



Discussion paper

Import behavior and export performance: Firm-level evidence from the Netherlands

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Abstract

We investigate to what extent the export performance of Dutch exporters is tied to their import behavior. In doing so, we particularly focus on the network dimension of trading. Firms importing from the same country as they serve as an exporter consistently show higher export growth and survival rates on these destination markets. Our findings suggest that firms which are familiar with a particular market and are in possession of a network of contacts and trading partners there are able to boost export performance on that market. The importance of being well connected to foreign markets directly or indirectly is also reflected by the fact that serving a wider variety of export markets is associated with increased export performance on a particular destination market, in addition to the number of (potentially competing) exporters from the same domestic industry serving that particular destination market. Policymakers may capitalize on these findings by focusing attention on capacity building in the field of networking in the development of export promotion programs.

Keywords Imports, exports, firm performance, firm heterogeneity
JEL-classification F23, F14, L25

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Nederlandstalige samenvatting

In beleidskringen wordt importeren vaak gezien als een kostenpost voor bedrijven, terwijl exporteren - uiteraard - beschouwd worden als opbrengst. Dat heeft mede tot gevolg dat overheden zich veel moeite getroosten om beleidsinstrumenten te implementeren die erop gericht zijn exportactiviteiten van bedrijven te stimuleren, terwijl er nauwelijks instrumenten zijn met een specifieke focus op importeren. Ook in het academische onderzoek is er veel minder aandacht voor importgedrag dan voor exportgedrag van bedrijven. Niettemin kunnen bedrijven baat hebben bij importeren bijvoorbeeld door de beschikbaarheid van een breder palet aan variëteiten van betere kwaliteit of tegen een lagere prijs op buitenlandse markten dan via binnenlandse toeleveranciers. Op die manier kunnen bedrijven in staat zijn om kosten van inputs te verlagen of de productiviteit te verhogen waardoor zij competitiever voor de dag kunnen komen op exportmarkten.

In voorliggend onderzoek brengen we daarom in kaart in hoeverre exportprestaties van Nederlandse bedrijven samenhangen met hun importgedrag. Daarbij richten we ons in het bijzonder op de netwerkdimensie van handelsactiviteiten. Dat wil zeggen dat we met name onderzoeken in welke mate importeurs profijt hebben van de ervaring die zij hebben opgedaan met handelen op specifieke buitenlandse markten, van het reeds vertrouwd zijn met deze buitenlandse markten en van het hebben van een netwerk van handelspartners en contacten in het buitenland. We kijken daarbij naar twee aspecten van exportprestaties: (1) de groei van de export naar individuele bestemmingsmarkten en (2) de overlevingskans van exporteurs op deze bestemmingsmarkten. Onze analyse heeft betrekking op zowel de handel in goederen als de handel in diensten. Bij de goederenhandel maken we bovendien een onderscheid tussen de export van producten van Nederlandse makelij en wederuitvoer.

In algemene zin suggereren de resultaten van de analyse data dat importeurs succesvollere exporteurs zijn dan exporteurs die niet importeren. Zo laten bedrijven een sterkere groei van de export zien en hebben ze een grotere kans om in de toekomst op deze markt als exporteur actief te blijven als zij ook importeren uit hetzelfde land. Dit geldt ongeacht het type goed dat het bedrijf exporteert. Deze samenhang is sterker voor de dienstenhandel dan voor de goederenhandel. Met name omdat het hier specifiek gaat om import uit hetzelfde land als waarnaar geëxporteerd wordt is er aanleiding te concluderen dat er sprake is van een netwerkeffect. Dat wil zeggen dat bedrijven die bekend zijn met een bepaalde markt en op die markt reeds een netwerk van contacten en handelspartners bezitten, in staat zijn tot betere exportprestaties op de betreffende markt. Het belang van de mate waarin

een bedrijf verbonden is met een specifieke markt blijkt ook uit de bevinding dat een diepe verankering in bepaalde markten gepaard gaat met een relatief zwakke exportgroei op markten waarmee een bedrijf minder goed verbonden is. Niettemin zijn de overlevingskansen van exporteurs op bestemmingsmarkten doorgaans wel hoger voor bedrijven die goederen importeren uit andere herkomstlanden dan het bestemmingsland.

De resultaten wijzen er ook op dat het type product dat een bedrijf importeert samenhangt met de exportprestaties van dat bedrijf. Bedrijven die focussen op het importeren van goederen waar veel laaggeschoolde arbeid voor nodig is, die hightech van aard zijn, of die kennisintensief laten lagere groeicijfers zien van de export, vooral bij de wederuitvoer van goederen. Dit komt waarschijnlijk doordat het hier voornamelijk gaat om bedrijven die actief zijn in de groothandel. Daarbij gaat het doorgaans om het verhandelen van grote volumes, waardoor het simpelweg moeilijker is om hoge groeicijfers te genereren. Dit verklaart echter niet de positieve samenhang tussen het importeren van voornamelijk grond- en hulpstoffen en exportgroei, omdat dit ook met name groothandelaars betreft. We zien geen sterke samenhang tussen de overlevingskansen van bedrijven op exportmarkten en de samenstelling van de importportfolio.

In aanvulling op het importgedrag van de exporteur hebben we nog een aantal andere factoren in kaart gebracht die de exportprestaties van individuele bedrijven beïnvloeden. Zo blijkt de ervaring van bedrijven met exporteren positief samen te hangen met exportprestaties. Ook specifieke bedrijfskenmerken zoals bedrijfstak, grootte en productiviteit hangen samen met exportprestaties. Ook de karakteristieken van specifieke exportmarkten, zoals omvang en afstand tot Nederland, zijn van belang. Het belang van goede verbindingen met buitenlandse markten blijkt ook uit het feit dat het bedienen van een groter aantal exportmarkten samenhangt met betere exportprestaties op individuele afzetmarkten. Ten slotte blijkt het aantal (potentieel concurrerende) exporteurs uit dezelfde Nederlandse bedrijfstak dat naar een specifiek doelland exporteert een netwerkdimensie te zijn die positief samenhangt met de prestaties van individuele exporteurs op de betreffende markt.

De beleidsrelevantie van deze studie is tweeledig. Van oudsher ligt de focus van beleidsmaatregelen ter bevordering van de internationalisering van bedrijven als gezegd bijna uitsluitend op de export. Onze bevindingen suggereren echter dat het stimuleren van bedrijven om te beginnen met importeren uiteindelijk kan leiden tot stabiele exportactiviteiten als gevolg van het ontwikkelen van relevante vaardigheden, contacten en handelsnetwerken. Deze inzichten kunnen door beleidsmakers worden ingezet om het beleidsinstrumentarium gericht op het stimuleren van internationalisering van bedrijven

te verbreden. Onze studie benadrukt dus het belang van het ontwikkelen en onderhouden van handelsnetwerken en -contacten bij het ontplooiën van exportactiviteiten. Dit inzicht kan door beleidsmakers worden gebruikt om beleidsinstrumenten die de stimulering van export tot doel hebben specifiek te richten op het ontwikkelen van de benodigde vaardigheden bij beginnende exporteurs om een netwerk van handelscontacten op te zetten.

Onze studie biedt ten slotte ook aanknopingspunten voor vervolgonderzoek. We bespreken een selectie van de ideeën. De mate van integratie in internationale waardeketens van bedrijven zou een interessante dimensie kunnen zijn om te accommoderen in de analyse, omdat bedrijven die sterk geïntegreerd zijn in internationale waardeketens waarschijnlijk stabielere handelsrelaties hebben, zowel aan de importkant als aan de exportkant. Onze studie focust op de bedrijf-bestemmingsland dimensie van handelsrelatie, maar het kan interessant zijn om deze uit te breiden tot de bedrijf-bestemmingsland-afnemer dimensie. Wat zijn bijvoorbeeld factoren die de overlevingskans van de relatie met een individuele afnemer in een buitenland beïnvloeden? Er zijn dus nog verschillende mogelijkheden om de kennis van de relatie tussen importgedrag en exportprestaties verder te verbreden via toekomstig onderzoek.

1 Introduction

Importing is frequently considered a cost to firms, particularly in policy circles, whereas exports are - of course - a revenue. Consequently, many governments have put in place a host of policy instruments aiming to promote exports (particularly) by SMEs, while few instruments aim to stimulate imports [Wymenga et al. \(2013\)](#). Also in academic research in the field of firm heterogeneity much less attention is directed towards the relevance of importing. Nonetheless, firms may benefit from the availability of a wider variety of inputs of better quality or at lower prices on foreign input markets than on domestic markets. In that sense, importing may offer firms the opportunity to reduce input costs and/or increase productivity which may enable the firm to boost its performance on export markets.

We aim to investigate to what extent importing adds to the success of firms on export markets. More precisely, our research question is twofold: *to what extent does importing affect firm-level export growth and the probability of survival on export markets?* This question has been sparsely researched as we will see later on. We hypothesize that the relationship between importing and export success constitutes another dimension of firm heterogeneity with respect to export performance. For example, we expect the importing of high-tech inputs to affect export success differently than does the importing of raw materials, at least partly because of their varying association with firm-level productivity as [Van den Berg and van Marrewijk \(2017\)](#) have shown for the Netherlands.

Our contribution to the literature is fourfold. First, we add to a still small body of literature focusing on the relationship between import behavior and export performance. Second, a novel feature of our analysis is that we particularly focus on the relationship between the characteristics of imports, in terms of nature, type and origin, and the export behavior of the firm. Third, to the best of our knowledge we are the first to tackle this question also taking into account the importing and exporting of services in the analysis. Finally, we are also able to separate between re-exports and export of local product, which enables us to add another new dimension to the analysis of the relationship between import behavior and export performance.

Our key finding is that firms familiar with a particular market and in possession of a network of contacts and trading partners there, are able to boost export performance on that market in terms of export growth and survival rates. The importance of being well connected to foreign markets directly or indirectly is also reflected by the fact that serving a wider variety of export markets is associated with increased export performance on a particular destination market, in addition to the number of (potentially competing) ex-

porters from the same domestic industry serving that particular destination market.

