referring to country-specific fixed marketing costs, the dummy variable $xpr_{ict}^{country}$ indicates whether i has been exporting another product or has been exporting to another partner in the same destination c, again within a recurrent ongoing export spell.

[12] Importantly, the recurrent and ongoing spells providing experience started before the newly started spell.

Other explanatory variables refer to demand shifters that, according to the theoretical model in section 3, ceteris paribus, affect the preferred export mode of the firm. The indicator variable $PrtNew_{jt}$ captures whether partner firm j is newly active on the Colombian market, i.e., whether j has already imported from any Colombian manufacturing firm before. The variable $\Upsilon_{(-i)jt}$ controls for partner firms' tendency to engage in one-off import relations. We also estimate model specifications where we more broadly control for partner-specific demand shifters by including partner-time-specific fixed effects.

The parameters α_{it}, φ_{pt}, and χ_{ct} denote unobserved and potentially correlated firm-time-, product-time- and country-time-specific characteristics. To accommodate the fact that our dependent variable and controls have different aggregation levels, we allow for arbitrary correlation of ϵ_{ijpct} within firms, products, countries, and partners and calculate multi-level clustered standard errors.

4.1 Results

Although coefficient estimates from the PPML are not particularly informative on their own, they can be easily transformed into risk ratios (e^{β}) and set into relation to the unconditional baseline risk, yielding an interpretation similar to a marginal effect. In our sample, the unconditional risk for a newly started export spell to be one-off is 56.01 per cent (see Table 2), with a coefficient of, e.g. $\beta = -0.15$ on an indicator variable, we would obtain that the baseline risk is changed by $e^{\beta} \times 56.01 - 56.01 = -7.8$ percentage points whenever the indicator variable takes on the value 1. Table 7 reports respective changes in the baseline risk. Untransformed PPML coefficient estimates are reported in Table B.1 in Appendix B.

We start by estimating a very parsimonious model with firm-time-specific sales in the previous year and time-specific fixed effects as the only control variables (Table 7, Column I). The model, thus, only captures the unconditional effect of firm size, which in the context of our theoretical model also indicates productivity, and does not account for differences in fixed marketing costs. In line with the predictions of our theoretical model in Section 3, we find a statistically significant effect, an increase in firm sales by one log-percent, ceteris paribus, lowers the risk for a newly started export spell to be one-off by on average 2.1 percentage points. Thus, larger and, in the context of our theoretical model, more productive firms on average are less likely to choose one-off exporting as

their export mode.

However, with an R_{Tjur} of 0.01, the predictive power of this parsimonious model is very low. Which, based on our theoretical considerations, should not be surprising as the impact of variations in fixed marketing costs is ignored. At the same time, any partner-, product-, or country-specific idiosyncrasies or demand shifts that may affect the propensity of one-off exports so far are disregarded.

We, thus, expand the model by including control variables for export partner-, product- and country-specific export experience thereby, in line with our theoretical model, allowing for fixed partner-, product- and country-specific marketing costs to vary in accordance with experience and assess their impact conditional on firm productivity captured by a set of firm-time fixed effects (Table 7, Column II). With an R_{Tjur} of 0.16, the predictive power of the expanded model is substantially higher than before. We find statistically significant effects of experience, lowering the probability of one-off exporting. In the context of our theoretical model, this is evidence for past export experience lowering the fixed marketing costs and thereby lowering the probability of serving a specific market through reactive one-off instead of proactive recurrent exporting. More concretely, we find partner-specific export experience to reduce the baseline risk of a newly started export spell to be one-off by about 9 percentage points. For product-specific experience, the effect is -11 percentage points. For country-specific experience, the effect is -3 percentage points and only weakly statistically significant.

