Dissecting Thailand’s International Trade: Evidence from 88 Million Export and Import Entries

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This paper uses transaction-level data from Thailand to study concentration, specialization, and fragility of export activities. The paper shows that although exports have been an integral part of the development strategy of the country for several decades, direct engagement in international trade through exports is a rare activity. Export firms are different from their nonexport counterparts. Export activities are also extremely concentrated. There is a great deal of churning in Thai exports and exporting relationships are highly fragile. The findings highlight some cautions from a micro perspective about an export-oriented development strategy, particularly regarding concentration and vulnerability.

Keywords: export firms, export-oriented industrialization, international trade, Thailand
JEL codes: F10, F14, F40

I. Introduction

International trade is an important activity of an economy and is inseparable from economic development. Trade policies have been used to promote industrialization, and exports have been one of the key ingredients behind the growth of many economies over the past several decades, especially Asia’s miracle economies.1 However, there are some concerns with an export-oriented industrialization strategy. For example, this strategy makes the economy dependent on its importing counterparts and the global economy, the reason why we have repeatedly witnessed drops in gross domestic product (GDP) growth of

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1The literature on export-oriented industrialization and economic development, especially in Asia, is extensive. See, for example, Johnson (1982) for Japan, Amsden (1989) for the Republic of Korea, and Suehiro (2008) for Southeast Asia.
export-oriented economies during global economic slowdowns. There is also a limit to this development strategy as growth becomes increasingly more difficult when more countries adopt similar export-led growth policies under a given set of global demand conditions.

These concerns, however, focus mainly on macroeconomic arguments. The objective of this paper is to point out additional cautious considerations based on evidence from micro data. In particular, this paper attempts to answer three questions. First, are exporting activities concentrated among few exporters or do they involve the majority of firms in the economy? Second, are exporters specialized or diversified across products and markets? Third, how fragile are exporting activities, i.e., how likely will those entering international markets survive over time? Analyzing granular international trade data from Thailand, one of the most open emerging economies in the world, this paper shows that Thai exports are extremely concentrated among a few large exporters, that there is limited diversification across destinations and products, and that exporting activities are highly fragile. These findings raise cautions for economies currently pursuing or aspiring to adopt a development strategy focusing on exports.

This paper joins others in the literature on heterogeneous firms in international trade. This literature focuses on the firm level, where decisions and actions that actually drive trade flows are taken, allowing researchers to measure both the extensive and the intensive margins of trade which are central to understanding the evolution of aggregate trade flows. Focusing on the extensive margins—the number of firms that trade, the number of products they trade, and the number of countries they trade with—offers a complementary dimension to the more traditional focus on intensive margins—the value traded per firm, per product, or per country. Disaggregated data help identify potential winners and losers from trade-related developments and hence can shed light on their distributional implications.

However, most empirical studies on heterogeneity and international trade have relied on data from advanced economies. The use of granular-level census of firms from a developing economy is rare. Exceptions include a study by Eaton et al. (2007), who use transaction-level customs data from Colombia to study firm-specific export patterns. They find that, in a typical year, nearly half of all Colombian exporters were new and tend to be extremely small in terms of their

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2The literature on heterogeneous firms in international trade is extensive. Seminal work includes Eaton and Kortum (2002), Bernard et al. (2003), and Melitz (2003). These studies provide a theoretical model that incorporates a firm’s decision making in an open market economy. For a survey on this literature, see Bernard et al. (2007a) and Melitz and Redding (2014).

3There are papers that use a sample of firms in developing countries to examine international trade and economic development. For example, Berman and Hericourt (2010) use a firm-level database containing 5,000 firms in nine economies to study how financial factors affect firms’ export decisions and the amount exported by firms. Hallward-Driemeier, Iarossi, and Sokoloff (2002) use firm-level data from five East Asian countries to explore the patterns of manufacturing productivity across the region and the sources of export firms’ greater productivity.
overall contribution to export revenues. Most of these firms also do not continue exporting in the following year, although those who survived continued to grow and expanded into new markets. Overall, export sales are dominated by a small number of very large and stable exporters.

Another exception is a study by Manova and Zhang (2009), who use data on Chinese trade flows and show that the bulk of exports and imports are captured by a few multiproduct firms that transact with a large number of countries. Firms also frequently exit and reenter into trade and regularly change their product mix and trade partners. The authors also find that most of the growth in Chinese exports was driven by deepening and broadening of trade relationships by surviving firms, while reallocations across firms contributed relatively less.

In another study, Arkolakis and Muendler (2010) use panel data from Brazil and show that few top-selling products account for the bulk of a firm’s exports in a market and that firms systematically export their highest-sales products across multiple destinations. Finally, Lederman, Rodriguez-Claire, and Xu (2011) use customs data from Costa Rica to study the role of new exporting entrepreneurs in determining export growth. They also show that the rate of firm turnover into and out of exporting is high, but exit rates decline rapidly with the number of years the firm has been exporting. The exiting and entering firms tend to be significantly smaller than incumbent firms. Surviving new exporters actively adopted new products and abandoned weaker existing products they had started with.

Our paper adds to the literature by documenting international trade in Thailand using the universe of transaction-level customs data, supplemented by information from financial statements of all registered firms. To better understand internationally engaged firms, we examine the various dimensions of firm activities, including how many products they trade, how many countries they transact with, the concentration of trade across firms, and whether firms import as well as export. We also trace the evolution of these variables, as well as firm survival over time.4

Examining Thailand’s international trade structure at a granular level makes an interesting case for a number of reasons. The country has adopted an export-oriented industrialization strategy since the late 1970s.5 This strategy has led to rapid growth in exports: while exports grew at only 6% per year in the 1960s, the growth rate increased to 11% in the 1970s, 16% in the 1980s, and continued to grow

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4 In this paper, we focus mainly on exports, given its important role in the Thai economy. We note results for imports when they are of particular interest. The full set of results for imports is presented in the working paper version of this paper (Apaitan, Disyatat, and Samphantharak 2017).

5 The reason for this policy was to respond to several events that adversely affected Thailand’s balance of payments: the appreciation of the Thai baht, which was fixed to the United States (US) dollar; the decrease in prices of agricultural products; and the withdrawal of US military operations after the Viet Nam War. These events reduced foreign exchange and put pressure on the country’s balance of payments. Coincidently, Thailand’s shift to an export-oriented strategy took place at the time when there was a massive relocation of manufacturing firms from Japan and the newly industrializing economies (NIEs) to countries with lower labor costs in response to the Plaza Accord and the appreciation of the Japanese yen in 1985. See Samphantharak (2017) for a summary of Thailand’s development strategy since the end of the Second World War.
rapidly into the early 1990s. Meanwhile, in the early 1990s manufacturing exports accounted for 75% of total exports, up from only 1% in the 1960s. Export-led industrialization, in turn, resulted in GDP growth of over 8% per year during 1980–1996. Even today, the country remains very open and highly integrated with the global economy. It participates in various free trade agreements and is an integral part of the global production chain in certain key industries, especially in auto and computer parts. The country’s trade-to-GDP ratio is high, over 130% in 2016. As an emerging economy whose impressive economic growth was fueled by the export sector, Thailand (among other East Asian economies) epitomizes a growth strategy emulated by many other developing countries. Understanding Thailand’s trading activities will shed light on the distributional aspects of an export-oriented industrialized economy.