Our paper is organized as follows. Section 2 provides a brief synthesis of the literature regarding the measurement of export success and its determinants and the relationship between importing and productivity. Section 3 introduces the firm-level micro-data sources and the country-level data sources utilized in our analysis and details our empirical approach. Section 4 presents our empirical findings concerning export growth and survival on export markets. Finally, section 5 summarizes and concludes the paper.

2 Relevant strands of research

Although the literature regarding the direct link between importing and export performance of firms is scant, there is abundant empirical research available that deals with separate elements of our study. More specifically, we briefly discuss relevant work regarding the operationalization and determinants of export success.

2.1 Measuring export success

In the empirical trade literature a wide array of measures of firm-level export behavior and success is considered.¹ First, a large literature aims to uncover the determinants of export behavior by trying to explain the probability of being an exporter (the propensity to export), see amongst others [Conti et al. \(2010\)](#); [Bellone et al. \(2010\)](#); [Brakman et al. \(2018\)](#). However, the propensity to export is not necessarily a proper dimension of export *success* in view of the empirical notion that a considerable fraction of firms (repeatedly) enters and exits export markets (see for example [Békés and Muraközy \(2012\)](#) and [Bernini et al. \(2016\)](#)). In that sense, the ability to stay in export markets seems to be a more relevant measure of export success than being an exporter at a given point in time, either per se or to a specific destination country. In this respect a lot of empirical research has been done uncovering the determinants of survival on export markets and, related to this, the probability of exiting export markets. A few examples include [Freund and Pierola \(2010\)](#);

¹In the business literature several measures of export performance emerge which are either difficult to quantify (such as export profitability or export market share) or qualitative and oftentimes subjective (such as product acceptance, client loyalty, management satisfaction with the export performance or achievement of the export objectives). See for example [Katsikeas et al. \(2000\)](#); [Carneiro et al. \(2016\)](#). Such measures hold no practical applicability to our quantitative analysis and will not be further explored.

Creusen and Lejour (2012); Stirbat et al. (2013); Fu and Wu (2014); Gullstrand and Persson (2015); Albornoz et al. (2016). Related to this, some papers focus on the number of destinations served or the number of products exported, in terms of market entries or exits (e.g. Muûls (2008); Askenazy et al. (2011)).

Export intensity measured as the share of exports in total sales is oftentimes considered in research of export behavior and its determinants as well (Bellone et al., 2010; Conti et al., 2010; Eikerpasch and Vogel, 2011). However, export intensity is a difficult measure to interpret in terms of performance, since the export share in sales may decline while exports grow. Nonetheless, this measure may be an interesting albeit somewhat imprecise measure of export success if it is operationalized dynamically: to what extent is the firm able to increase its export share in sales? This aligns with a number of studies that consider export growth, either growth of the export value (Bricongne et al., 2012; Creusen and Lejour, 2012; Araujo and Ornelas, 2016) or growth of the export share in total sales (Wagner, 1993).

The unit of measurement varies in this strand of literature, usually being either total firm exports or exports at the firm-country or firm-product-country level. For example, when the probability of survival is the dependent variable of interest this either concerns the probability of survival as an exporter per se (e.g. (Ilmakunnas and Nurmi, 2010; Jaarsma, 2012; Fu and Wu, 2014; Inui et al., 2017; Görg and Spaliara, 2018)) or the probability of survival as an exporter (of a specific product) to a specific destination country (e.g. (Stirbat et al., 2013; Gullstrand and Persson, 2015; Albornoz et al., 2016)).

2.2 Determinants of export success

The determinants of export success are generally considered at three different levels: (i) at the level of the firm, (ii) at industry level and (iii) at country level.² A wide array of firm characteristics is included in the empirical analysis of the determinants of export performance. Most prominent in this respect are firm size, age and productivity, whether the firm is part of a broader enterprise group, the number of affiliates, foreign ownership, capital intensity, investments, the degree to which the firm is innovative, the geographic location of the firm within the home country and the composition of the labor force in terms of wage level, education level or type of skills. However, many of these firm characteristics yield mixed evidence with respect to

²The determinants of export success have also received considerable attention in the business literature. However, due to the more qualitative nature of the studies in this field we will not further elaborate on this strand of literature.

their association with export performance. For example, the more productive firms generally have a higher export propensity and duration of exports (Görg et al., 2012; Gullstrand and Persson, 2015; Inui et al., 2017; Brakman et al., 2018), but the evidence regarding export intensity is much more mixed (Barrios et al., 2003; Conti et al., 2010; Smeets et al., 2010; Eikerpasch and Vogel, 2011; Lejárraga and Oberhofer, 2015; Masso et al., 2015).

The direct link between importing and export behavior is sparsely researched however. Brakman et al. (2018) show that being an importer is associated with a higher export propensity. Inui et al. (2017) on the other hand show that being an importer does not lower the probability of exiting exporting. Finally, Stirbat et al. (2013) show that having experience with particular countries as an importer increases the probability of survival as an exporter on that market.

Moreover, the importing behavior of the firm may also affect export performance indirectly through productivity. The rationale for the link between importing and productivity is manifold. Importing may enable firms to procure intermediate inputs at lower cost or of higher quality because of the wider variety available to the firm on international sourcing markets. In addition, firms could benefit from importing state-of-the-art intermediate inputs from the technological frontier or they could learn from their foreign suppliers (spill-over effects). A few papers dig into this indirect link between importing and export behavior. Aristei et al. (2013) show that importing positively affects exports (foreign sales) indirectly through increased productivity and product innovation. These findings are corroborated by Feng et al. (2016); Edwards et al. (2018) who additionally acknowledge the transmission mechanism of the lower cost of imports. Bas and Strauss-Kahn (2014) show that the number of imported varieties (the number of different products) and their origin (developing or advanced country) affect the number of exported varieties by the firm both directly and indirectly (by boosting productivity). Finally, trade liberalization may also play a moderating role in this relationship. Bas (2012); Kasahara and Lapham (2013) show that import tariff cuts foster imports and in turn lead to additional exports through productivity gains.

Specific dimensions of the export behavior of the firm are also widely considered as factors explaining its export performance. Firm experience with exporting (per se or with specific markets) is often included in the analysis in this respect and generally shows to have a positive impact on export performance (see amongst many others Stirbat et al. (2013); Gullstrand and Persson (2015); Araujo and Ornelas (2016); Bernini et al. (2016)). The initial value of the export relationship is generally controlled for in survival analysis as well (e.g. Freund and Pierola (2010); Görg et al. (2012)). The underlying

premise being that the larger the initial value the larger the commitment of the exporter with the new export endeavor and thus the higher the probability of survival. Whether the exported product or destination constitutes a key or core element in the export portfolio of the firm also shows to positively affect the duration of the export relationship (Békés and Muraközy, 2012; Gullstrand and Persson, 2015).

In addition, a relatively new strand of research has been emerging that links the degree to which firms are financially constrained to their export performance. The results generally indicate that limited access to finance does indeed hamper the export performance of firms, see amongst others Greenaway et al. (2007); Muûls (2008); Bellone et al. (2010); Minetti and Zhu (2011); Askenazy et al. (2011); Görg and Spaliara (2018).

A considerable amount of research investigates industry-level determinants of firm-level export performance. A few studies investigate spill-over effects such as the impact of the R&D intensity of the industry in which the firm operates on export performance (Barrios et al., 2003; Greenaway et al., 2007). Others focus on network-type effects for example by analyzing if the number of incumbent exporters to a certain destination correlates with survival rates, which it generally shows to do (Creusen and Lejour, 2012; Ilmakunnas and Nurmi, 2010; Tovar and Martinez, 2011; Stirbat et al., 2013; Inui et al., 2017).

Finally, numerous papers consider the impact of the characteristics of the destination country on export performance. Gravity type factors frequently staging in this strand of research include distance, size, growth and level of development of the destination economy, trade policy measures (import tariffs, trade agreements, etc.) and cultural or linguistic similarity (see e.g. Smeets et al. (2010); Békés and Muraközy (2012); Creusen and Lejour (2012); Stirbat et al. (2013); Gullstrand and Persson (2015); Albornoz et al. (2016)). The results are generally intuitively straightforward. For example, exit rates show to be higher on more distant markets and lower on larger, richer or faster growing markets.

3 Data and methodology

3.1 Data sources

The empirical analysis is derived from a combination of firm-level data and country-level data. The firm-level data are maintained by Statistics Netherlands and are derived from five separate databases: (i) the Registry of Business Demographics (RBD), (ii) the International Trade in Goods Statistics,

(iii) the International Trade in Services Statistics, (iv) Baseline and (v) the Structural Business Statistics (SBS). Our sample spans the years 2008 through 2016.

The Registry of Business Demographics is the backbone of the firm-level data infrastructure and contains information on every firm located in the Netherlands, providing basic firm characteristics such as the sector in which it operates in accordance with internationally harmonized NACE and ISIC classifications, firm size in terms of employment, etc. A separate but related database is used to identify whether the main ultimate controlling institution (UCI) of the firm is located within the Netherlands or abroad, indicating if the firm belongs to a foreign multinational company (MNC). In addition, the main feature of the RBD is the focus on panel data analysis in the sense that it enables us to track individual firms through time by accommodating statistical events such as recodings.

The Trade in Goods Statistics database provides information on all goods exports and imports by individual firms registered in the Netherlands. Extra-EU trade is recorded by the Customs Authority. These data always include product information at the 8-digit Combined Nomenclature (CN) level and specification of origin and destination country. Intra-EU imports and exports are recorded by the Dutch Tax Authority. Firms with intra-EU import and/or export values larger than a total of 1.2 million euro (threshold in 2016) are required to specify their trade transactions at the 8-digit level according to the CN and specify the origin and destination of trade through an additional questionnaire from Statistics Netherlands. Below this threshold firms only need to report the total import and export value of intra-EU trade. However, since 2013, the export data do comprise of a full decomposition of destination country, also for firms below the reporting threshold, through a combination with the Intra-Community Transactions Declaration data. The trade data available at the firm level cover more than 80% of annual aggregate trade in terms of value in the Netherlands.³

We translate the product dimension of trade into a categorization reflecting the factor intensity of imported goods, following the product classification developed by [Van Marrewijk \(2002\)](#) into five types of product. This classification differentiates between five categories: (i) Primary products, such as meat, fruit, sand, oil, and iron ore, (ii) natural-resource-intensive products, such as leather, wood, copper and aluminum, (iii) unskilled-labor-intensive products, such as various textiles, clothing, ships, furniture and footwear,

³The trade data are recorded on VAT-numbers. Connection to the firm identification key used by Statistics Netherlands leads to a merging loss of about 20% of annual trade values, because of foreign firms trading on Dutch VAT-numbers without a physical representation in the Netherlands. These firms are not registered in the RBD.