We proceed by controlling for product-time-specific demand shifters and idiosyncrasies that may affect fixed marketing costs relative to the demand base. We also allow for country-time-specific effects, which control for any country-specific demand shifters as well as gravity-type covariates such as country size, distance to Colombia, cultural barriers, and multilateral resistance terms that may affect fixed marketing costs and thereby the propensity of one-off exporting (see Table 7, Column III). While the effects of partner- and product-specific experience remain qualitatively unchanged, the effect of country-specific firm experience is now rendered statistically insignificant. More importantly, product-time- in conjunction with country-time-specific fixed effects raise the predictive power of the model to $R^2_{Tjur} = 0.26$. Product- as well as country-specific idiosyncracies and shocks, thus, can explain a sizeable proportion of the variation in the one-off propensity. However, almost three-quarters of the variation remains unexplained.

Can partner firm-specific characteristics close this gap? To answer this we extend the model by $PrtNew_{jt}$, an indicator variable for whether the partner firm is new on the Colombian market, as well as $\Upsilon_{(-i)jt}$, the partner firms j overall volume share of one-off imports when excluding firm i (see Table 7, Column IV). The effect of $PrtNew_{jt}$ is found to be positive and statistically significant. That is, when dealing with a partner firm that is completely new on the Colombian market, the baseline risk that a new export spell turns out to be one-off is raised by 5.8 percentage points. In the context of our theoretical model this could be explained by newly active partners that import from Colombia for the first time going through several one-off import relations until a suitable match is found, i.e., a match where exporters' expected profits are high enough to justify their fixed marketing costs necessary to establish a more permanent export relation.

We also find $\Upsilon_{(-i)jt}$ to be positive and statistically significant, a one percentage point increase in the partners' overall one-off volume share is associated with a 0.11 percentage point increase in the baseline risk of one-off exporting. Accordingly, some partner firms appear to be more prone to be served by one-off exports than others. This could reflect the productivity of the partner firm or a specific sourcing strategy. However, as interesting as these statistically significant partner characteristics are, in terms of explanatory power of the model they hardly matter as indicated by the coefficient of determination, which basically stays constant at $R^2_{Tjur} = 0.26$. The question is whether there are other partner-firm characteristics, not observed and not controlled for yet, that matter more.

To assess this, we estimate a model specification that, in addition to firm-, product-, and country-time-specific fixed effects, also controls for partner-time fixed effects, which of course also capture all previously included partner-firm specific variables (see Table 7, Column V). The explanatory power of the model substantially increases, as is indicated by the coefficient of determination increasing to $R^2_{Tjur} = 0.5$. Controlling for these partner-time-specific characteristics also has a profound effect on the magnitude of our experience coefficients, indicating that partner firm characteristics and export experience are indeed correlated. Previous export experience with a specific partner in any product to any destination lowers the unconditional baseline risk that a newly started export spell with this partner turns out to be one-off by 5 percentage points. Previous product-specific export experience lowers the baseline risk of one-off exporting of this product by 17

percentage points. And previous country-specific export experience reduces the baseline risk of one-off exporting to this country by 8 percentage points. In the context of our theoretical model we interpret these effects as strong evidence for the relevance of fixed partner-, product and country-specific marketing costs. Once these are covered through a pre-existing recurrent export relation, newly started export spells are significantly less likely to be one-off.

In a final model specification, we again extend the model by controlling for match-specific characteristics, i.e. by allowing for firm-partner-time fixed effects. Naturally, these fixed effects also capture partner-specific experience. Coefficients of product- and country-specific export experience remain qualitatively unchanged. However, overall predictive power of the model again increases, if only slightly, to $R^2_{Tjur} = 0.52$. Thus, with firm-partner-time specific fixed effects, the model, which just falls short of perfect collinearity, now explains more than half of the variation in the propensity of one-off exporting. Comparing coefficients of determination across all model specifications, we conclude that it is not firm-specific productivity shocks, or product- or country-specific demand shocks that mainly explain one-off exporting. One-off exports appear to be mostly driven by idiosyncratic partner-time-specific if not match-specific shocks. In the context of our theoretical model such shocks are indistinguishable from random unsolicited customer orders, highlighting the relevance of reactive or passive exporting to unsolicited orders for explaining the phenomenon of one-off exporting.