Our study presents several findings. First, although exports have been an integral part of Thailand’s development strategy, direct engagement in international trade is a rare activity: only 5.7% of registered Thai firms exported to other countries in 2013. Second, trade is extremely concentrated. The top 5% of firms accounted for 88% of total Thai exports in 2015. At the same time, the top 5% of products and markets made up 77% and 67%, respectively, of all exports. We also find that most exporters tend to trade relatively few products and engage in trade with a relatively small number of countries. However, the small number of firms with the greatest product and trading-partner intensity account for the bulk of exports. Third, trading firms are special. They differ substantially from purely domestic firms and tend to be larger, more capital intensive, more productive, and utilize more external finance. Among exporters, those that also import stand out from the rest along similar margins. Fourth, there is a great deal of churning in Thai exports. In any given year, roughly one-third of exporters are new, and an equal number exit the market. Finally, exporting relationships are extremely fragile. The likelihood that an exporter or a given product–market–trader bundle remains in the market for more than 1 year is roughly 30%, although those that survive generally blossom and account for a disproportionate share of total export value.

The findings from this paper highlight some concerns over an export-oriented development strategy and have important policy implications. First, exporting activities are rare and exporting firms are different from nonexporting firms. Policies promoting exports should therefore pay attention to firm-specific attributes and identify factors that can reduce barriers to enter foreign markets. Second, given that exporting activities are fragile, with low survival rates, policies promoting exports must incorporate longer-term considerations. Reducing barriers for new firms to enter is not sufficient; making sure that they survive is also necessary. Finally, high levels of concentration have important implications for risk and

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6 Unless stated otherwise, statistics are from the World Bank’s World Development Indicators.
shock transmission. High concentration in exports implies that idiosyncratic shocks specific to particular traders, markets, or products can generate large repercussions on aggregate trade value. This implication raises a concern on the vulnerability of an export-dependent economy from a micro perspective, in addition to the traditional macro external-dependency argument.

The rest of the paper is structured as follows. Section II describes the data. Section III highlights the role of export firms and their characteristics, while section IV provides a comprehensive account of Thai exports at the extensive and intensive margins. Section V describes the dynamic evolution of Thai exports, by decomposing export growth along intensive and extensive margins and performing survival analyses.

II. Data

The main data source of our analysis is a database of all trade transactions collected by the Thai Customs Department at the Ministry of Finance. These data cover all shipments of goods that crossed into or out of Thailand between 2001 and 2015. The key variables include firm identification, destination and origin, commodity, value, currency, shipping method, point of entry and exit, tariffs and duties, as well as trade sanctions and preferential measures. To export or import goods, traders submit entry forms to the customs department. Individual entry forms may contain many items to be shipped. We will use the term trader to designate the party engaged in the trade transaction. Traders can be registered firms or ordinary individuals.

Table 1 presents summary statistics of the data. The upper panel reports the number of entry forms, items per entry, and number of traders in each year of the sample. While the number of entries has increased steadily, the number of items per entry has increased even more rapidly, with an average entry containing around nine items in 2015 compared to just under two in 2001. The total value of exports increased by roughly 260% during this time, from B2.79 trillion to B7.24 trillion. A similar picture obtains for imports. All in all, we have information on over 546 million items exported or imported from around 88 million entries over a span of 15 years.

The second panel of Table 1 shows the number of traders categorized according to whether they export, import, or both export and import. For the latter we will use the term hybrids. Under our definition, exporters equals pure exporters plus hybrids. The same applies for importers. Between 2001 and 2009, the number of exporters rose from 21,289 to 38,114. Since then, however, the

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7The exchange rate was approximately B35.72 per US dollar on December 31, 2015. The numbers presented in this article are in nominal terms. However, in 2001–2015 inflation in Thailand was low, ranging from the lowest rate of 0.2% (2003) to the highest rate of 2.4% (2008 and 2011). Cumulative inflation during this 15-year period was 16%.
Table 1. Overview of Customs Data

|               | Number of Entries, Number of Items, and Total Value by Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------|-------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| **Export**    |                                                             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Number of entries (million) |                                                            | 2.0  | 2.3  | 2.5  | 2.8  | 3.0  | 3.2  | 3.3  | 3.4  | 3.3  | 3.5  | 3.7  | 3.7  | 3.8  | 4.0  | 4.0  |
| Number of items (million)    |                                                            | 3.9  | 4.5  | 5.3  | 5.8  | 6.4  | 6.9  | 12.6 | 19.7 | 19.6 | 23.4 | 26.5 | 27.1 | 29.5 | 32.0 | 33.6 |
| Average number of items per entry |                                                          | 1.9  | 2.0  | 2.1  | 2.1  | 2.1  | 2.2  | 3.8  | 5.9  | 6.0  | 6.8  | 7.2  | 7.4  | 7.8  | 8.1  | 8.5  |
| Total value (trillion baht)  |                                                            | 2.8  | 2.9  | 3.3  | 3.8  | 4.3  | 4.9  | 5.3  | 5.8  | 5.2  | 5.8  | 6.7  | 7.1  | 6.9  | 7.3  | 7.2  |
| **Import**    |                                                             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Number of entries (million) |                                                            | 1.7  | 1.8  | 2.1  | 2.3  | 2.4  | 2.6  | 2.6  | 2.7  | 2.5  | 3.0  | 3.1  | 3.3  | 3.4  | 3.4  | 3.5  |
| Number of items (million)    |                                                            | 3.9  | 4.2  | 5.0  | 5.4  | 5.9  | 6.3  | 7.4  | 21.4 | 22.1 | 28.0 | 29.8 | 34.2 | 36.8 | 38.0 | 40.7 |
| Average number of items per entry |                                                          | 2.3  | 2.3  | 2.4  | 2.4  | 2.5  | 2.5  | 2.8  | 7.9  | 8.8  | 9.4  | 9.6  | 10.3 | 10.9 | 11.0 | 11.7 |
| Total value (trillion baht)  |                                                            | 2.7  | 2.5  | 3.1  | 3.8  | 4.6  | 4.8  | 4.9  | 5.9  | 4.6  | 5.9  | 7.0  | 7.9  | 7.6  | 7.4  | 6.9  |

| **Number of Traders by Year** | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total number of traders     | 44,251 | 48,352 | 54,101 | 57,644 | 60,716 | 61,945 | 66,505 | 81,212 | 87,026 | 87,834 | 92,674 | 97,404 | 98,647 | 93,221 | 95,320 |
| Exporters                   | 21,289 | 23,117 | 24,290 | 26,047 | 27,742 | 29,130 | 31,522 | 37,947 | 38,114 | 36,345 | 38,086 | 38,928 | 37,909 | 36,017 | 36,686 |
| Pure exporters              | 8,325  | 9,460  | 10,021 | 10,871 | 11,912 | 8,162  | 14,551 | 19,443 | 19,361 | 17,661 | 18,595 | 19,219 | 18,001 | 16,313 | 17,017 |
| Importers                   | 35,926 | 38,892 | 44,080 | 46,773 | 48,804 | 53,783 | 51,954 | 61,769 | 67,665 | 70,173 | 74,079 | 78,185 | 80,646 | 76,908 | 78,303 |
| Pure importers              | 22,962 | 25,235 | 29,811 | 31,597 | 32,974 | 32,815 | 34,983 | 43,265 | 48,912 | 51,489 | 54,588 | 58,476 | 60,738 | 57,204 | 58,634 |
| Hybrids                     | 12,964 | 13,657 | 14,269 | 15,176 | 15,830 | 20,968 | 16,971 | 18,504 | 18,753 | 18,684 | 19,491 | 19,709 | 19,908 | 19,704 | 19,669 |

| **Number of Products (6-digit)** | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Export                          | 4,384 | 4,429 | 4,461 | 4,487 | 4,555 | 4,551 | 4,633 | 4,555 | 4,576 | 4,586 | 4,725 | 4,917 | 4,825 | 4,768 | 4,769 |
| Import                          | 4,848 | 4,948 | 4,941 | 4,977 | 4,976 | 5,007 | 5,113 | 4,883 | 4,853 | 4,865 | 4,936 | 5,015 | 5,001 | 4,998 | 5,011 |