(iv) technology-intensive products, such as various chemicals, medicaments, plastics, machines, telecommunications and optical equipment, (v) human-capital-intensive products, such as synthetic colors, cosmetics, rubber and tires, various types of steel and iron, televisions, cars and jewelry. The data concerning goods exports additionally enable a distinction between re-exports and exports of Dutch products.

The Trade in Services Statistics database is less comprehensive than the trade data concerning goods trade. Firm-level data concerning services trade only distinguishes between individual EU-countries as the origin or destination of trade, destinations outside the European Union are lumped together. In addition, this database does not provide details regarding the types of services traded.⁴

The Baseline database contains a wide range of financial information on Dutch firms obtained from corporate tax declarations and income tax declarations. As this data source is characterized by a slight underrepresentation of large firms we combine the financial data from Baseline with information from the Structural Business Statistics which contains information on the production and cost structure of large firms derived from a survey.⁵ The information from the combined databases is used to operationalize variables such as labor productivity, value added at factor costs and wages.

The firm-level data is complemented with typical country-level data serving as input for gravity models of trade, such as geographical distance to the Netherlands, economic size measured by nominal income and GDP growth. These data are taken from the World Bank's World Development Indicators database and CEPIL.

We combine the data from the various sources in two separate data sets in which an observation expresses the exports of product X by firm A to country B in year Y.⁶ In the first data set we only use exports of services with a sample period ranging from 2012 to 2016.⁷ Since trade in services data only singles out EU-destinations this data set distinguishes between 27 EU destination countries and the rest of the world as an aggregate. The second data set only

⁴The Trade in Services Statistics database excludes trade in travel services, insurance services, activities of special purpose vehicles and passenger air transport services.

⁵We do not combine information from the two sources for individual firms within the sample period. That is, for each firm we take the required information either from Baseline or from the SBS, whichever provides the best coverage for that particular firm.

⁶Only the destination country of exports is recorded, not the buying firm. This implies that we do not know if the exporter has just one or more customers in a destination country. In addition, the nature of the contractual arrangements is unobserved. This implies that we are unable to separate between one-time export orders and long-term contracts with pre-arranged delivery schedules.

⁷Trade in services data is only available from 2012.

includes trade in goods, separating between re-exports and exports of Dutch products and covering the years 2008-2016. Since the level of detail is much higher for goods trade, we can distinguish any individual destination country in the world in this data set. This enables us to investigate if the higher level of detail at the destination country level reveals any additional heterogeneity in the empirical results.

We apply a nominal lower boundary to firm-year-destination export values of 5000 euro. That is, in the survival analysis we exclude export spells that exclusively consist of firm-year-destination export values of less than 5000 euro. In case at least one observation exceeds this threshold, we treat the export data as is.⁸ The same logic is applied to the regressions concerning export growth. We only include export growth observations if at least one of the observed firm-year-destination export values in $t-1$ and t exceeds the 5000 euro threshold. In addition, we exclude firms with less than 1 employee from our analysis. Both measures are taken in order to tackle the issue of marginal exporting. Besides these two measures we treat the export data as is in the sense that an export spell is defined as a series of consecutive years of reported export values larger than zero to a particular country. That is, one-year gaps in the export data are treated as the end of a spell followed by the start of a new spell.

3.2 Empirical approach

We choose two different econometric approaches to tackle our research questions. We employ an ordinary least squares regression model to investigate the extent to which importing behavior is associated with export growth.⁹ The relationship between importing and survival on export market is detailed by means of a duration model. We harmonize the set of explanatory variables included in both models as much as possible.

⁸For example, a firm reporting re-exports to Germany of respectively 1000, 2000 and 4000 euro in three consecutive years is not taken into consideration in the survival analysis. If the spell would consist of export values of 1000, 12000 and 4000 euro we would consider this as an export spell of three years in the survival analysis.

⁹We also run the model using a fixed effects specification. The results of this alternative approach are presented in the appendix and will not be further discussed in the main text. Considering the fact that the majority of the firms in our sample consistently imports, this implies that the individual firm-specific intercept would capture the effect of import status on export growth for those firms where the import status does not alter during the observed period. The estimated coefficient will then only reflect the effect of switching import status on export growth, which is in principle a different issue.

Export growth

In our ordinary least squares panel regressions, the dependent variable is the growth of the value of exports of firm i to destination country c in year t relative to year $t - 1$ or in log-linear first-difference terms $expgr_{ict} = e^{\ln(exp_{ict}) - \ln(exp_{ict-1})} - 1$. We run separate regressions for (the growth of) goods exports of Dutch products, re-exports of goods and exports of services. Considering the fact that trade in services data only distinguish the country dimension for intra-EU exports, we run our regressions on goods trade separately on the full set of destination countries and on the subset of EU-destinations for a total of 5 baseline regression specifications. This enables us to qualitatively compare the regressions results regarding goods and services exports. Our baseline regression model is specified as follows:

$$\begin{aligned}
 (expgr_{ict}) = & \beta_1 + (\beta_2 \ln(imports_{ict}) | \beta_2 dumimports_{ict}) \\
 & + \beta_3 dumaddimports_{it} + \sum_{g=5}^5 \beta_g typeofimports_{it} \\
 & + \beta_9 initialtransaction_{ict} + \beta_{10} noofdestinations_{it} + \beta_{11} \ln(totexports)_{it} \\
 & \quad [+ \beta_{12} \ln(nexpproducts)_{ict}] + \beta_{13} SME_{it} + \beta_{14} \ln(productivity)_{it} \\
 & + \beta_{15} prodgrowth_{it} + \beta_{16} sector_{it} + \beta_{17} \ln(noofexporters)_{it} + \beta_{18} GDP_{ct} \\
 & + \beta_{19} GDPgrowth_{ct} + \beta_{20} landlocked_c + \beta_{21} \ln(distance)_c + \beta_{22} year_t + e_{it}
 \end{aligned} \tag{1}$$

In this model subscript i identifies the exporting firm, t indexes the year and c denotes the destination country of exports. The main explanatory variables of interest in both the OLS-regressions and the survival analysis concern the importing behavior of the exporter. The identification of the variables with respect to importing activities mostly concerns the imports of both goods and services. We operationalize several variables capturing the importing behavior of the firm. We investigate to what extent importing from the same country affects export growth on that destination, either in value terms $\ln(imports_{ict})$ or in terms of a dummy variable $dumimports_{ict}$. Looking at both the import status and the value of imports enables us to qualitatively assess the differential impact of the existence of a network of trading partners in a particular country and the breadth of that local network.

We also include a dummy variable indicating if the firm imports from any other source country ($dumaddimports_{it}$) than the country to which it exports. Regarding the importing of goods we construct a dummy variable set ($typeofimports_{it}$) with value 1 for the most important (the largest share in total goods imports) type of good the firm imports, separating between primary products, natural-resource-intensive products, unskilled-labor-intensive

products, technology-intensive products and human-capital-intensive products (see section 3.1).¹⁰ An additional dimension of the trading network that may affect the success of individual exporters to a particular country is the number of incumbent exporters from the same domestic industry to the same destination country ($\ln(\text{noofexporters})_{it}$).

In addition to this, we also control for several measures of the export experience and commitment of the individual firm: the value of the initial export transaction ($\text{initialtransaction}_{ict}$), the number of export destinations it serves ($\text{noofdestinations}_{it}$), the total value of its exports ($\ln(\text{totexports})_{it}$) and the number of exported products ($\ln(\text{nexpproducts})_{ict}$), with the latter mirroring its import-equivalent in a separate set of regressions on extra-EU exports. Firm characteristics we control for include firm size by means of a dummy variable indicating if the firm is an independent SME (SME_{it}) and industry of activity (sector_{it}) by including a full set of industry fixed effects at 1-digit level of the NACE-classification.¹¹ In addition, we include labor productivity ($\ln(\text{productivity}_{it})$) measured as value added per worker and its growth rate (prodgrowth_{it}).¹² Finally, we also include a number of gravity-type determinants of trade patterns, such as geographical distance ($\ln(\text{distance})_c$), size (GDP_{ct}) and economic growth (GDPgrowth_{ct}) of the destination country and a dummy indicating if the destination country has sea access (landlocked_c). All regressions also include a full set of year fixed effects. The list of dependent and independent variables, their operationalization and their source are summarized in Table 1.

¹⁰Note that the five product categories are not multi-collinear on account of an existing sixth category of non-categorized and unclassified imports. We do not include this non-informative product category in our model implying that the remaining five product groups are not multi-collinear.

¹¹An independent SME is a firm with less than 250 employees jointly at the highest national aggregate level of the firm (the enterprise group). In addition, firms of which the ultimate controlling institution is located outside the Netherlands are always considered to be part of a large multinational enterprise (MNE) and fall outside the definition of an independent SME. In other words, this dummy variable implicitly controls for foreign ownership status. We are unable to control for industry of activity at a more disaggregated level because of computational issues.

¹²Negative labor productivity figures are dropped from the analysis in the log-transformation. In addition, we exclude the top 1 percent of the observations along the productivity distribution in order to eliminate implausible observations due to measurement error, which we are unable to further investigate due to confidentiality considerations.