Table 7: Risk Changes for Newly Started Export Spell being One-Off

	(I)	(II)	(III)	(IV)	(V)	(VI)
$ln(sales)_{it}$	-2.0648 ***					
	[-3.0234,-1.0944]					
$xpr_{ijt}^{partner}$		-8.9782 ***	-10.2564 ***	-7.8577 ***	-5.2929 ***	
		[-11.3793,-6.4481]	[-12.4486,-7.9493]	[-9.6054,-6.0493]	[-8.1511,-2.2697]	
$xpr_{ipt}^{product}$		-11.3212 ***	-10.3068 ***	-10.4987 ***	-17.3265 ***	-17.9877 ***
		[-12.9563,-9.6240]	[-11.6380,-8.9358]	[-11.7490,-9.2132]	[-18.5063,-16.1057]	[-19.2544,-16.6736]
$xpr_{ict}^{country}$		-2.5275 *	0.1854	-0.3195 ***	-7.8384 ***	-8.9876 ***
		[-5.1606,0.2417]	[-2.6559,3.1838]	[-2.7627,2.4239]	[-11.3749,-4.0224]	[-55.6726,-4.1732]
$PrtNew_{jt}$				5.8010 ***		
				[3.2431,8.4691]		
$\Upsilon_{(-i)jt}$				0.1135 ***		
				[0.0394,0.1966]		
Constant	14.7975	-9.9436 ***	-10.0889	-12.4398 ***	2.2078	1.9228
	[-3.2512,39.0197]	[-11.0967,-8.7609]	[-11.2136,-8.7467]	[-14.0888,-10.7307]	[-0.4804,5.0320]	[-1.8265,5.9373]
Observations	115,696	115,696	115,696	115,696	115,696	115,696
R^2_{Tjur}	0.01	0.16	0.26	0.26	0.50	0.52
Time FE	YES	NO	NO	NO	NO	NO
Firm-time FE	NO	YES	YES	YES	YES	NO
Product-time FE	NO	NO	YES	YES	YES	YES
Country-time FE	NO	NO	YES	YES	YES	YES
Partner-time FE	NO	NO	NO	NO	YES	NO
Firm-partner-time FE	NO	NO	NO	NO	NO	YES

Notes: reported are risk changes in percentage points, assessed at baseline risk of 56.1 per cent, confidence interval in brackets. ***,**,* coefficients statistically significant at 1, 5 and 10 per cent error probability, respectively.

4.2 Robustness

To test the robustness of our results, we also estimate model variants with broader cumulative export experience indicators where $xpr_{ijt}^{partner}$, $xpr_{ipt}^{product}$, and $xpr_{ict}^{country}$ take on the value one when the firm has had respective partner-, product-, or country-specific export experience either in t, $t-1$ or $t-2$. Respective results are reported in Columns (I)-(II) of Table 8. Compared to the corresponding results reported in Columns (IV) and (VI) in Table 7 results are qualitatively very similar, with the notable exception of the effect of $xpr^{country}$, which is not estimated with sufficient precision in model specification (I).

Another robustness test is to use a Logit model with high dimensional fixed effects using the algorithm of Stammann (2018) and the corresponding *R*-package *ALPACA*. As already explained in Section 4, for the present application this estimator has severe disadvantages in that it will disregard completely identified observations, that coefficient estimates have to be corrected for incidental parameter bias, and that this correction algorithm can only accommodate up to three fixed effects for computational reasons. Regardless, results reported in Columns (III)-(IV) of Table 8, are broadly in line with the corresponding ones presented in Table 7, Columns (IV) and (VI) suggesting that our findings are robust to the concrete choice of estimator.[13]

[13]For comparison, we also estimate linear probability models with high-dimensional fixed effects, again yielding similar results.