Sources: Thai Customs Department and authors’ calculations.
Table 2. Overview of Trading Firms, 2013

|                  | Registered Firms | Nonregistered Traders | Total  |
|------------------|------------------|-----------------------|--------|
| Pure exporters   | 7,408            | 10,593                | 18,001 |
|                  | (7.5%)           | (10.7%)               | (18.2%)|
| Pure importers   | 28,282           | 32,456                | 60,738 |
|                  | (28.7%)          | (32.9%)               | (61.6%)|
| Hybrids          | 17,562           | 2,346                 | 19,908 |
|                  | (17.8%)          | (2.4%)                | (20.2%)|
| Total            | 53,252           | 45,395                | 98,647 |
|                  | (54.0%)          | (46.0%)               | (100.0%)|

Sources: Thai Customs Department, Ministry of Commerce, and authors’ calculations.

number of exporters actually declined to 36,686 in 2015. By contrast, the number of importers rose steadily from 35,926 in 2001 to 78,303 in 2015, the bulk of this increase coming from pure importers.

The last panel of Table 1 provides the number of products based on various Harmonized System (HS) classifications. We adopt the 6-digit classification scheme as it provides sufficiently fine product delineation while avoiding problems related to product reclassifications that would arise with a finer level of disaggregation. This classification yields 4,769 export products and 5,011 import products in 2015, both representing only modest growth over the sample.

III. Firms in Thai Exports

We first examine the characteristics of trading firms by supplementing the customs data with the Corporate Profile and Financial Statement (CPFS) data from Thailand’s Department of Business Development at the Ministry of Commerce. The CPFS database consists of annual financial statements submitted to the department by all registered firms in Thailand. Key available variables include firm identification; balance sheet items (total and subitems of assets, liabilities, and equities); and income statement items (revenues, expenses, and net income). The data also include information on the type of business and industry in which each firm operates, as well as a registration year that allows us to calculate a firm’s age. Merged with trade data, CPFS data provide additional information on major characteristics of traders who are registered firms.

Table 2 provides a snapshot of the overlap between the Thai Customs Department dataset and the CPFS. In 2013, there were a total of 98,647 traders. Of these, just over half were registered firms. Thus, a large portion of trading activity in Thailand is conducted by nonregistered entities (individuals and firms). This, in part, reflects the large informal sector of the Thai economy. While the majority of

8Given a lag in collection and compilation of the CPFS data, the sample analyzed in this section covers data up to 2013.
pure exporters and importers are not registered, most hybrids are registered. In what follows in this section, we focus only on registered firms.

### A. Exporters

Taking the universe of all registered firms as a starting point (435,121 firms), Table 3 shows that exporters are rare. Only 5.7% of all registered firms in Thailand engaged in exporting. Importing is also atypical with only 10.5% of firms importing (hybrids plus pure importers). Overall, an astounding 87.8% of Thai firms do not engage in any direct international trade. We also look at exporters in the manufacturing sector and the retail and wholesale sector separately, given the difference in the nature of their underlying economic activity: manufacturing firms mainly produce physical commodities that are sent abroad, while retailing and wholesaling firms are intermediaries that provide trading services. Exporting is less rare for manufacturing, with 16.7% of firms engaged in exports.

Figure 1 shows that export intensity, measured as the ratio of exports to total sales, takes a median value of 0.11. That is, export sales of the median firm account for just 11% of its total revenue. Moreover, there is concentration near zero and one, indicating a bipolar characteristic of Thai export firms: either firms specialize in export or they just dabble in it. Many do just the latter. Export intensity for exporters in manufacturing and retail and wholesale sectors broadly display a similar pattern (middle and right panels).

Figure 2 depicts the distribution of export compared to nonexport firms along a number of dimensions (first and last columns). Looking at median values, it is apparent that exporters tend to be more capital intensive (higher ratio of fixed assets to total assets), larger (higher revenue), more profitable (higher return on asset), and...
more efficient (higher turnover ratio measured as the ratio of revenues to asset), and have greater access to external finance (higher leverage ratios). Not surprisingly, manufacturing exporters tend to be larger and more capital intensive relative to retailing and wholesaling exporters, though the latter tend to have higher return on assets.

In light of our observation above that hybrid exporters play a very important role in Thai exports, we also present a comparison for hybrid versus pure exporters in Figure 3. With the exception of return on assets, the same pattern emerges. Hybrids are distinguished from other exporters in terms of size, capital intensity, efficiency, and leverage.

B. Implications

In summary, the observations documented in this section indicate that, despite having pursued an export-oriented development strategy for several decades, exporters constitute a very small fraction of all registered Thai firms. This low participation is consistent with data for other countries and points to the importance of entry costs to trade. Bernard et al. (2007a), for example, find that of the 5.5 million firms operating in the United States (US) in 2000 only 4% export. Similarly, Manova and Zhang (2009) show that the bulk of exports and imports of the People’s Republic of China (PRC) are captured by just a few firms.\footnote{A caveat is that we have adopted a strict definition of international trade. A firm is deemed an exporter if it sells goods overseas. But many more firms may be supplying intermediate inputs that go into those final exports even though they themselves do not export directly. Thus, the importance of trade and the involvement of domestic firms in international trade will be understated by looking only at direct exporters.}

Export firms are also special. They are different from domestic firms in terms of size, capital intensity, profitability, and efficiency. This is largely in line with previous findings in the literature (Eaton, Kortum, and Kramarz 2004; Bernard, Jensen, and Schott 2009; and references listed in these two papers) and raises a natural question of whether the differences already existed even before...
Figure 2. Firm Characteristics—Exporters versus Nonexporters, 2013

ROA = return on assets.
Sources: Thai Customs Department, Ministry of Commerce, and authors’ calculations.

export firms began to trade. That is, do better and larger firms self-select into international trade, or does engagement in international trade over time make firms more efficient and grow? The overwhelming evidence in the literature is that these differences exist before entry (Bernard et al. 2007a). The heterogeneity among firms is systematically related to trade participation, with exporters being larger and more productive than nonexporters even prior to entering export markets. Most studies
also find little or no evidence of improved productivity as a result of becoming an exporter, though an abundance of evidence indicates that firms entering export markets grow substantially faster in employment and output than nonexporters. Thus, exporters are more productive, not as a result of exporting, but because only the most productive firms are able to overcome the costs of entering export markets.
Once they export, conditional on surviving, they scale up faster than domestic firms. This has both positive and normative implications.

On the positive side, such microeconomic heterogeneity helps to explain macroeconomic outcomes. When entry costs fall, high-productivity trading firms survive and grow, while lower-productivity domestic firms are more likely to fail. This reallocation of resource across firms raises aggregate productivity, both within sectors as well as for the economy as a whole, and is an important source of welfare gains from trade. On the normative side, entry costs appear to be the key barrier to trade. Rather than focusing policy on helping exporters improve, the emphasis should be ensuring that good firms are able to export. Entry barriers come in a myriad of forms, including tariffs, transport costs, distribution channels, marketing, unfamiliar regulation, and other informational asymmetries. On the one hand, these barriers could be firm specific and need policies targeting particular firms or industries. On the other hand, overcoming these barriers individually is costly, and the government should explore whether there is a potential role for governments to play in exploiting economies of scale and overcoming coordination failures in these areas.