Table 1: Description of variables

Variable	Description	Source
A. Dependent variables		
Firm-destination export growth	growth of the value of firm exports to the destination country	CBS
Duration of firm-destination export spell	number of consecutive years of exports to destination country	CBS
B. Independent variables		
<i>Firm import behavior</i>		
Imports from destination (dummy)	1 if the firm also imports from the destination country of exports	CBS
Imports from destination (ln, value)	(log of) value of imports from the destination country of exports	CBS
Imports from other countries (dummy)	1 if the firm also imports from other countries than the destination of exports	CBS
Most prominent imported product group (dummy)	1 for the most important imported product group in terms of factor intensity	CBS
<i>Firm characteristics</i>		
Initial export transaction (ln, value)	(log of) the export value in the first year of the export spell	CBS
Number of export destinations (ln)	(log of) the total number of export destination served by the firm	CBS
Total exports (ln, value)	(log of) the total value of exports of the firm	CBS
Number of exported products (ln)	(log of) the number of exported products at the 3-digit level of CN	CBS
Independent SME (dummy)	1 if the firm is an SME and not belonging to a large enterprise group or MNC	CBS
Labor productivity (ln)	(log of) value added per employee	CBS
Labor productivity growth	growth of the value added per employee	CBS
Industry of activity	1-digit NACE industry classification	CBS
<i>Destination market characteristics</i>		
Exporters from same domestic industry (ln)	(log of) number of incumbent exporters from the domestic industry to destination country	CBS
Distance (ln)	(log of) distance in km between Amsterdam and most populated city	CEPII
Landlocked (dummy)	1 if the destination has no access to seas	CEPII
GDP (ln, value in USD)	(log of) GDP of the destination country in USD	WDI
GDP growth	%	WDI

Export survival

We explore the relationship between importing behavior and subsequent export survival on destination markets by estimating a discrete-time duration model adopting the approach of, e.g., [Esteve-Pérez et al. \(2007\)](#), [Brenton et al. \(2010\)](#), [Ilmakunnas and Nurmi \(2010\)](#) and [Fu and Wu \(2014\)](#). The dependent variable in the survival analysis is the duration of the export spell of the firm on a particular destination market. When export duration data is constructed, a censoring problem arises because we do not know when firms started exporting if they export in the first year we observe. This problem is known as left-censoring. [Brenton et al. \(2010\)](#), [Stirbat et al. \(2013\)](#) and [Fu and Wu \(2014\)](#) choose to exclude these spells from their analysis. This implies that conclusions about the duration of export relations refer only to new exports rather than to existing export flows. We choose to run our univariate analysis both with and without left-censored observations, in order to be able to assess the impact of this subset of exporters on our findings. It seems intuitive to expect that the duration of export relations increases when we include left censored observations, since these concern on average larger exporters with more steady export relations. However, since left-censored observations can easily disturb the estimation results of a duration model,

we exclude these observations in our final multivariate survival model.

In addition, export relations of many firms will continue past the final observation in our data set. This problem, known as right-censoring can be dealt with by duration estimation techniques. The information on the survival time up to the censoring point is used, without making any inference about what will happen to the export spell subsequently. Since the data are organized in annual observations, a discrete time model is more appropriate than a continuous time model such as Cox’s proportional hazards model (Cox, 1972). The model proposed by Prentice and Gloeckler (1978) is a discrete-time equivalent of the Cox model. Let’s denote the discrete hazard (the probability of firm i ending a spell in time interval $]t_{k-1}, t_k]$ given that the spell has not ended before the beginning of this interval and conditional on the observed explanatory variables \mathbf{x}_i) as $h_{ik} = P(t_{k-1} < T_i \leq t_k | T_i > t_{k-1}, \mathbf{x}_i)$. Following Prentice and Gloeckler (1978), we assume that the hazard rate h_{ik} follows a complementary log-log distribution:

$$h_{ik} = 1 - \exp[-\exp(\boldsymbol{\beta}'\mathbf{x}_i + \gamma_k)]. \quad (2)$$

This can be rewritten as

$$\log(-\log(1 - h_{ik})) = \boldsymbol{\beta}'\mathbf{x}_i + \gamma_k, \quad (3)$$

where the coefficient vector $\boldsymbol{\beta}$ is identical to that of the continuous-time proportional hazards model, and γ_k is the interval baseline hazard, expressing the probability of an export spell ending after k years. The vector \mathbf{x}_i contains time specific characteristics of the exporter, its import behavior and the characteristics of the destination markets along the lines discussed above. The discrete-time survival model is therefore equivalent to the binary response model with complementary log-log link function. In each time interval, the response is dichotomous, corresponding to whether or not the exporting spell ended. The model allows us to control for unobserved individual heterogeneity by incorporating a random effect $u_i = \log \nu_i$, where ν_i is assumed to be Gamma distributed with unit mean and variance σ^2 ,

$$\log(-\log(1 - h_{ik})) = \boldsymbol{\beta}'\mathbf{x}_i + \gamma_k + \nu_i. \quad (4)$$

The so-called frailty term ν_i acts multiplicatively on the underlying continuous hazard function: $h(t) = h_0(t)\nu_i \exp(\boldsymbol{\beta}'\mathbf{x}_i)$. The more “frail” a firm is, the lower are its chances of survival in an export market. We only consider the longest spell at the firm-country level in our analysis, since the frailty term is unable to control for the correlation between the spells within an individual firm-country combination.

4 Empirical findings

4.1 Export growth

We start the discussion of our findings by presenting our regression results focussing on export growth on the destination market as the dimension of export performance of interest. The results are presented in Tables 2 and 3. Recall that the dependent variable is the growth of the value of exports of individual firms to individual destination countries. Columns (1) and (2) contain the results of the regressions concerning Dutch products, columns (3) and (4) concern re-exports and column (5) concerns exports of services. The regressions presented in columns (2) and (4) focus on export growth on EU-markets, thereby allowing a comparison with the results concerning exports of services in column (5) for which the extra-EU country dimension is unavailable.

All regressions indicate that export growth is higher for firms sourcing (importing) from the same country, both in terms of value (Table 2) and per se (Table 3). The estimated coefficients are considerably higher for re-exports than for exports of Dutch products. This is an intuitive finding considering the fact that, by design, re-exports depend much stronger on imports than exports of Dutch products. Nonetheless, this dimension of import behavior particularly concerns imports from the destination country of exports which suggests that in addition to the import-dimension of re-exporting there is also a network effect at play. That is, the results suggest that firms which are familiar with a market and are in possession of a network of contacts and trading partners in a particular country, are able to generate higher export growth on that market. The fact that the coefficients for services export growth are even higher provides additional support for this hypothesis, since the nature of services trade makes it less likely that firms are able to increase export growth on a particular market by processing intermediate services from the same country. In other words, particularly with respect to services it seems intuitive that the market experience and network effect is a prominent factor explaining the positive association between importing and export growth. The importance of familiarity with a particular market and the possession of a network of contacts and trading partners may also explain the consistently negative coefficients concerning importing from other countries in the sense that being deeply integrated in other markets may be associated with a relatively poor export performance on markets where the firm is less well-connected. The main type of product the firm imports also shows to be associated with export growth. Exporters mainly importing primary products are able to generate higher export growth. On the contrary,

firms with a focus on importing unskilled labor intensive, high-tech or human capital intensive goods are less successful in expanding exports, particularly re-exports. The underlying data reveal that the latter result is most likely due to wholesaling. That is, re-exporters with a dedicated import portfolio in either one of these three product categories mainly concern wholesalers. Wholesaling is generally characterized by large volumes rendering it relatively difficult to generate high growth rates of gross exports. Nonetheless, this does not explain the significantly positive coefficient for dedicated importers of primary products, since these firms also tend to be wholesalers.

The initial export value is significantly negatively correlated with export growth. In other words, the larger the first transaction when a firm first starts exporting to a particular country, the lower its subsequent export growth on that market. This makes sense of course, since it is relatively easier to generate higher growth after starting with smaller export volumes. The number of export destinations the firm serves is positively associated with export growth on individual markets, with the largest coefficients found for re-exports. This is another indication that firms with a more dense network of trading partners in general are able to outperform less well-connected exporters. The total value of firm exports is negatively associated with export growth. This is a straightforward result, since it is easier to achieve strong export growth in relative terms for a small exporter than for a large and established exporter which is more likely to already generate a considerable export turnover on individual destination markets.

The dummy variable for independent SMEs returns a significant and in most specifications negative coefficient. This suggests that SMEs in general are less well connected to foreign markets, particularly given the fact that we consider small firms that are part of a multinational conglomerate non-SMEs. This type of small firm is integrated in cross-border networks by design. Nonetheless, the regressions concerning export growth of Dutch products in Table 3 return a positive and significant coefficient. An explanation for the aberration is not evident. Our results also show that goods export growth increases in productivity growth, but decreases in productivity levels. An explanation for these results may be that the 'better' firms in terms of productivity are more likely to have a strong export base already, making it more difficult to generate strong export growth rates than less experienced and efficient exporters who may still be involved in a learning process of increasing efficiency.

