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Here Today, Gone Tomorrow: The Duration of Norwegian Salmon Exports

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Abstract: Success in the export markets is not only about entry into markets, but also about survival and export growth. General empirical evidence suggest that high export growth are positively associated with the duration of trade relationships. For exporters of highly perishable goods such as fresh salmon, efficient trade relations is important to prevent loss of product quality as time from harvest to final consumption increases. This paper analyzes the duration of trade relationships for Norwegian salmon exports. Using highly disaggregated data for the 1999-2009 period, the trade relations for exports of fresh-farmed salmon from Norway is remarkably short. At the firm-to-country level the mean duration is 4 years, Furthermore, the degree of dynamics increases as the data becomes more disaggregated. Market uncertainty in the form of transportation costs and export to countries in the EU, are associated with a larger probability for failure. Factors that are associated with a reduced risk of exiting the market are the size of the initial shipment between the trading partners, continuing large shipments and the size of the exporting firm.

Key words: aquaculture, salmon, duration of trade

JEL classification: F10, F14, C41

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1. Introduction

During the last decades, there has been an increasing interest in the role of firms and products in international trade. One of the main findings is that the observed trade flows are largely driven by entry into, and exit from, exports at the firm level (Eaton et al., 2008, Bernard et al., 2007). There has also been increasing interest in the duration of trade relationships commencing with Besedeš and Prusa (2006a, 2006b). Besedeš and Prusa (2006a, 2006b) argues that trade duration is much more volatile than standard trade theory would predict. Besedes and Prusa (2011) shows that export growth mainly occurs through survival and deepening of existing trade relations. It is well known that productivity growth through the whole supply chains has been important for the development of aquaculture (Asche, 2008). Given the general literature, an important success criterion for exporters of aquaculture products can be the development of stable trade relationships. This paper investigates factors, which influence trade duration for exports of the most successful salmon product: fresh-farmed salmon. The focus on one single homogeneous product allows focusing on specific details, and prevents characteristics of different product types to influence results.[2]

Aquaculture has, in recent decades, been the world´s fastest growing food production technology, and salmon has been one of the most successful species when measured by production growth (Smith et al., 2010; Asche et al, 2015a). Salmon is the largest product category in Norway's second largest export sector, seafood. More than 80 percent is exported in one relatively homogenous product form, whole fresh, and, as such, differences in export strategies between firms are due to different choices and not products. Norwegian salmon farming has been a rapidly growing industry. Today Norway is the world's leading producer of farmed salmon (Asche, Roll and Tveterås, 2009). This development is due to factors such as reduced production costs and improved competitiveness (Asche, 2008; Asche, Roll and Tveterås, 2009). Further the industry has been characterized by substantial productivity growth (Tveterås and Heshmati, 2002; Nilsen, 2010; Vassdal and Holst, 2011; Roll, 2013; Asche and Roll, 2013; Asche, Guttormsen and Nielsen, 2013; Asche, Roll and Tveterås, 2007).

Asche et al. (2013) argues that the retail chains focus on logistics has led to the creation of very large production companies. Today the industry is characterized by the use of several

[2] Asche et al. (2015b) show that salmon prices varies with product attributes.

settlement methods for the exports, such as contracts (Kvaløy and Tveteras, 2008; Larsen and Asche, 2011) and future contracts (Sollibakke, 2012; Oglend, 2013; Asche, Oglend and Zhang, 2015; Asche, Misund and Oglend, 2016) and other factors that influence transactions such as invoicing currency (Straume, 2014). An investigation of trade duration will provide complementary knowledge with respect to trade patterns for salmon.

To investigate which factors affects the duration of trade a Cox-model is used, following the approach in the general literature. In line with findings in previous studies (Besedeš and Prusa, 2006a, 2006b; Nitsch, 2009), a large share of trade relations are short-lived.[3] Negative duration dependence is present, i.e. if the trade relationship survives in an export market over a period, the possibility for failure decreases significantly. The estimated survival rates are heavily affected by the level of aggregation in the data. At the firm level, the probability for failure in a trade relationship decreases with the size of the initial trade volume and by measures for market concentration. Moreover, trade relationships are shorter in larger markets being served by many companies and where competition, accordingly, seems keen, a feature that is masked in industry-level data.

This paper is organized as follows. In section 2, a brief overview over some relevant literature is offered. The data is described in section 3. Section 4 presents the empirical approach, and estimations of trade duration are presented in section 5. Section 6 concludes.