IV. What, Where, and Who? A Granular Perspective of Thai Exports

A unique feature of the customs data is that it provides information about the nexus between product, market, and trader. We call this product–market–trader (PMT) combination, where product $x$ is exported to market $n$ by firm $i$. This feature allows us to analyze trading activities beyond the firm-level data. We take advantage of this granularity of the data to examine the extensive and the intensive margins of Thai exports.

A. Extensive Margins

We examine three extensive margins of Thai exports: traders (exporters), markets (destinations), and products. First, from the perspective of traders, Figure 4 plots the distribution of exporters based on the number of markets they serve (left panel) and the number of products they sell (right panel). The frequency with which more markets and products are served declines smoothly and monotonically. Exporters generally sell few products to very few markets and most export just a single product to a single destination. This suggests that the fixed cost of expanding products and markets is high.

Second, turning to markets, Figure 5 shows the distribution of markets according to the number of traders per market and the number of products per market. While the number of traders per market is relatively small (median of 95 exporters per market), the number of products within a given market is relatively high (median of 210 products per market). This implies that traders are specialized
in markets but diversified in products, and also suggests that entry barriers are high—most export markets are dominated by a few firms that sell many things.

Finally, at the product level, Figure 6 plots the distribution of products relative to the number of traders per product and the number of markets per product. The number of traders per product (left panel) is relatively small (median of 19 traders per product). At the same time, the right panel shows that most products are sold to a few markets (median of 18 markets per product, with bunching at one). In other words, Thailand exports few “global” products.

We can also examine exports through the lens of product–market (PM) combinations. The left-hand panel of Figure 7 shows the distribution of traders based on the number of PM combinations that each one trades. There is a very large variation in the number of PM combinations per trader, ranging from one to over 10,000 combinations. Most traders export just one PM bundle while a handful export over 1,000 bundles. The right-hand panel flips things around and shows the
distribution of PMs based on the number of traders per PM. A striking finding is that for most PM bundles, there is just one trader. This finding implies that Thai exporters evidently do not compete with one another by exporting the same product to the same country, resulting in a high degree of trader segmentation by PM bundle.

B. Intensive Margins

We next examine the value of exports at the PMT level. The left-hand column of Figure 8 shows the distribution of traders, markets, and products in terms of their average values. For example, the median value exported per trader in 2015 is rather small at around B1.9 million. More striking is the information presented in the right-hand column of Figure 8. Here we show the degree of export concentration from the PMT perspective. No matter how you look at it, Thai exports are highly concentrated. The top 5% of traders, markets, and products account for 88%, 67%,

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**Figure 6. Distribution of Number of Export Traders and Markets per Product, 2015**

![Chart showing distribution of number of traders and markets per product, 2015](chart1.png)

Sources: Thai Customs Department and authors’ calculations.

**Figure 7. Distribution of Export Product–Market Combinations, 2015**

![Chart showing distribution of export product-market combinations, 2015](chart2.png)

Sources: Thai Customs Department and authors’ calculations.
Figure 8. **Intensive Margins, 2015**

Distribution of average export value *per trader*  
Concentration by trader

Distribution of average value *per market*  
Concentration by market

Distribution of average value *per product*  
Concentration by product

CI = confidence interval.

Note: The right column shows Lorenz curves for exports. If every trader, market, and product accounted for the same share of exports, the plot would lie on the diagonal equality line.

Sources: Thai Customs Department and authors’ calculations.
and 77%, respectively, of total export value. A handful of traders, markets, and products make up most of aggregate export value.

At a more granular level, we can also look at the distribution based on PM and PMT bundles. The top panel of Figure 9 shows that the typical value traded per PM bundle is quite small, around B300,000. More importantly, PM-level concentration is very high with the top 5% of PM bundles accounting for 90% of total exports. At the PMT level, the concentration is even higher with around 92% of total exports accounted for by the top 5% of PMT bundles. Thus, not only are exports concentrated across exporters, but within each firm, activity is also very
highly concentrated in a few PM bundles that account for much of each firm’s exports.

### Table 4. Distribution of Exporters and Export Value, 2015

| Share of Traders (%) | Number of Countries |
|----------------------|---------------------|
| Number of Products   | 1       | 2       | 3       | 4       | 5–29   | 30+    | All |
|----------------------|---------|---------|---------|---------|--------|--------|-----|
| 1                    | 33.3    | 3.2     | 1.0     | 0.6     | 1.2    | 0.0    | 39.2|
| 2                    | 8.0     | 3.9     | 1.3     | 0.7     | 1.5    | 0.0    | 15.4|
| 3                    | 3.3     | 2.0     | 1.2     | 0.6     | 1.6    | 0.0    | 8.7 |
| 4                    | 1.9     | 1.0     | 0.7     | 0.5     | 1.4    | 0.0    | 5.6 |
| 5–29                 | 7.4     | 3.1     | 2.5     | 2.0     | 9.8    | 0.7    | 25.4|
| 30+                  | 1.4     | 0.4     | 0.2     | 0.2     | 2.7    | 0.8    | 5.7 |
| All                  | 55.3    | 13.6    | 6.8     | 4.6     | 18.1   | 1.6    | 100.0|

| Share of Value (%)  | Number of Countries |
|---------------------|---------------------|
| Number of Products  | 1       | 2       | 3       | 4       | 5–29   | 30+    | All |
|---------------------|---------|---------|---------|---------|--------|--------|-----|
| 1                   | 1.9     | 0.9     | 0.4     | 0.2     | 1.5    | 0.1    | 4.9 |
| 2                   | 0.4     | 0.5     | 0.3     | 0.3     | 1.7    | 0.1    | 3.2 |
| 3                   | 0.2     | 0.3     | 0.3     | 0.2     | 1.9    | 0.5    | 3.4 |
| 4                   | 0.2     | 0.1     | 0.1     | 0.1     | 2.0    | 0.5    | 3.0 |
| 5–29                | 0.8     | 0.6     | 0.7     | 0.5     | 18.0   | 9.9    | 30.5|
| 30+                 | 0.6     | 0.2     | 0.1     | 0.2     | 15.2   | 38.7   | 55.0|
| All                 | 4.0     | 2.5     | 1.9     | 1.5     | 40.2   | 49.9   | 100.0|

Sources: Thai Customs Department and authors’ calculations.

C. The Product–Market–Trader Nexus

Combining the information on both the extensive and intensive margins, the top panel of Table 4 shows the distribution of traders based on the number of products exported and the number of destination markets, while the bottom panel presents a similar breakdown based on the share of export value. The table reveals a number of striking observations. The number of destination countries served by the average exporter is small: 55.3% of Thai traders exported to a single market in 2015, though these exports represented just 4% of total export value. By contrast, traders exporting to five or more destinations accounted for around 20% of exporters but 90.1% of export value. A similar picture emerges with respect to the number of products exported. In 2015, 39.2% of exporters exported a single product abroad, though these accounted for a mere 4.9% of aggregate export value. Exporters of 30 or more products accounted for just 5.7% of all exporters but as much as 55% of total export value.

Moreover, 33.3% of all exporters exported a single product to a single market but made up just 1.9% of export value. At the other extreme, the 0.8% of exporters...
exporting 30 or more products to 30 or more countries accounted for almost 40% of aggregate exports. These observations reflect the importance of multiproduct and multimarket exporters in overall Thai exports. The small share of firms that dominate Thai exports are large in size and are relatively diversified across products and markets. Our findings are consistent with what Manova and Zhang (2009) find in the PRC, where a large share of exports and imports are captured by a few multiproduct firms that transact with a large number of countries.