Table 2: Regression results destination country export growth (OLS)

	Dutch products		re-exports		services
	world	EU	world	EU	EU
<i>Import behavior</i>					
Imports from destination (ln, value)	0.011*** (25.193)	0.010*** (17.432)	0.020*** (37.021)	0.023*** (36.688)	0.033*** (42.830)
Importer from other countries (dummy)	-0.133*** (-16.169)	-0.170*** (-13.966)	-0.216*** (-6.393)	-0.272*** (-6.196)	-0.238*** (-24.784)
<i>Most prominent imported product group (dummy)</i>					
Primary products	0.037*** (4.983)	0.064*** (6.171)	0.030*** (2.616)	0.022*** (1.656)	
Natural resource intensive products	0.012 (1.590)	0.029*** (2.661)	-0.010 (-0.807)	-0.005 (-0.336)	
Unskilled labor intensive products	-0.002 (-0.251)	0.012 (1.089)	-0.028** (-2.341)	-0.026* (-1.855)	
Technology intensive products	-0.028*** (-3.898)	-0.004 (-0.435)	-0.081*** (-7.467)	-0.065*** (-4.997)	
Human capital intensive products	-0.010 (-1.288)	-0.001 (-0.142)	-0.066*** (-5.819)	-0.085*** (-6.398)	
<i>Firm characteristics</i>					
Initial export transaction (ln, value)	-0.077*** (-82.526)	-0.058*** (-43.943)	-0.072*** (-56.299)	-0.067*** (-43.397)	-0.022*** (-17.638)
Number of export destinations (ln)	0.171*** (52.874)	0.152*** (32.440)	0.312*** (61.807)	0.260*** (44.129)	0.197*** (34.960)
Total exports (ln, value)	-0.067*** (-53.315)	-0.092*** (-50.716)	-0.134*** (-84.038)	-0.145*** (-70.928)	-0.157*** (-66.796)
Independent SME (dummy)	-0.015*** (-3.329)	-0.017*** (-2.945)	-0.083*** (-13.252)	-0.078*** (-11.240)	-0.188*** (-21.531)
Labor productivity (ln)	-0.000*** (-9.615)	-0.000*** (-6.538)	-0.000*** (-13.211)	-0.000*** (-9.643)	0.001*** (20.719)
Labor productivity growth	0.037*** (7.356)	0.035*** (4.962)	0.024*** (3.433)	0.029*** (3.588)	0.001*** (8.962)
<i>Destination market characteristics</i>					
Exporters from same dom. industry (ln)	0.029*** (16.839)	0.016*** (5.003)	0.005* (1.842)	0.008** (2.087)	-0.010*** (-2.718)
GDP (ln, value in USD)	-0.006*** (-2.781)	-0.009** (-2.468)	-0.004 (-1.115)	0.006 (1.459)	-0.045*** (-7.387)
GDP growth	0.0001*** (10.939)	0.0002*** (4.330)	0.0001*** (7.330)	0.0003*** (4.965)	0.0005*** (3.697)
Landlocked (dummy)	-0.043*** (-7.477)	-0.036*** (-4.745)	-0.007 (-0.843)	0.035*** (3.793)	-0.165*** (-13.413)
Distance (ln)	-0.009*** (-14.722)	-0.046*** (-7.776)	-0.008*** (-9.081)	0.009 (1.191)	-0.154*** (-15.852)
Constant	1.349*** (35.977)	1.750*** (27.885)	1.498*** (24.961)	1.766*** (21.905)	1.630*** (19.181)
No. of observations	720,821	347,436	505,595	298,215	211,983
Adjusted R^2	0.022	0.022	0.031	0.041	0.097

Notes: All regressions include a full set of industry (NACE 1-digit) and year fixed effects. t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Regression results destination country export growth (OLS, cont.)

	Dutch products		re-exports		services
	world	EU	world	EU	EU
<i>Import behavior</i>					
Imports from destination (dummy)	0.040*** (4.557)	0.036*** (2.982)	0.166*** (24.858)	0.206*** (26.766)	0.234*** (29.297)
Importer from other countries (dummy)	-0.376*** (-24.005)	-0.501*** (-20.687)	-0.210*** (-6.228)	-0.268*** (-6.083)	-0.212*** (-21.706)
<i>Most prominent imported product group (dummy)</i>					
Primary products	0.068*** (5.049)	0.109*** (5.705)	0.058*** (5.027)	0.054*** (3.986)	
Natural resource intensive products	0.018 (1.260)	0.026 (1.274)	-0.003 (-0.256)	0.004 (0.254)	
Unskilled labor intensive products	-0.007 (-0.526)	0.015 (0.753)	-0.014 (-1.226)	-0.012 (-0.894)	
Technology intensive products	-0.034*** (-2.610)	-0.035* (-1.884)	-0.049*** (-4.425)	-0.035*** (-2.686)	
Human capital intensive products	0.019 (1.429)	0.025 (1.306)	-0.041*** (-3.562)	-0.058*** (-4.305)	
<i>Firm characteristics</i>					
Initial export transaction (ln, value)	-0.082*** (-53.044)	-0.071*** (-31.723)	-0.067*** (-52.718)	-0.062*** (-40.612)	-0.021*** (-16.607)
Number of export destinations (ln)	0.295*** (57.138)	0.301*** (36.057)	0.306*** (60.657)	0.260*** (43.992)	0.201*** (35.540)
Total exports (ln, value)	-0.112*** (-104.505)	-0.117*** (-83.015)	-0.131*** (-82.485)	-0.141*** (-69.070)	-0.148*** (-63.231)
Independent SME (dummy)	0.047*** (6.126)	0.057*** (5.353)	-0.086*** (-13.759)	-0.082*** (-11.731)	-0.212*** (-24.238)
Labor productivity (ln)	-0.00000*** (-2.667)	-0.00000 (-0.546)	-0.00000*** (-12.883)	-0.00000*** (-9.425)	0.001*** (21.509)
Labor productivity growth	0.034*** (3.860)	0.018 (1.423)	0.024*** (3.405)	0.028*** (3.518)	0.001*** (8.836)
<i>Destination market characteristics</i>					
Exporters from same dom. industry (ln)	0.045*** (14.485)	0.032*** (5.463)	0.012*** (4.471)	0.009** (2.388)	-0.005 (-1.337)
GDP (ln, value in USD)	-0.005 (-1.427)	-0.014** (-2.100)	-0.004 (-1.149)	0.002 (0.514)	-0.048*** (-7.939)
GDP growth	0.0001*** (8.686)	0.0002** (2.249)	0.0001*** (7.146)	0.0003*** (4.366)	0.0004*** (3.259)
Landlocked (dummy)	-0.038*** (-3.772)	-0.063*** (-4.582)	-0.019** (-2.305)	0.014 (1.512)	-0.184*** (-14.957)
Distance (ln)	-0.005*** (-4.320)	-0.089*** (-8.385)	-0.010*** (-10.675)	-0.020*** (-2.767)	-0.172*** (-17.704)
Constant	1.538*** (23.945)	1.506*** (14.021)	1.412*** (23.526)	1.699*** (21.064)	1.551*** (18.185)
No. of observations	892,138	451,145	505,595	298,215	211,983
Adjusted R^2	0.019	0.022	0.029	0.039	0.093

Notes: All regressions include a full set of industry (NACE 1-digit) and year fixed effects. t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The number of incumbent exporters from the same domestic industry is generally positively associated with export growth, particularly for goods trading. This indicates that firms benefit from the accumulated experience and the network of trading partners and contacts of competing firms from the same domestic industry. Finally, we turn to the gravity model of trade type set of explanatory variables. Distance returns a consistently negative association with export growth. That is, the further away the destination market the lower the growth rates exporters are able to achieve. This is most likely

explained by increasing unfamiliarity with more distant markets translating into higher risk and poorer export performance. Another straightforward finding is that export growth consistently increases in the economic growth rate of the destination economy. The size of the destination economy returns mixed results, but the significant coefficients are consistently negative. This may indicate that it is not evident for exporters to attain high export growth on larger and more mature markets which are supposedly associated with slower growth rates as well. As expected, exporters have more difficulties to expand their sales in landlocked economies, except for re-exports to EU-destinations. This makes sense, simply because these countries (Austria, Czechia, Slovakia and Hungary) are only a short distance from the Netherlands and easily reached over land, for example from the port of Rotterdam, a major seaport for re-exports. The fact that services exports are most negatively associated with lacking sea access is quite surprising however.

4.2 Survival in destination market

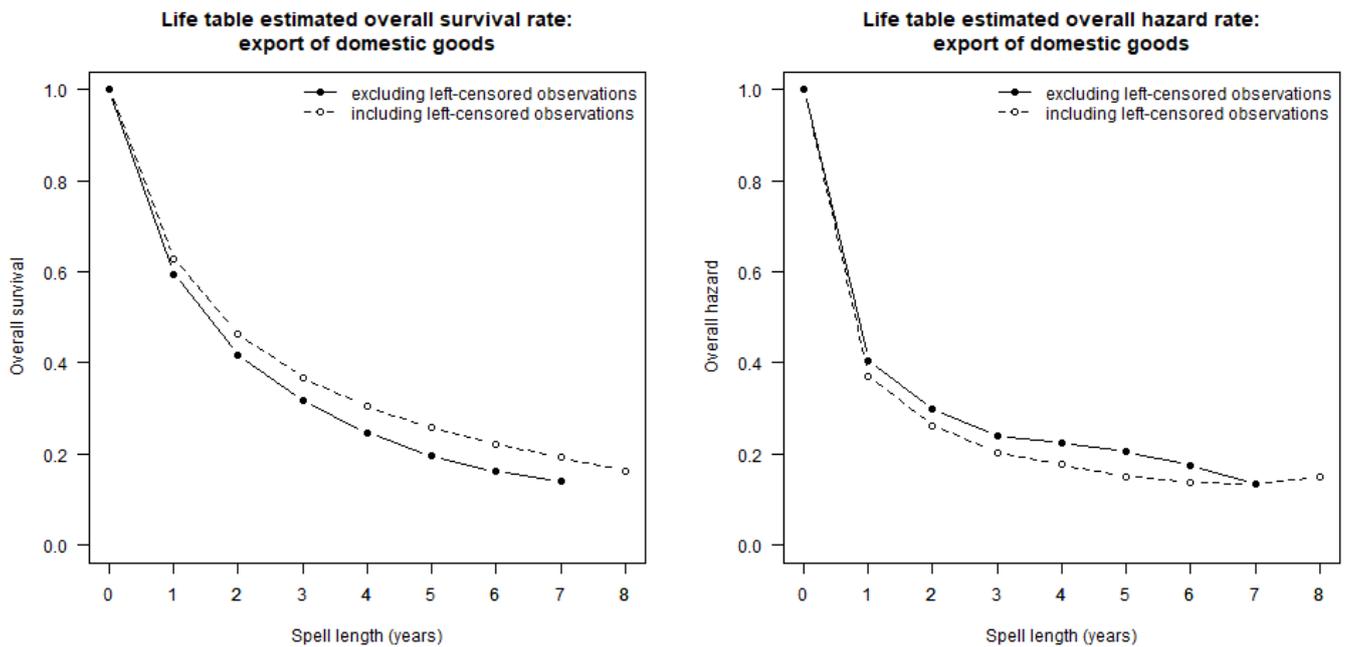
In this section we present our findings regarding the relationship between import behavior and the survival of firms on foreign markets. We proceed in two steps. First we investigate the association between export survival and firm characteristics graphically by plotting a series of survival and hazard curves. Then we proceed to multivariate analysis to further detail the relationship between importing behavior and export survival.