2. Literature

The analysis of survival and termination of trade relationships commenced with Besedeš and Prusa (2006a, 2006b). Besedeš and Prusa (2006a) show that trade duration for most US imports are relatively short, with substantial dynamics due to numerous entries and exits. Based on 7-digit trade data from 160 different trading partners for the period 1972-1988, they estimate Kaplan-Meier survival functions, and find a survival rate of 67 percent the first year. The median duration when exporting a product to the US is between two and four years. The same import data is used in Besedeš and Prusa (2006b) to investigate whether there are differences in trade duration for homogenous and differentiated products using the classification of products into homogenous or differentiated found in Rauch (1999). They

[3] Hence, trade duration can be regarded as an additional source of uncertainty in addtion to the two commonly listed categories price uncertainty (Dahl and Oglend, 2014; Asche, Dahl and Steen, 2015) and production uncertainty (Asche and Tveteras, 1999; Tveteras, 1999; Tyholdt, 2014).

estimate that the hazard rate for homogenous products is at least 23 percent higher than for differentiated products. Besedeš and Prusa (2006b) also estimate a proportional Cox-model based on the model of Rauch and Watson (2003) to investigate important factors explaining trade duration. They found that trade relationships involving homogenous products start out with larger initial purchases, and last for a shorter time than trade relationships involving differentiated products.

Using import data at the 8-digit product level from 1995-2005, Nitsch (2009) explores the duration of import trade in Germany. Most of the observed trade relations in German import last between 1-3 years. To formally analyze the duration of a trade relationship, Nitsch (2009) includes different explanatory variables, such as unit value, GDP, GDP per capita, market share and common language, and estimates a stratified Cox-model. He found that the duration of import in Germany depends on exporter country and product characteristics, market structure, and on the initial size of the transaction. Two-way trade (both export from, and import to, Germany in a given product) tends to increase the probability of survival.

Besedeš and Prusa (2011) investigate the extensive and intensive margin of trade. They decompose growth in export into three parts; establishment of new relationships, higher intensity in existing relationships, and the survival of existing relationships. Using export data for 46 countries at the 4-digit level for 1975-2003, they found the median duration to be between 1-2 years when data is pooled to estimate export survival at the regional level. Export survival is compared between East Asia, Central America, Mexico, Africa, South America and the Caribbean, and the mean survival of trade relationships in these regions is 1-2 years. Besedeš and Prusa (2011) argue that both the extensive and intensive margins are important for export growth, and emphasize the importance of survival of trade relationships. "*Survival of export relationships is a necessary requirement for trade deepening and export growth, as poor survival prevents deepening from taking place"* (Besedeš and Prusa, 2011, p. 372).

Esteve-Pèrez et al. (2012) study the duration of Spanish firms' trade relationships by destination for the period 1997-2006. They found that the median duration of a firm-country relationship is two years, and that 47 percent of all spells end after the first year. The analysis in Esteve-Pèrez et al. (2012) is carried out using data on the 4-digit level for 3803 firms operating in wholesale/retailing, or manufacturing and exporting to 122 different destinations.

Brenton et al. (2009) investigate survival rates of exports from 44 developing countries in the period 1985-2006. They found that export flows from low-income countries have lower survival rates than those for high-income countries. It is also argued that different policy variables may be important determinants for duration. More specifically, variations in bilateral exchange rates between the trading partners, exchange rate misalignment, and tariffs and trade preferences may influence the survival probability. In addition, Besedeš (2008), Jaud et al. (2009), Fugazza and Moliva (2009), Cadot et al. (2013) and Besedeš and Prusa (2011) investigated patterns in duration in the exports of developing countries. Hess and Persson (2011) studied duration in EU imports.

3. Industry and data

The development in the aquaculture industry over the last three decades has not only profoundly changed how seafood is produced, traded and consumed, but is also redefining seafood´s role in the larger food context. The growth in the aquaculture production is due to increased control with the production process that allowed systematic R&D, innovation and transfer of knowledge from the agrosciences (Anderson, 2002; Asche, 2008; Anderson et al, 2015; Kumar and Engle, 2016; Asche, Roll and Tveterås, 2016). Salmon has been one of the leading species with a production growth even higher than for aquaculture in aggregate. Total production of farmed salmon is shown in Figure 1, along with the two main producers, Norway and Chile. These two countries make up almost 90% of global farmed salmon production. As they export to more than 150 countries, trade and the development of the trade patterns and supply chains are highly important to the success of the industry. As noted in the introduction, this has led to substantial attention with respect to supply chain organization and transaction modes in recent years (Kvaløy and Tveteras, 2008; Olson and Criddle, 2008; Larsen and Asche, 2011; Sollibakke, 2012; Asche et al, 2013; Straume, 2014; Asche, Oglend and Zhang, 2015; Asche and Oglend, 2016). More knowledge with respect to the duration and trade and trade patterns will provide more insight with respect to this development.

The data used in this paper is custom data, collected, and provided by Statistics of Norway. I focus on the export of “fresh farmed salmon with head” at the 8-digit product level (03021201) in the Norwegian customs tariff, which makes up about 85 percent of total salmon exports. The data spans an 11-year interval, from 1999-2009. In the sample, I am able to identify the seller (exporter) and the destination country. In addition, the data contains information about the value and volume of each shipment, the invoicing currency, the form of delivery contract and the date of export. For export firms, I also have data on the number of employees in the firm. The dataset contains a total of 686,664 distinct transactions from 274 Norwegian exporters to 85 different destination markets. Figure 2 shows the largest and smallest destination markets in the Norwegian data for the period 1999-2009.