D. Hybrid: Exporter–Importer Firms

The literature finds that firms that simultaneously export and import typically exhibit the highest levels of performance (for example, Bernard et al. 2007a and 2007b). To get a sense of the extent to which traders engage in both exports and imports, Figure 10 shows the distribution of traders in our sample based on their “natural hedge” ratios. This is calculated, for each trader, as the ratio of the absolute value of exports minus imports divided by the total trade undertaken, or \(|x - m|/(x + m)|

\(M = \text{imports}, X = \text{exports.}

Sources: Thai Customs Department and authors’ calculations.

Table 5 documents the overall role of hybrids. In 2015, 53.6% of exporters also imported while only 25.1% of importers also exported. Strikingly,
Table 5. Exporter–Importer Firms

|                                | 2001  | 2007  | 2011  | 2015  |
|--------------------------------|-------|-------|-------|-------|
| Number of hybrids              |       |       |       |       |
| Total                          | 12,964| 16,971| 19,491| 19,669|
| Share of exporters (%)         | 60.9  | 53.8  | 51.2  | 53.6  |
| Share of importers (%)         | 36.1  | 32.7  | 26.3  | 25.1  |
| Number of downstream production-chain exporters (DPE) |       |       |       |       |
| Total                          | 3,295 | 3,801 | 3,901 | 3,532 |
| Share of exporters (%)         | 15.5  | 12.1  | 10.2  | 9.6   |
| Share of importers (%)         | 9.2   | 7.3   | 5.3   | 4.5   |
| Value traded by hybrids        |       |       |       |       |
| Share of total exports (%)     | 92.4  | 93.4  | 92.5  | 93.3  |
| Share of total imports (%)     | 90.4  | 92.1  | 91.9  | 89.7  |
| Value traded by downstream production-chain exporters (DPE) |       |       |       |       |
| Share of total exports (%)     | 27.6  | 31.1  | 30.2  | 32.6  |
| Share of total imports (%)     | 21.6  | 31.3  | 30.5  | 26.7  |

Sources: Thai Customs Department and authors’ calculations.

hybrid traders account for 93.3% of total export value and 89.7% of aggregate imports. Thus, Thai international trade is overwhelmingly dominated by firms that simultaneously export and import. This is consistent with previous findings in the literature. Bernard, Jensen, and Schott (2009) document that over 50% of firms in the US that import also export, and these firms account for close to 90% of the country’s trade.

Thai customs data allow hybrids to be further decomposed into traders that import intermediate products and export final goods, or what we call “downstream production-chain exporters” (DPE). These traders are of interest because they are likely to be part of global production networks, hence engaged in high value-added activity while at the same time more exposed to fluctuations in the global economy. We define DPEs as traders whose majority of exports are final goods and majority of imports are intermediate goods. Table 5 reveals that DPEs made up just 9.6% of all exporters in 2015 but accounted for 32.6% of total exports.

We next present the distribution of hybrid and DPE exporters along combined extensive and intensive margins as we did for overall exporters. Table 6A shows that most hybrids export five or more products to five or more destinations. This is in contrast to overall exporters, many of whom export just a single product to a single market as shown above. In terms of value, it is striking that the 3.2% of hybrids that export 30 or more products to 30 or more markets account for just under half of all exports by hybrid traders. Hybrid trade is dominated by a few large and well-diversified traders. The same message carries over to DPEs. As shown in Table 6B, the 5.2% of all DPEs that export 30 or more products to 30 or more markets account for 64.3% of total exports by DPEs.
**Table 6A. Distribution of Hybrid Exporters and Export Value, 2015**

*Share of Traders (%)*

| Number of Products | 1  | 2  | 3  | 4  | 5–29 | 30+ | All  |
|--------------------|----|----|----|----|------|-----|------|
| 1                  | 1.3| 1.0| 0.3| 0.2| 0.3  | 0.0 | 3.2  |
| 2                  | 1.4| 2.8| 0.9| 0.5| 0.9  | 0.0 | 6.5  |
| 3                  | 1.0| 1.9| 1.4| 0.7| 1.2  | 0.0 | 6.2  |
| 4                  | 0.7| 1.3| 1.1| 0.7| 1.3  | 0.0 | 5.0  |
| 5–29               | 3.5| 6.3| 6.4| 5.9| 25.3 | 0.6 | 48.1 |
| 30+                | 0.8| 1.3| 1.5| 1.5| 22.8 | 3.2 | 31.0 |
| All                | 8.7| 14.6|11.6| 9.5| 51.7 | 3.9 | 100.0|

*Share of Value (%)*

| Number of Products | 1  | 2  | 3  | 4  | 5–29 | 30+ | All  |
|--------------------|----|----|----|----|------|-----|------|
| 1                  | 0.0| 0.0| 0.1| 0.0| 0.4  | 0.0 | 0.6  |
| 2                  | 0.0| 0.1| 0.2| 0.0| 0.2  | 0.0 | 0.6  |
| 3                  | 0.1| 0.1| 0.1| 0.1| 0.4  | 0.0 | 0.7  |
| 4                  | 0.0| 0.0| 0.0| 0.1| 0.4  | 0.1 | 0.7  |
| 5–29               | 0.2| 0.3| 0.5| 0.5| 9.0  | 2.9 | 13.3 |
| 30+                | 0.1| 0.2| 0.4| 0.6| 35.7 | 47.4| 84.5 |
| All                | 0.4| 0.8|1.2 |1.4 |46.0  |50.4|100.0 |

Sources: Thai Customs Department and authors’ calculations.

**Table 6B. Distribution of Downstream Production-Chain Exporters and Export Value, 2015**

*Share of Traders (%)*

| Number of Products | 1  | 2  | 3  | 4  | 5–29 | 30+ | All  |
|--------------------|----|----|----|----|------|-----|------|
| 1                  | 0.0| 0.0| 0.0| 0.0| 0.0  | 0.0 | 0.0  |
| 2                  | 0.9| 3.1| 0.7| 0.4| 0.6  | 0.0 | 5.6  |
| 3                  | 0.8| 2.2| 1.2| 0.8| 0.9  | 0.1 | 6.0  |
| 4                  | 0.5| 1.4| 1.2| 0.9| 1.6  | 0.0 | 5.6  |
| 5–29               | 3.0| 6.1| 6.2| 6.1| 29.3 | 1.2 | 51.9 |
| 30+                | 0.6| 0.9| 0.9| 1.0| 22.2 | 5.2 | 30.8 |
| All                | 5.7|13.7|10.2| 9.3| 54.6 | 6.5 |100.0 |

*Share of Value (%)*

| Number of Products | 1  | 2  | 3  | 4  | 5–29 | 30+ | All  |
|--------------------|----|----|----|----|------|-----|------|
| 1                  | 0.0| 0.0| 0.0| 0.0| 0.0  | 0.0 | 0.0  |
| 2                  | 0.0| 0.0| 0.0| 0.0| 0.0  | 0.0 | 0.1  |
| 3                  | 0.0| 0.0| 0.0| 0.2| 0.1  | 0.0 | 0.3  |
| 4                  | 0.0| 0.0| 0.0| 0.2| 0.0  | 0.0 | 0.3  |
| 5–29               | 0.1| 0.1| 0.3| 0.3| 4.0  | 1.5 | 6.2  |
| 30+                | 0.0| 0.1| 0.1| 0.1| 28.6 | 64.3| 93.1 |
| All                | 0.1| 0.3| 0.4| 0.6|32.9  |65.7|100.0 |