Following the work of [Esteve-Pérez et al. \(2007\)](#); [Brenton et al. \(2010\)](#) and [Fu and Wu \(2014\)](#), we use the life table method to estimate the survival on destination markets and the accompanying hazard rates of Dutch exporters. We distinguish export spells that comprise exports of Dutch products and export spells that comprise re-exports. Figures concerning re-exports are deferred to the Appendix as they show many similarities to those concerning exports of Dutch products.¹³ The left panel of Figure 1 shows that the survival rate of exporters of Dutch products on foreign markets is higher when left-censored observations are included. This is due to the fact that these left-censored spells comprise all long-term export relationships, which are less likely to end. Furthermore, the figure shows that more than half of the firms that start exporting, exit that particular market already in the first year. This finding aligns with most of the empirical literature on this matter (see for example [Esteve-Pérez et al. \(2007\)](#); [Gullstrand and Persson](#)

¹³In addition, we have also mimicked the survival analysis for trade in services. However, since the data concerning trade in services only covers the time period 2013-2016 it is much less suitable for survival analysis. Therefore, we do not present the figures concerning the export of services in the Appendix, without further discussing the results.

(2015)). After having survived the first year, the rate of survival drops considerably less rapidly. The hazard rates, depicted in the right panel of Figure 1, show roughly the same trend, although the hazard is slightly higher in early years for firms that started exporting after 2008 (spells that are not left-censored).¹⁴ These results suggest that exclusion of left-censored spells will prompt underestimation of firms' export duration, a notion important to keep in mind for the remainder of this section.

Figure 1: Overall survival and hazard rates of export of domestic goods



Next, we turn to our research question by comparing the survival on export markets for importers versus non-importers. Note that in this step the origin of imported goods doesn't necessarily coincide with the export destination; it may for example concern a chocolate manufacturer that imports cocoa beans from Ivory Coast and exports chocolate bars to Sweden. Hence, in this univariate analysis the import status indicates whether a firm imports any goods at all, in the following multivariate analyses we will further detail the firm's import behavior. As the import status can change during an export

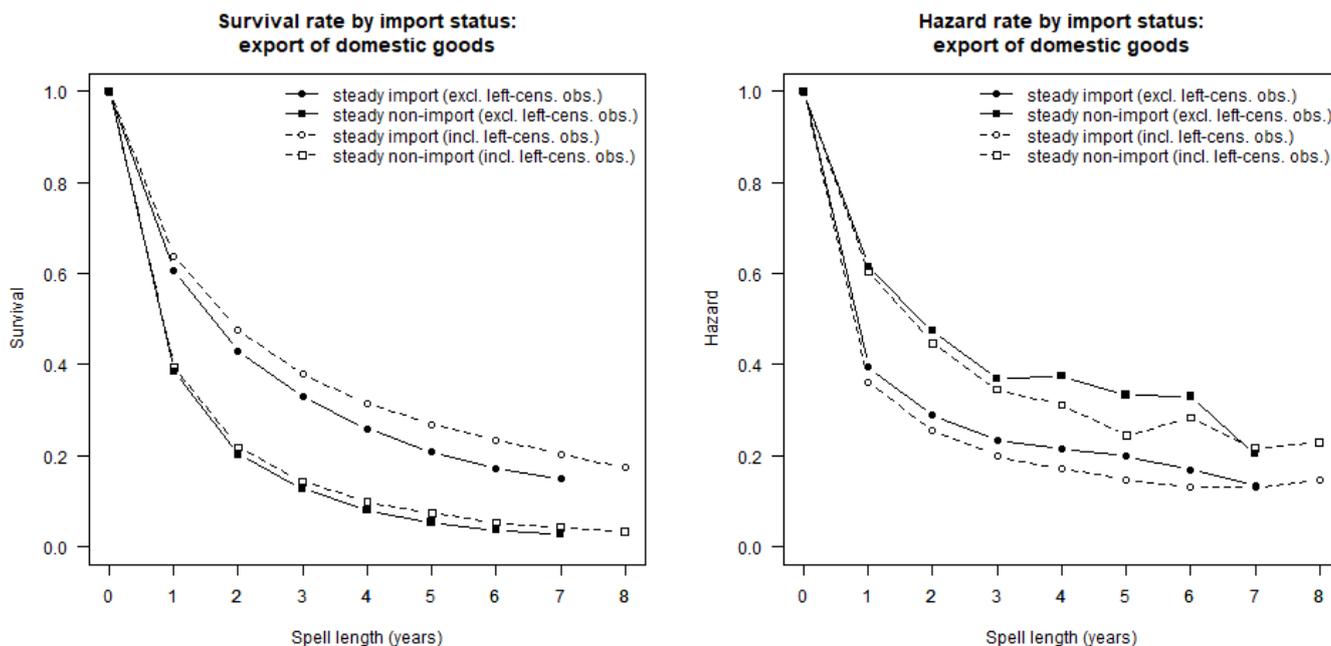
¹⁴The difference between de hazard rate and the survival rate is best illustrated by means of an example such as the daily testing of a set of light bulbs (with regards to an anonymous contributor to a statistics forum). The hazard rate would be the number of broken bulbs divided by the number of working bulbs by day. The survival rate would be share of working bulbs in the total set by day.

spell, we compare steady importers (firms that consistently import during the entire export spell) to steady non-importers (firms that consistently source domestically during an export spell).¹⁵ This analysis gives an indication of the extent to which familiarity with foreign markets and access to a wider variety of cheaper or better inputs by being active as an importer translates into differing survival rates on export markets. Note that the depicted relationship between import status and export survival should be interpreted as an association, not necessarily as a causal relationship.

The association between (steady) import status and survival and hazard rates is depicted in Figure 2. Importers show to have a considerably higher probability of survival on the export market than non-importers. This is confirmed by the log-rank test for equality of survival functions ($p = 0$). This indicates that firms with a deeper involvement in international markets in general are more prone to stay in export markets. Note that the survival curve of starting exporters that do not import at all during the export spell almost coincides with the survival curve of the full sample of non-importing exporters (including left-censored observations). This is intuitive because there are simply very few long-lasting exporters that do not import.

¹⁵We also investigated the survival rates of switching importers. However, the number of observations in this subset is relatively small and single year export spells do not exist by design, because a firm is either an importer or a non-importer in that single year. This renders presenting the resulting curves moot. We suffice by stating that the survival rates of switching importers do not differ much from the survival rates of steady importers.

Figure 2: Survival and hazard rates of export of domestic goods by import status



Extending the univariate analyses, we proceed to a multivariate setting enabling us to detail the import behavior of the firm and additionally control for firm and destination specific characteristics along the lines of the model detailed in section 3.2. Due to the discrete nature of the data, we estimate a discrete-time duration model using the complementary log-log form of the hazard. This is the discrete counterpart of Cox' proportional hazards model (Cox, 1972; Prentice and Gloeckler, 1978).¹⁶ A likelihood ratio test is performed to reveal the presence of unobserved heterogeneity. The hypothesis of no unobserved heterogeneity is rejected in each specification presented in Table 4. The estimation results presented in Table 4 are thus derived from the regression model including a Gamma frailty.

Table 4 presents the results of the regressions. The duration dependence, the probability that a firm exits a destination market in a particular year given the fact that it has survived on that market up to that moment for a given number of years, is captured by a non-parametric baseline model which includes binary dummy variables corresponding to each duration interval, that is, each one-year period of the export spell. In accordance with

¹⁶The Stata program *pgmhaz8* fits both an ordinary cloglog model and an augmented cloglog model with Gamma distributed unobserved heterogeneity.

the picture emerging from Figure 1, the estimation results reveal a negative pattern of duration dependence. That is, the hazard of export market exit decreases over time after controlling for observable firm and destination market characteristics, indicated by the generally decreasing size of the coefficients of the year dummy variables. This makes sense intuitively. The most crucial phase for a firm entering a new export market is immediately after market entry. After surviving this debut period, when the firm has gotten familiar with the ins and outs of the market, it gets easier to sustain a market position reflected in a gradual drop of the exit probability.

The results regarding the importing behavior of the firm are largely intuitive. Being a two-way trader has a significant and negative effect on the hazard rate. This implies that firms that are importing from the same country as they are (re-)exporting to, face a lower risk of exiting that particular export market. The magnitude of this effect is considerable. Importing from other countries than the destination country has an additional negative effect on the hazard rate of goods trading. However, it has a significant and positive effect on the hazard rate of trade in services. This seems to suggest that particularly for service exports the network dimension of importing is important in the sense that having a network of trading partners and experience in developing contacts in a country adds to the probability of being successful as an exporter rather than the nature of the sourced services. This may even explain the positive coefficient of importing from other countries in the sense that having an extensive trade network on other markets may be tied to the probability of leaving a service export destination where the firm's network is less dense in favor of markets where the firm has a more evolved network of trading partners. For goods trading the coefficients of the importing from other countries dummy variable may additionally reflect the notion that importing intermediate inputs may enable the firm to improve on its export products. This direct connection between imports and exports seems less obvious in terms of services. Nonetheless, the relevance of the characteristics of imported goods is not evidently confirmed when we consider their factor intensities. Only the dedicated importing of human capital intensive products significantly contributes to the probability of survival. A rather surprising finding in this respect is that a focus on importing high-tech products does not translate into better export performance.

The following three control variables concern the export behavior of the firm. The key takeaway here is that the more dedicated and experienced exporters have a significantly lower probability of exiting a particular destination market. The number of export destinations the firm serves and the size of total firm exports in the preceding year have a significant and negative effect on the hazard rate, as does the export value at the start of the

export spell. The only aberration is the finding that the larger the initial export value at the start of a service export spell, the higher the hazard rate. This result could hinge on the underlying type of service provided. It may be the case that larger service export transactions concern large one-off projects more frequently than smaller export transactions. Unfortunately, we are unable to further investigate this issue due to a lack of data.