Table 8: Robustness Estimates

	Cumulative Experience, PPML		Logit Model, ALPACA	
	(I)	(II)	(III)	(IV)
$xpr_{ijt}^{partner}$	-7.3095 ***		-10.9772 ***	
	[-9.1475,-5.3944]		[-13.9328,-7.9866]	
$xpr_{ipt}^{product}$	-10.3800 ***	-17.9000 ***	-15.6179 ***	-30.3706 ***
	[-11.5311,-9.1991]	[-19.0771,-16.6894]	[-17.9458,-13.2465]	[-36.2115,-23.5120]
$xpr_{ict}^{country}$	0.2420	-7.5480 ***	-0.8007	-14.6957 ***
	[-1.8753,2.6350]	[-55.6593,-2.6078]	[-5.0233,3.3468]	[-24.0277,-4.7030]
$PrtNew_{jt}$	5.7638 ***		8.4547 ***	
	[3.1601,8.4885]		[3.8308,12.8217]	
$\Upsilon_{(-i)jt}$	0.1138 ***		15.3243 **	
	[0.0390,0.1979]		[0.9666,26.3566]	
Constant	-12.6098 ***	1.3512		
	[-14.2565,-10.8937]	[-2.3612,5.3200]		
Observations	115,696	115,696]	115,696	115,696
of which perfectly identified			14,029	47,385
R^2_{Tjur}	0.26	0.52		
$R^2_{McFadden}$			0.18	0.32
Firm-time FE	YES	NO	YES	NO
Product-time FE	YES	YES	YES	YES
Country-time FE	YES	YES	YES	YES
Firm-partner-time FE	NO	YES	NO	YES

Notes: reported are risk changes in percentage points, assessed at baseline risk of 56.1 per cent, confidence interval in brackets. ***,**,* coefficients statistically significant at 1, 5 and 10 per cent error probability, respectively.

5 Conclusion

This paper documents the prevalence and determinants of "one-off" export events—isolated, single-month export transactions surrounded by extended periods of export inactivity—using firm-buyer-destination-product-level customs data at the *monthly* frequency from Colombian manufacturing firms. These one-off events account for over half of newly initiated export spells and nearly a quarter of first-year export volume. This prevalence holds across sectors and levels of product and market aggregation, underscoring its significance as a systemic feature of export behavior rather than a statistical anomaly.

Our contributions are threefold. Our first contribution is to develop a theoretical framework that rationalizes one-off exporting as the outcome of two distinct export modes: proactive and passive. In this framework, firms may serve unsolicited orders from foreign buyers (passive exporting) without incurring the fixed marketing costs associated with proactive exporting. Export spells initiated through passive exporting are more likely to be short-lived and one-off. The model yields clear empirical predictions: export spells are less likely to be one-off when the firm has prior experience with the same product, destination, and even partner, reflecting economies of scope in fixed costs and information spillovers across related export activities.

Our second contribution is to empirically evaluate the models' predictions using a high-dimensional fixed-effects PPML estimator. Consistent with the model, we find that firm-specific experience in a given product, destination, or with a partner significantly reduces the likelihood of one-off exporting. However, despite the statistical significance of these effects, the majority of variation in one-off outcomes is explained by idiosyncratic firm-buyer-time-specific shocks. These results suggest that one-off exports often stem from (random) match-specific factors or unsolicited foreign demand, rather than systematic firm-level characteristics alone. The findings underscore the importance of incorporating match-level frictions, as in Eaton et al. (2022) or Fontaine et al. (2024), and idiosyncrasies as well as buyer-initiated transactions into models of firm-level export dynamics.

Our final contribution is to provide new evidence for one-off exporting from an emerging economy using firm-to-buyer data. This complements the findings in Geishecker et al. (2019) for Denmark by providing evidence that the prevalence and characteristics of one-off exporting are similar across very different countries.

These results have important implications. First, they highlight the need for theoretical

models of exporting to accommodate the high frequency of non-persistent trade relationships. Second, the prominence of one-off export events cautions against interpreting export starts as indicators of sustained market entry or future export growth. From a policy perspective, export promotion schemes might benefit from explicitly accounting for the distinction between proactive and passive exporting when targeting firms and evaluating outcomes.