Sources: Thai Customs Department and authors’ calculations.
Table 7. Distribution of Exporters and Their Balance Sheet Attributes, 2013

| Number of Products | Number of Countries | 1  | 2  | 3  | 4  | 5–29 | 30+ | All |
|--------------------|---------------------|----|----|----|----|------|-----|-----|
| 1                  | Median Return on Assets (%) | 4.6 | 4.1 | 4.3 | 4.2 | 4.3  | 3.2 | 4.5 |
| 2                  |                     | 4.2 | 4.8 | 4.4 | 4.9 | 3.8  | 2.2 | 4.4 |
| 3                  |                     | 4.8 | 5.3 | 5.0 | 4.3 | 4.1  | 4.7 | 4.7 |
| 4                  |                     | 5.8 | 5.7 | 5.5 | 5.7 | 5.0  | 5.7 | 5.5 |
| 5–29               |                     | 5.6 | 5.0 | 6.0 | 6.4 | 5.4  | 5.4 | 5.5 |
| 30+                |                     | 9.5 | 8.1 | 6.9 | 7.1 | 6.7  | 7.9 | 7.5 |
| All                |                     | 4.8 | 4.9 | 5.1 | 5.5 | 5.2  | 6.1 | 5.0 |

| Number of Products | Median Turnover Ratio | 1  | 2  | 3  | 4  | 5–29 | 30+ | All |
|--------------------|-----------------------|----|----|----|----|------|-----|-----|
| 1                  |                       | 1.4| 1.4| 1.4| 1.6| 1.4  | 1.9 | 1.4 |
| 2                  |                       | 1.3| 1.4| 1.4| 1.6| 1.4  | 0.9 | 1.4 |
| 3                  |                       | 1.5| 1.4| 1.4| 1.2| 1.4  | 1.3 | 1.4 |
| 4                  |                       | 1.3| 1.4| 1.5| 1.5| 1.4  | 1.7 | 1.4 |
| 5–29               |                       | 1.6| 1.4| 1.4| 1.4| 1.3  | 1.3 | 1.4 |
| 30+                |                       | 3.8| 2.2| 1.6| 2.0| 1.5  | 1.6 | 1.8 |
| All                |                       | 1.4| 1.4| 1.4| 1.5| 1.4  | 1.4 | 1.4 |

Sources: Thai Customs Department and authors’ calculations.

E. Firm Attributes, Export Products, and Export Destinations

Finally, Table 7 presents median return on assets and median turnover ratio of registered firms tabulated jointly by the number of destinations and the number of products. It shows that exporters that serve a greater number of products and markets generally have higher return on assets and higher turnover ratios. Thus, not only are firms that dominate exports bigger and more diversified, they also tend to be more efficient as their scale grows.

F. Implications

In summary, the overall message of this section is that Thai international trade is extremely concentrated. A handful of the largest traders, the largest markets, and the most intensively exported products account for much of Thai exports. From a trader’s perspective, most exports are undertaken by a small number of well-diversified traders exporting a large number of products to a large number of countries. These traders invariably also import. The finding on high concentration of Thai exports is consistent with studies in other countries. Using French export data by firm and destination market, for example, Eaton, Kortum, and Kramarz (2004) find that more than 60% of the variation in exports across markets of different
sizes is explained by the extensive margin of the number of exporting firms. For developing countries, Arkolakis and Muendler (2010) use data from Brazil and find that few top-selling products account for the bulk of a firm’s exports in a market.

There are many possible explanations for export concentration. The unequal distribution of trade could reflect large differences in productivity across firms. These differences could be exacerbated by a high degree of substitutability between goods varieties, so that even small productivity differences across firms, which translate into small differences in prices, lead to higher-priced varieties exiting the market. Alternatively, there could be economies of scale in distribution and marketing, or market-specific and product-specific sunk costs that favor high-productivity firms when it comes to expanding across markets and products. For example, Arkolakis and Muendler (2010) argue that productive firms choose to reach a large number of consumers in a market and incur large market penetration costs, while less productive firms choose to reach smaller markets.

Such high levels of concentration have important implications for risk and shock transmission. In particular, idiosyncratic shocks specific to particular traders, markets, or products can have big repercussions on aggregate trade value. Indeed, Di Giovanni, Levchenko, and Mejean (2014) show that for French exports, firm-specific shocks explain a substantial share of aggregate export fluctuations. This comes not just from the direct impact of large firms, but also through indirect linkages across firms. High concentration at the PM and PMT levels are particularly worrisome because idiosyncratic shocks at this level that seem isolated (e.g., a problem with exports of a particular machine component to one market by a single producer) can have widespread repercussions on total exports. A corollary is that aggregate tools, such as monetary policy, may not be well-suited to dealing with export fluctuations driven by idiosyncratic shocks to firms or unique PM and PMT bundles.

V. The Dynamics of Thai Exports

This section examines the dynamic evolution of Thai exports focusing on the extensive margin and longevity survival of export relationships, both at the trader and PMT levels. We begin by defining export relationships at two levels. At the trader level, a relationship is the occurrence of export activity by a particular trader in a given year. At the PMT level, a relationship is the occurrence of export activity in a particular PMT bundle, i.e., export of product \( x \) to market \( n \) by trader \( i \) in a given year. We define a relationship as “new” if it is less than 1 year old.

Table 8 provides an overview of the dynamics of Thai exports from various dimensions. Of note is the steady decline in the growth of traders, with the number of traders actually declining on average during 2011–2015. Similarly, growth in
Table 8. **Overview of Thai Export Dynamics**

|                          | 2001–2007 | 2007–2011 | 2011–2015 | 2001–2015 |
|--------------------------|-----------|-----------|-----------|-----------|
| Growth in value          | 14.9      | 7.0       | 1.9       | 11.4      |
| Growth in number of products | 0.9     | 0.5       | 0.2       | 0.6       |
| Growth in number of markets | 0.0     | 0.4       | 1.6       | 0.6       |
| Growth in number of traders | 8.0     | 5.2       | −0.9      | 5.2       |
| Growth in number of PMT relationships | 8.0    | 4.8       | 0.5       | 5.7       |
| Fraction of new traders  | 33.3      | 42.2      | 37.2      | 37.0      |
| Fraction of lost traders | 26.6      | 37.0      | 38.1      | 32.8      |
| Value-weighted fraction of new traders | 1.9    | 1.5       | 1.8       | 1.7       |
| Value-weighted fraction of lost traders | 0.8    | 0.8       | 0.9       | 0.8       |
| Fraction of new PMT relationships | 61.5   | 58.3      | 52.4      | 58.0      |
| Fraction of lost PMT relationships | 54.7   | 53.6      | 51.9      | 53.6      |
| Value-weighted fraction of new relationships | 14.6  | 8.4       | 9.1       | 11.3      |
| Value-weighted fraction of lost relationships | 10.0  | 7.3       | 6.9       | 8.4       |

PMT = product–market–trader.

Sources: Thai Customs Department and authors’ calculations.

The number of PMT relationships has declined substantially. Both of these suggest that the degree of dynamism in Thai exports has fallen. The middle panel of the table provides a glimpse of the “churn”—traders entering and exiting the market—underlying Thai exporters. On average, around 40% of traders enter and exit a market each year, though their contribution to total exports is very small: from 2011 to 2015 new traders accounted for roughly 1.8% of exports each year, while those that exited made up just 0.9%. Looking at a more granular level, the bottom section of Table 8 shows that between 2011 and 2015, just over half of all PMT relationships were new and lost on average per year. These made up around 7%–9% of total exports.