We also control for several additional firm characteristics. The variable *Independent SME* controls for both size and ownership of a firm, it has value 1 for small firms that do not constitute an element of a larger (multinational) conglomerate. Surprisingly, we see that SMEs show a significantly lower hazard rate when looking at goods trade. This may be due to the fact that other control variables, particularly concerning the export behavior of the firm, may pick up an important part of the effect of firm size on hazard rates. We do find the hypothesized positive and significant coefficient for trade in services. That is, SMEs exporting services face a higher hazard rate than non-SMEs. Our results consistently show that more productive firms are more likely to survive on export markets. This is an intuitive finding in line with existing research (see for example [Fu and Wu \(2014\)](#)). The results regarding the association between labor productivity growth and export survival are mixed.

The final set of five variables presented in [Table 4](#) concern a number of characteristics of the destination country. Our results indicate that the number of exporters from the same domestic industry to a particular destination market is positively associated with the probability of survival. This is another suggestion of the importance of a well-developed and dense trading network, indicating that firms benefit from the experience and network that competing firms from the same domestic industry have accumulated on a particular foreign market. In addition, hazard rates are consistently lower on larger destination markets. This may reflect the fact that firms may be more determined to succeed on large markets because of the large demand potential. The association of GDP growth of the destination country with hazard rates varies over the different specifications. Concerning goods trade we find that higher growth rates of EU-markets are associated with lower exit rates. However, the signs reverse when we include extra-EU goods trade. An explanation for this result could be that fast growing markets outside the EU frequently concern more volatile developing countries resulting in riskier export endeavors and higher failure rates. A rather surprising result is the fact that firms exporting goods to landlocked countries face lower hazard rates than firms exporting to destination countries bordering a sea. This finding may be driven by relatively important landlocked EU- and EFTA-countries such as Switzerland, Austria, Hungary and Czechia, which are important

export destinations for Dutch firms. Finally, the distance to the destination country has a positive and generally significant effect on hazard rates. This implies that the further away the export destination, the larger the probability of exiting that particular market, a finding well in line with existing research (see for example [Gullstrand and Persson \(2015\)](#)).

Table 4: Estimation results for discrete time duration models with gamma frailty

	Dutch products		Re-export		Services
	world	EU	world	EU	EU
<i>Duration dependence (dummy)</i>					
Year 1	1.751*** (27.95)	1.930*** (16.70)	1.763*** (22.77)	1.834*** (15.31)	3.203*** (24.31)
Year 2	1.673*** (26.07)	1.913*** (16.31)	1.730*** (21.93)	1.921*** (15.90)	3.027*** (22.58)
Year 3	1.622*** (24.62)	1.856*** (15.54)	1.705*** (21.15)	1.824*** (14.94)	2.678*** (19.40)
Year 4	1.670*** (24.66)	1.855*** (15.20)	1.777*** (21.52)	1.853*** (14.96)	
Year 5	1.664*** (23.86)	1.809*** (14.46)	1.838*** (21.67)	1.850*** (14.66)	
Year 6	1.486*** (20.57)	1.613*** (15.35)	1.694*** (19.33)	1.724*** (13.34)	
Year 7	1.081*** (13.91)	1.119*** (8.21)	1.293*** (13.83)	1.142*** (8.31)	
<i>Import behavior</i>					
Imports from destination (dummy)	-0.173*** (-20.05)	-0.078*** (-5.82)	-0.131*** (-13.34)	-0.054*** (-4.05)	-0.283*** (-14.00)
Importer from other countries (dummy)	-0.053*** (-5.64)	-0.139*** (-8.09)	-0.477*** (-18.33)	-0.518*** (-11.87)	0.131*** (6.17)
<i>Most prominent imported product group (dummy)</i>					
Primary products	-0.000 (-0.04)	-0.023 (-1.26)	-0.001 (-0.06)	-0.006 (-0.28)	
Natural resource intensive products	0.008 (0.72)	0.013 (0.68)	0.006 (0.40)	0.027 (1.19)	
Unskilled labor intensive products	0.004 (0.34)	-0.026 (-1.42)	-0.015 (-1.07)	-0.014 (-0.61)	
Technology intensive products	0.011 (1.06)	0.016 (0.89)	-0.020 (-1.43)	0.034 (1.61)	
Human capital intensive products	-0.019* (-1.82)	-0.048*** (-2.67)	-0.027* (-1.89)	-0.010 (-0.46)	
<i>Firm characteristics</i>					
Number of export destinations	-0.013*** (-65.67)	-0.015*** (-37.74)	-0.013*** (-53.39)	-0.016*** (-37.38)	-0.043*** (-21.47)
Total exports (ln)	-0.017*** (-15.19)	-0.016*** (-7.83)	-0.020*** (-13.95)	-0.019*** (-9.08)	-0.035*** (-18.48)
Initial export value (ln)	-0.012*** (-7.39)	-0.025*** (-9.69)	-0.004* (-1.95)	-0.003 (-1.34)	0.059*** (11.35)
Independent SME (dummy)	-0.168*** (-22.89)	-0.196*** (-17.02)	-0.098*** (-11.23)	-0.128*** (-10.89)	0.094*** (3.95)
Labor productivity (ln)	-0.031*** (-6.46)	-0.048*** (-5.87)	-0.032*** (-5.18)	-0.040*** (-4.65)	-0.073*** (-7.67)
Labor productivity growth	0.018*** (3.34)	-0.014 (-1.48)	-0.038*** (-5.41)	-0.039*** (-3.71)	-0.000*** (-3.15)
<i>Destination market characteristics</i>					
Exporters from same dom. industry (ln)	-0.147*** (-44.51)	-0.070*** (-11.65)	-0.135*** (-29.54)	-0.057*** (-8.25)	-0.087*** (-9.20)
GDP (ln)	-0.036*** (-17.47)	-0.032*** (-8.00)	-0.033*** (-12.52)	-0.041*** (-9.65)	-0.088*** (-15.31)
GDP growth	0.005*** (5.65)	-0.013*** (-7.27)	0.007*** (5.77)	-0.018*** (-8.72)	0.014*** (4.55)
Landlocked (dummy)	-0.065*** (-6.81)	-0.029** (-2.02)	-0.082*** (-6.81)	-0.075*** (-4.68)	0.030 (0.98)
Distance ($\times 1000$ km)	0.028*** (29.76)	0.020* (1.90)	0.038*** (30.04)	0.016 (1.42)	0.068*** (3.28)

Notes: All regressions include a full set of industry (NACE 1-digit) fixed effects. z statistics in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5 Conclusion and discussion

In this paper we investigate to what extent the export performance of Dutch exporters is tied to their import behavior. In doing so, we particularly focus on the network dimension of trading. That is, we focus our analysis on the extent to which importers benefit from having experience as a cross-border trader, from being familiar with the customs of foreign markets and from having a network of trading partners and contacts. We focus on two firm-level dimensions of export performance: (1) export growth on individual destination markets and (2) survival rates on individual destination markets. Our analysis concerns both goods trading, separating between exports of Dutch products and of re-exports, and services trading.

Our results in general suggest that importers are more successful exporters. Firms importing from the same country as they serve as an exporter consistently show higher export growth and survival rates on these destination markets. This holds for all types of exports, and for importing both in terms of value and per se. This relationship is considerably stronger for services than for goods exports. Since this dimension of import behavior particularly concerns imports from the destination country of exports this suggests that there is also a network effect at play. That is, firms which are familiar with a particular market and are in possession of a network of contacts and trading partners there, seem to be able to boost export performance on that market. The importance of the degree of connectedness may also be reflected by our finding that being deeply integrated in other markets is associated with relatively poor export growth on markets where the firm is less well-connected. On the contrary, survival rates on destination markets tend to be higher for goods importers from other sourcing markets.

Our results also reveal that the main type of product the firm imports is associated with export growth. Firms with a focus on importing unskilled labor intensive, high-tech or human capital intensive goods are less successful in expanding exports, particularly re-exports. The underlying data reveal that this result is most likely due to wholesaling, which is generally characterized by large volumes rendering it relatively difficult to generate high growth rates of gross exports. Nonetheless, this does not explain the positive connection with a focus on importing primary products, since these firms also tend to be wholesalers. Survival rates do not seem to be strongly connected to the composition of the firm's import portfolio.

In addition to the import behavior of the exporter several other dimensions show to shape the export performance of individual firms, such as the experience of the firm as an exporter, firm characteristics such as size and productivity and destination market characteristics of the gravity model of

trade type. The importance of being well connected to foreign markets directly or indirectly is also reflected by the fact that serving a wider variety of export markets is associated with increased export performance on a particular destination market, in addition to the number of (potentially competing) exporters from the same domestic industry serving that particular destination market.

The policy relevance of this study is twofold. Traditionally, the focus of policy efforts aiming at increasing the international involvement of businesses is almost exclusively directed to exporting. Our findings suggest that stimulating firms to start importing may ultimately lead to durable export activity as well through capacity and network building. These insights can be utilized by policymakers to refine the array of policy instruments aiming at the stimulation of firms to develop international activities. In addition, the findings of our study stress the importance of building and maintaining a network of trading partners and contacts for developing growing and sustainable export activities. Policymakers may capitalize on these findings by focusing attention on capacity building in the field of networking in the development of export promotion programs.

A few promising avenues for further research emerge naturally from our analysis. A deeper analysis of the composition of the imported product portfolio would be an interesting extension of our study. The product dimension of service trade is currently unavailable altogether and would be relevant to integrate. Accommodating a longer time series of service trade would also be fruitful, particularly with respect to the survival analysis. In addition, it would also have been interesting to investigate to what extent the number of products a firm trades constitutes a network type of dimension associated with export performance. However, since this information is only exhaustively available for extra-EU trade this dimension is not straightforward to unambiguously incorporate in our analysis. Building on this idea, a potentially informative extension of this study would entail the accommodation of some measure of global value chain (GVC) involvement in the analysis. That is, it may be that firms that are deeply integrated in GVC's may be engaging in much more stable trade relationships both as a buyer and as a supplier. Finally, while our analysis concerns the firm-country level it would also be worthwhile to investigate the firm-country-buyer dimension of exporting. For example, which factors shape the hazard curve of firm-country-buyer relationships? At this point this would only be possible for intra-EU trade relationships. All in all, several avenues for further research emerge that would add to our understanding of the relationship between import behavior and export performance.