Future research could extend the analysis in several directions. One promising avenue is the study of one-off importing to explore the demand-side drivers of temporary trade relationships, particularly in the context of global sourcing strategies; see e.g. Fontaine et al. (2024) for a search model of firm-to-firm trade, where buyers continuously search for more attractive suppliers. Another is to examine whether one-off export events—though transitory—facilitate learning or signal capabilities that increase the likelihood of future successful market entries in related products or destinations. Addressing these questions would help deepen our understanding of the micro-foundations of trade dynamics and the granular structure of international markets.

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A Data Appendix

Colombian firms are identified with their tax number, which is unique and constant over time. Foreign firms lack a unique identifier and are identified using their names, which are stored as text in our data. These names contain errors, and there are cases in which different names are used to identify the same importer. We start by deleting and removing common characters, prefixes, suffixes, and common words (such as "Ltd", "GmbH", "SA", and country names). We subsequently use a string-matching method to group similar names.

For the string-matching, we create a list for each partner country with all the firm names in our data. This is done for two reasons: first, to prioritize matching firm names within a given country, and second, to reduce the computational power required to process the list. In each list, we calculate the Jaro-Winkler similarity between any two names and match the names with highest similarity if their similarity is above a certain threshold.[14] We repeat the matching two more times to allow for sequential matching of names. This might happen when a firm is misspelled in several different ways in our data. After one round of matching, we might end up with the firm still showing up with two or more

[14]We use 0.9 on a scale from 0 to 1 in the final version of the paper, but experimented with different thresholds from 0.8 to 0.95 and results do not qualitative change.

different names. After the third round of matching, there are no more names left to be matched. To allow for the fact that buyer firms may operate across several countries through local affiliates, we repeat in a second stage the matching of names across countries.

From the original 481,693 unique names in the data, we end up with 108,817 consolidated partner names in our customs data.

B Additional Results

Table B.1: PPML Coefficient Estimates corresponding to Table 7

	(I)	(II)	(III)	(IV)	(V)	(VI)
$ln(sales)_{it}$	-0.0375 ***					
	(0.0091)					
$xpr_{ijt}^{partner}$		-0.1744 ***	-0.2019 ***	-0.1509 ***	-0.0991 ***	
		(0.0267)	(0.0250)	(0.0188)	(0.0295)	
$xpr_{ipt}^{product}$		-0.2254 ***	-0.203 ***	-0.2072 ***	-0.3694 ***	-0.3866 ***
		(0.0190)	(0.0151)	(0.0142)	(0.0158)	(0.0173)
$xpr_{ict}^{country}$		-0.0461 *	0.0033	-0.0041	-0.1505 ***	-0.1746 ***
		(0.0257)	(0.0265)	(0.0237)	(0.0388)	(0.0497)
$PrtNew_{jt}$				0.0984 ***		
				(0.0215)		
$\Upsilon_{(-i)jt}$				0.0018 ***		
				-0.0006		
Constant	0.2341	-0.1951 ***	-0.1963 ***	-0.2507 ***	0.0386	0.0337
	(0.1499)	(0.0129)	(0.0136)	(0.0196)	(0.0241)	(0.0341)
Observations	115,696	115,696	115,696	115,696	115,696	115,696
R^2_{Tjur}	0.01	0.16	0.26	0.26	0.50	0.52
Time FE	YES	NO	NO	NO	NO	NO
Firm-time FE	NO	YES	YES	YES	YES	NO
Product-time FE	NO	NO	YES	YES	YES	YES
Country-time FE	NO	NO	YES	YES	YES	YES
Partner-time FE	NO	NO	NO	NO	YES	NO
Firm-partner-time FE	NO	NO	NO	NO	NO	YES

Notes: reported are risk changes in percentage points, assessed at baseline risk of 56.1 per cent, confidence interval in brackets. ***,**,* coefficients statistically significant at 1, 5 and 10 per cent error probability, respectively.