A. **Growth Decomposition**

The decomposition of export growth can be carried out on a number of dimensions. Over a given period, the change in export value is driven by (i) *existing* products, markets, or traders—those that were present in the base year as well as the last year; (ii) *new* products, markets, or traders—those that entered during the period and remained until the end; and (iii) *lost* products, markets, or traders—those that were present in the base year but exited during the period. Of course, there may be products, markets, or traders that enter and exit during the period, but these are awash when comparing end-to-end growth rates. More precisely, we adopt the following definitions for $k = \text{product, market, or trader}$:

*Entry* $\equiv$ new $k$ that are present at the end date but not at the start date (e.g., entry for 2011–2015 equals new $k$ that were present in 2015 but not at the end of 2010, representing new entrants);
Exit \equiv k \text{ that exit after the start date (e.g., exit for 2011–2015 equals all } k \text{ that were present in 2010 but not at the end of 2015, representing lost incumbents); and}

Stayers \equiv k \text{ that are present at the beginning and end of the period (e.g., stayers for 2011–2015 are those } k \text{ that were present at the end of 2010 and 2015, representing survivors).}

Given these definitions, we can proceed to decompose export growth. Note that the sum of entry and exit represents change on the net extensive margin, while stayers reflect the intensive margin. Focusing at the trader level, Figure 11 shows that over time, the relative contribution of incumbent traders to export growth has steadily declined with new traders becoming more important. Exiting traders have also weighed more heavily. During the 2011–2015 period, exports grew by 1.9% per year on average. This was underpinned by a growth of 2.4% from entrants, 1.5% from stayers, and –2% from exits. The right panel of Figure 11 shows the absolute number of traders entering, exiting, and staying. Of note is that during 2011–2015, the absolute number of traders fell as indicated by a negative net entry (the sum of entry and exit).

Table 9 takes a closer look at the characteristics of exporters who enter, exit, and stay in the market over time. Since we are looking across ranges of years, we list for stayers both the characteristics at the beginning and the end of the range. Compared to stayers, traders who enter and exit the export market tend to be much smaller—both in terms of export value and size of fixed assets—and tend to export few products to fewer markets and have lower return on assets. This is consistent with a Darwinian process of selection. It would be interesting to explore how these performance gaps increase when one conditions only on entrants that survive. It could be the case, for example, that conditional on survival, new entrants are even more productive than incumbents. We leave this for future work.
The number of entries and exits into exports, what we call churning, is important in its own right. The empirical trade literature has shown that within-industry reallocations of resources are an important source of average industry productivity growth as low-productivity firms exit and high-productivity firms expand to enter export markets (Melitz and Redding 2014). This process of resource reallocation is part and parcel of “creative destruction” that is at the core of Schumpeterian growth theory (Aghion, Akcigit, and Howitt 2014). That said, excessive churning may also be a source of concern if it reflects wasteful resources spent by unproductive entrants or exits of productive producers that are no longer able to operate due to financial frictions or other barriers. Thus, while we want to highlight the degree of churning, we present it as a stylized fact and, without further analysis, abstain from making judgments on whether the high degree of churning observed in certain periods, sectors, and regions is healthy or not.

Table 10 presents trader churning by broad sectors and regions. The churning rate for any given year is defined as the gross sum of new entrants and exits divided by the total number of traders at the end of the previous year. During the entire sample, the average churning rate per year is 69.8%. That is, in a typical year,
entering and exiting traders amount to almost 70% of all traders. The sectors with the highest churn rate are textiles and wearing apparels and transportation, the former showing a significant increase since 2007. Looking across regions, traders exporting to the PRC have the largest churn rate over the entire sample, though the rate has declined over time. The opposite applies in the case of Japan.

Turning to product dimension, Figure 12A shows export growth decomposition at the product level. Given that the number of products change slowly, it is not surprising to see that the bulk of export growth is driven by growth in exports of existing products. That said, during the trade boom between 2001 and 2007, the entry of new products did play a significant part in driving export growth. Finally, decomposing growth at the most granular PMT level reveals a starkly different picture, as shown in Figure 12B. The formation and disappearance of PMT relationships—the extensive margin—plays a big part in export growth. During 2011–2015, for example, new PMT bundles contributed on average 7.3% of export growth per year, while exiting relationships reduced exports by around 6.5% every year. Existing PMT relationships, by contrast, grew by 1.1% per year on average. Thus, the 1.9% average yearly growth belies the large amount of expansion and contraction at the extensive margin.

Table 10. **Trader Churning Rate (%)**

|                      | 2001–2007 | 2007–2011 | 2011–2015 | 2001–2015 |
|----------------------|-----------|-----------|-----------|-----------|
| **Aggregate**        | 59.9      | 79.2      | 75.3      | 69.8      |
| **By sector**        |           |           |           |           |
| Agricultural products| 72.2      | 69.3      | 72.3      | 71.4      |
| Food                 | 66.5      | 64.5      | 65.3      | 65.6      |
| Mineral products     | 97.6      | 88.1      | 82.8      | 90.7      |
| Chemicals and rubbers| 71.1      | 68.7      | 66.6      | 69.2      |
| Wood and leather products| 81.2      | 105.9     | 90.4      | 90.8      |
| Textiles and wearing apparels| 78.3      | 134.7     | 117.9     | 105.7     |
| Metals and other materials| 71.2      | 86.1      | 75.4      | 76.7      |
| Machinery            | 84.2      | 95.2      | 84.6      | 87.5      |
| Transportation       | 105.9     | 101.2     | 97.1      | 102.1     |
| Miscellaneous        | 89.7      | 113.0     | 103.4     | 100.3     |
| **By region**        |           |           |           |           |
| ASEAN                | 69.9      | 67.1      | 68.2      | 68.6      |
| Australia            | 64.0      | 67.0      | 60.1      | 63.7      |
| People's Republic of China | 84.4      | 77.3      | 70.1      | 78.3      |
| East Asia            | 71.3      | 69.5      | 67.6      | 69.8      |
| European Union       | 59.2      | 64.7      | 63.9      | 62.1      |
| Hong Kong, China     | 67.7      | 63.1      | 59.5      | 64.1      |
| India                | 80.9      | 76.2      | 65.8      | 75.3      |
| Japan                | 51.8      | 86.6      | 75.5      | 68.5      |
| United States        | 55.0      | 59.0      | 60.2      | 57.6      |
| Rest of the world    | 57.8      | 74.7      | 66.3      | 65.1      |

ASEAN = Association of Southeast Asian Nations.

Sources: Thai Customs Department and authors’ calculations.
Digging deeper into this granular PMT-level decomposition reveals further insights about the PM bundles that new traders engage in. We are interested in exploring whether new entrants extend the universe of Thailand’s PM export bundles—exporting an existing product to a new market, exporting a new product to an existing market, or both—or simply compete in an existing PM space. Focusing on the trader level, Table 11 takes the export growth decomposition
shown on the left panel of Figure 11 and splits the contribution of new entrants into those that export existing PM bundles and those that export new ones. We find that the majority of the contribution to export growth from new traders has been from existing PMs, particularly in the recent period. During 2011–2015, for example, new entrants with new PMs contributed only 0.2 percentage points to total export growth, much lower than the contribution of 2.2 percentage points from new entrants with existing PMs. This suggests that new entrants tend to choose to compete with incumbents rather than going to untapped markets. Possible explanations include positive externalities from the incumbents that help save entry costs for new entrants or a lack of demand in the markets not currently served by existing traders. Alternatively, the low growth rate of new entrants with new PMs raises a concern over the inability of Thai firms to initiate new products into new markets.10

B. Survival Analysis

In light of the high degree of churning observed, with many traders entering and exiting the export market each year, we take a closer look at the frailty of exporting by estimating survival probabilities of export relationships. Besedes and Prusa (2007) show that the frailty of export relationships, defined as unique PM bundles, is an important factor underlying the differences in long-run export growth across countries. Exploiting the more granular nature of our data, we examine the frailty of export relationships both at the trader level as well as the PMT level.