Appendix

Figure 3: Overall survival and hazard rates of re-exports of foreign goods

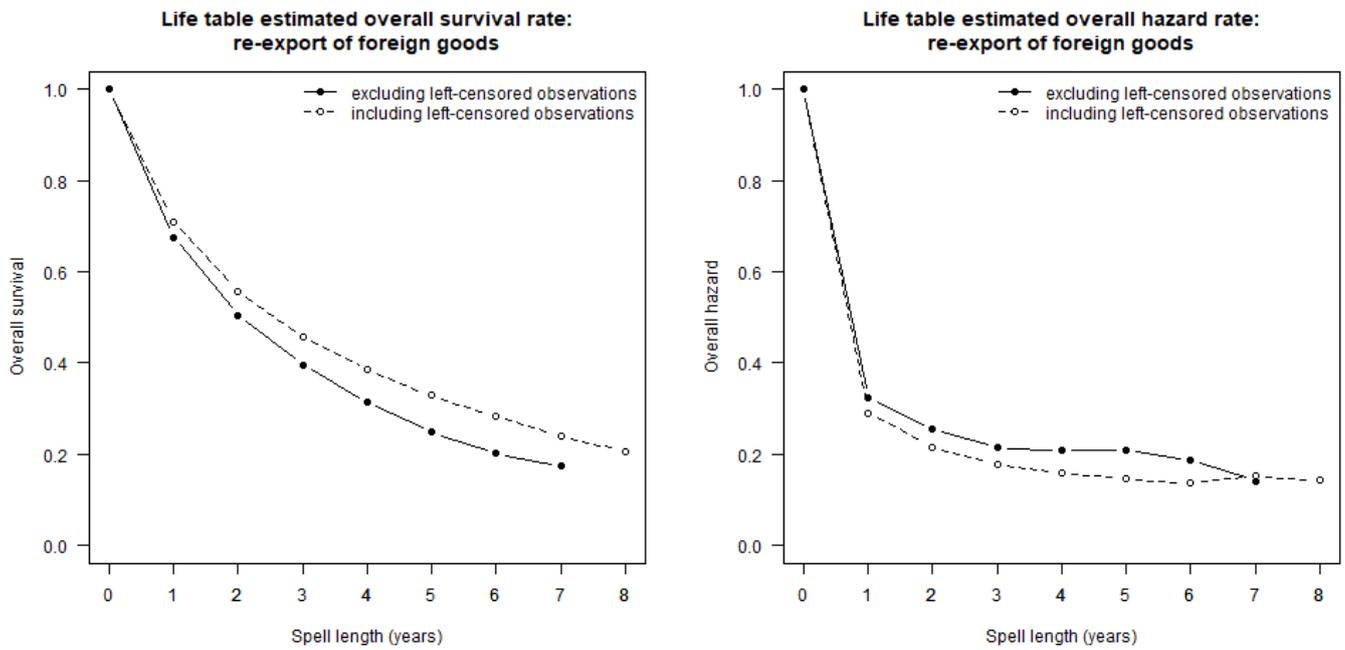


Figure 4: Survival and hazard rates of re-export of foreign goods by import status

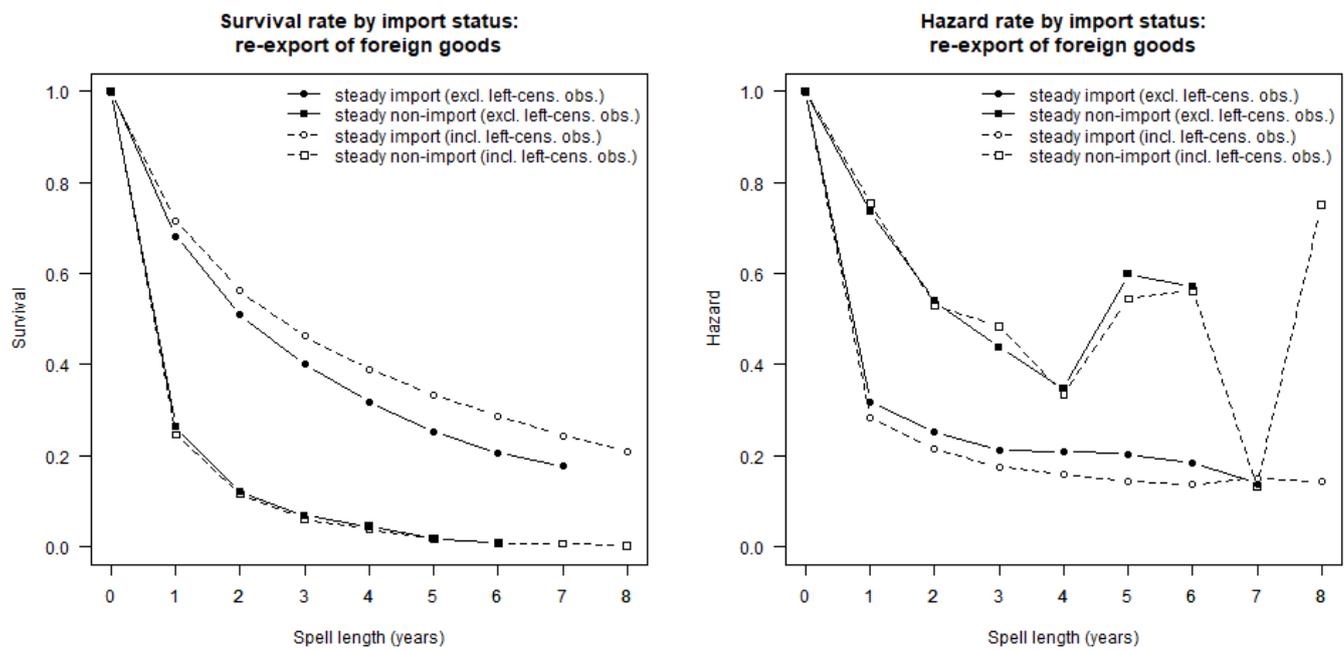
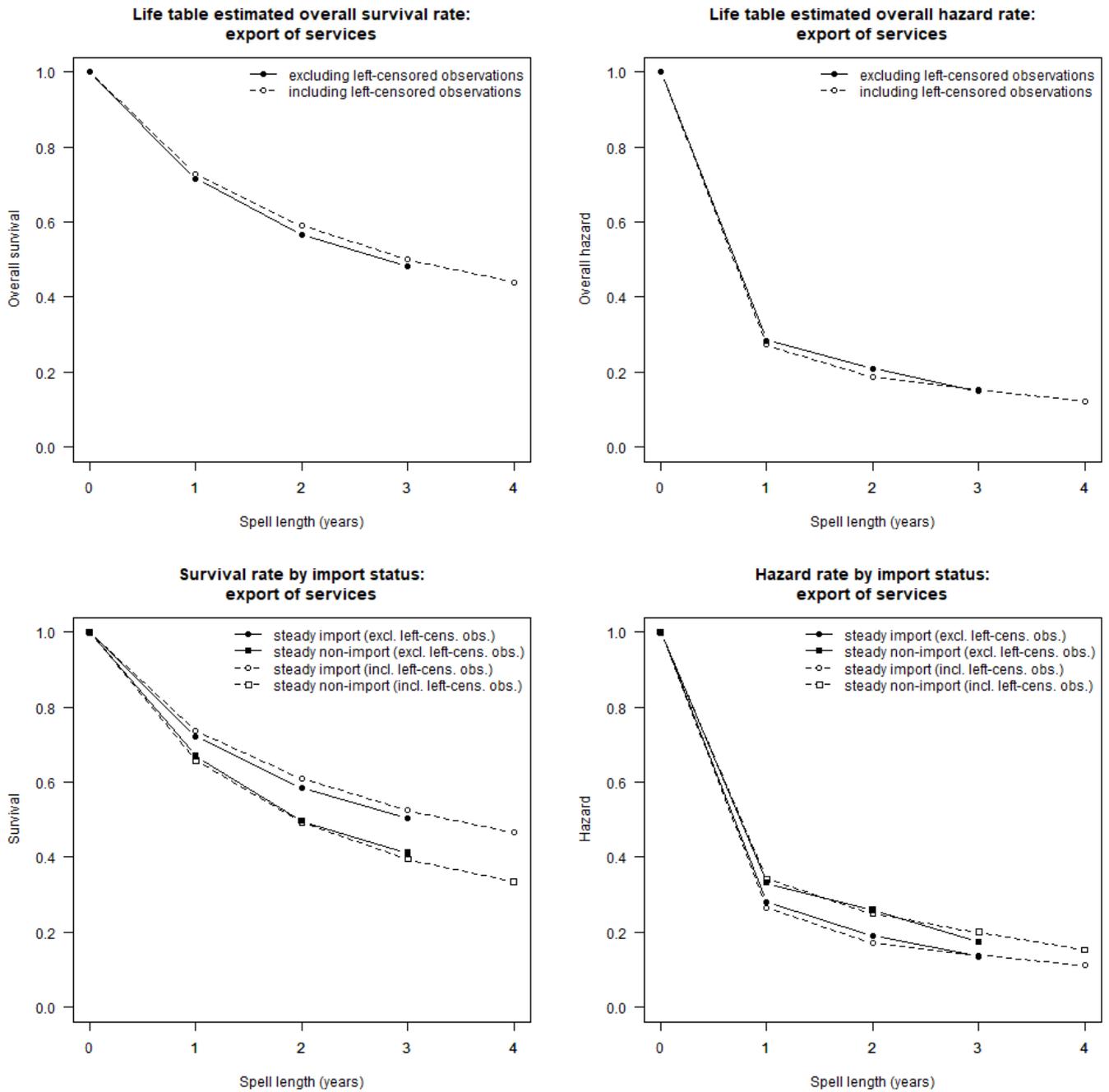


Figure 5: Survival and hazard rates of export of services



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