To analyze survival, we construct “relationship spells” from our data focusing only on new entrants in our sample (i.e., we drop incumbent traders or PMT bundles in 2001). If a given export relationship appears in two or more distinct nonoverlapping spells, for example, trader i exports during 2003–2005 and then again in 2008–2009, we treat these as two independent spells. With this criterion, we have 592,648 export spells at the trader level, and 12,819,202 spells at the PMT level.

We are particularly interested in the difference between new and long-term relationships. Figure 13 shows the distribution of export relationships by age at the end of 2015. The left panel shows the distribution at the trader level. Clearly, most exporters are new and the number of traders who enter during our sample and survive generally falls with the number of years. The spike in the category of traders 15 years and older reflect traders who have been present since the start of our sample in 2001. At the PMT level, the general message is the same except that the number of PMT bundles that have been present since 2001 is very small.

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10This finding is different from the overall global pattern presented by Kehoe and Ruhl (2013), who analyze a panel of 1,900 country pairs and find that this product extensive margin accounts for 10% of the growth in trade for North American Free Trade Agreement country pairs, and 26% of the trade growth between the US and Chile, the People’s Republic of China, and the Republic of Korea.
In Table 12 we report that as of 2015, the fraction of relationships that are long term (i.e., present in all years of the sample since 2001) amount to 17% at the firm level and only 3% at the PMT level. Yet these relationships account for a sizable amount of total exports. Long-term firms made up 64% of total exports in 2015 while long-term PMT amounted to 19%. The average annual deepening of long-term relationships is also shown in the table.

These results contrast with the situation for new relationships presented in Table 8. Between 2001 and 2015, new relationships at the PMT level made up on average 58% of all relationships in a given year and these accounted for around 11% of total export value. At the trader level, new relations made up around 37% of all relationships and accounted for just 1.7% of total exports. The fact that new relationships account, in value terms, for a considerably smaller portion than those of established relationships reinforces the view that new relationships only have a meaningful impact on aggregate export growth if they survive and

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**Table 12. Long-Term Relationships, 2015**

| Fraction of value traded by long-term relationships (%) |  |
|-----------------------------------------------|---|
| Trader level                                  | 64 |
| PMT level                                     | 19 |

| Average growth of value traded by long-term relationships (%), 2001—2015 |  |
|----------------------------------------------------------------------------|---|
| Trader level                                  | 6  |
| PMT level                                     | 5  |

| Fraction of long-term relationships (%) |  |
|----------------------------------------|---|
| Trader level                           | 17 |
| PMT level                              | 3  |

PMT = product–market–trader.
Sources: Thai Customs Department and authors’ calculations.

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**Figure 13. Distribution of Export Relationships by Age, 2015**

Distribution of durations at firm level  Distribution of durations at PMT level

PMT = product–market–trader.
Sources: Thai Customs Department and authors’ calculations.
Following Besedes and Prusa (2007), we proceed to estimate the Kaplan–Meier survival function, both at the trader and PMT levels based on new relationships during 2001–2015. This function describes the survival probabilities of relationships as the number of years in service increases. There are a couple of striking results. First and foremost, export duration is remarkably brief. As shown in the left-hand panel of Figure 14, 63% of trader-level relationships fail after the first year, and by the end of the fifth year around 86% of exporters have left the market. Breaking up new entrants into pure exporters and hybrids reveals a sizable difference between the two, as shown in the right panel of Figure 14. Pure exporters are twice as likely to fail after the first year compared to hybrids, with the gap widening into later years.

The second notable observation is that new relationships are much more likely to fail than existing ones. This can be seen in Figure 14 by the steep slope of the survival function over the first 3 or so years, before markedly flattening out after that. That is, in the first 3 years, the risk of failure is very high (i.e., the probability of survival drops substantially year by year). Thereafter, the change in survival probability is very small as we progress through the years, reflecting a fairly small risk of failure.

Given the frailty of new exporters, a natural question is whether those that survive have special attributes. Figure 15 provides some evidence by showing that survivors are indeed different. The longer traders remain in the export business, the more they export in value terms, the greater the number of products they export, and the greater the number of markets they export to. The overall combination of PM
bundles exported also increases with age. This finding is consistent with Schmeiser (2012), who finds evidence that the geographic expansion of firm exports occurs over time. Using firm-level data on the Russian Federation, she finds that learning plays a significant role in explaining the observed entry patterns.

Moving on to the PMT level, Figure 16 shows that survival probabilities are even more precarious compared to traders. The probability that a particular PMT bundle survives beyond the first year is just 34% (left panel). This trails off significantly as the number of years increases, and by the fifth year the survival probability is a mere 9%. There are significant sectoral differences in this regard, with survival probability highest for minerals and lowest for wood and leather products (right panel).

Overall, our findings contribute to the study of entrepreneurs in international trade and the role of the extensive margin. Evidence from Thai firms is similar to what Lederman, Rodríguez-Clare, and Xu (2011) find in Costa Rica, where the rate of firm turnover into and out of exporting is high, but exit rates decline rapidly with age. The exiting and entering firms tend to be significantly smaller than incumbents. They argue that the surviving new exporters actively took on new products (for the firm, but not necessarily new for the country) and gave up weaker existing products they had started with, and their export growth rates were very high during a period when those of incumbent exporting firms were actually negative.
C. Implications

In summary, this section shows that there is a great deal of churning among Thai exporters. In any given year, roughly one-third of exporters are new and an equal share exits the market. Looking at unique PMT bundles, the proportions of new entrants and exits jump to over half. While this dynamism is consistent with efficiency-improving resource reallocation, it could also be indicative of wasteful entrants and exits as many new exporters cannot overcome barriers to successful exporting. We find that exporters who enter and leave the market tend to be smaller, less diversified, and less profitable than incumbents.

Evidently, export growth is also increasingly being driven by the extensive margin. Over the past decade, changes on the extensive margin have become increasingly important in driving aggregate export growth. Existing exporters and PMT bundles account for a decreasing share of exports. Exporting is a dynamic undertaking and promoting export growth requires greater attention to new firms as well as a new configuration of products and markets.

Finally, this section also shows that export relationships are very fragile. The likelihood that an exporter or a given PMT bundle remains in the market for more than 1 year is very low. But those that survive generally blossom and account for a disproportionate share of aggregate exports. The challenge of exporting, therefore, is not simply one of overcoming fixed costs of entry, but also one of remaining in the market in subsequent years. The fact that most relationships end quickly suggests
that many exporters will not be able to recover the sunk cost required to enter an export market. This may partly explain why exporters are relatively rare. It also suggests that the assumption of a constant probability of exiting in the standard Melitz (2003) model may be inappropriate.

VI. Conclusion

This paper has documented the tremendous skewness in Thai international trade: despite decades-long implementation of an export-led development strategy, only a small minority of firms import and export, and they are big. The implication is clear. When it comes to thinking about Thai trade, one must think about big traders. Many of these are likely to be multinationals. Trading firms also stand out from domestic firms both in terms of scale and efficiency. These findings reinforce the importance of resource allocation among traded and nontraded sectors in Thailand’s overall productivity. The high degree of churning and the overall frailty of export relationships also suggest that exporting is difficult and successful firms are those that have overcome productivity hurdles before entering the market. The findings from this paper highlight some concerns about an export-oriented development strategy, particularly regarding concentration and fragility of an export-dependent economy from a micro perspective, in addition to the traditional macro external-dependency argument.

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