From figure 2, it is evident that many of the largest destination markets for Norwegian fresh-farmed salmon are located in the EU. The two largest markets, France and Denmark, together account for 32 percent of the total export volume. However, Russia and Japan are also in the top ten list, and several other Asian countries are in the top twenty. There is substantial firm heterogeneity in the data. The first data sample indicates that the 20 largest exporters provide 75 percent of the total volume, and out of the 274 exporting firms, 256 have at least one trade to one of these markets over the period. Moreover, the 20 largest destination markets take 96 percent of the volume (91 percent of the trades).

4. Duration analysis

Due to the nature of our data, two different model specifications are utilized. These are at the country-country level (Model 1), and the exporter-country level (Model 2).

4.1 Methodology

The duration of a trade relationship is calculated as the number of consecutive years the trade relationship is active without any interruption. A transition between states in a trade relationship (in or out) can occur at any particular time (day of the year), but in our analysis are given a discrete nature through the aggregation into yearly observations. A *spell* is defined as a continuous trade relationship. *Multiple spells* are observations of reoccurring relationships in the data. Such observations will be treated as independent in our analysis. A *failure*, is the event of a terminated trade relationship. These follows the definitions used by Besedeš and Prusa (2006a, 2006b).

The length of an export spell is represented by the random variable *T*. Given the discrete nature of the data, *T* will be taking on values $t = 1,2,3 \dots n$ with a probability density function $f(t)$, and a cumulative distribution function $F(t)$.

(1) $$F(t) = \int_0^t f(s)ds = P(T \leq t)$$

To determine the probability that the spell lasts for at least *t* periods, I use the survival function given by

(2) $S(t) = 1 - F(t) = P(T \geq t)$

Hence, if the spell has lasted until time t, the probability for failure within the next time interval, Δt, will be $l(t, \Delta t) = P(t \leq T \leq t + \Delta t | T \geq t)$. Greene (2008) gives the hazard rate:

(3) $\lambda(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T \leq t + \Delta t | T \geq t)}{\Delta t} = \lim_{\Delta t \to 0} \frac{F(t+\Delta t) - F(t)}{\Delta t S(t)} = \frac{f(t)}{S(t)}$

The hazard rate is an estimate of the rate at which spells fail after a duration of *t* periods, given that they last up until *t*. The baseline for our analysis will be that the hazard rate is constant over time. This implies that there is no memory in the underlying process, and the conditional probability of failure is the same regardless of what year the observation is made. The Kaplan-Meier estimator is a non-parametric estimate of the survival function S(t),

(4) $\hat{S}(T_k) = \prod_{i=1}^{k} \frac{n_i - h_i}{n_i}$,

where n_i is the number of objects at risk at time *i*, and h_i is the number of failures at time *i* (Greene, 2008). The estimator of the hazard rate is:

(5) $\hat{\lambda}(T_k) = \frac{h_k}{n_k}$

The hazard function is the conditional failure rate (the flip side of the survival probability). For discrete observations, it can be interpreted as the probability for failure to occur at time t, given that the relationship has survived up to this point.

4.2 Estimated survival rates

Figure 3, shows the survival functions for my two different models. It is evident that the level of aggregation is important for the estimated survival rates. In the country relationships (Model 1), 78 percent of the relationships are alive after the first year, and the two-year survival rate is 68 percent. I.e. 68 percent of established trade relationships survive for at least two consecutive years. In the exporter-country relationships (Model 2), 58 percent of the relationships survives after the first year, and 42 percent survive through the second year.
A striking feature of the pattern of the survival functions for both groups is that the probability for failure decreases sharply as the duration of the trade relationships increase. This feature has been observed in earlier studies, such as Besedeš and Prusa (2006a, 2006b) and Nitsch (2009), and provides empirical support to models that indicate that relationship-specific investments, or knowledge, make it more costly to terminate relationships.

Table 1 presents the mean length of spells, and number of trades in our three models. The difference in the mean survival rate between model 1 and model 2 is as high as 5 years, and indicates substantial dynamics at the firm level relative to the more aggregated levels.

Censoring of the dependent variable is a well-known problem when using micro-data. In our case, a trade relationship can have been established before the sample period starts, and may be active for an unidentified time after the sample ends. The first is referred to as left-censored spells, the latter as right censored. In the salmon industry, I find that a large share of the trade relationships will be left-censored, especially in Model 1. Table 2, reports the number of trades, and the length of spells in the data when I drop all left-censored observations in the data. I find smaller differences in survival times when all left-censored observations are dropped. E.g., the observed difference between the mean survival in model 1 and model 2 is now only 2 years, while it is 5 years for the sample in table 1. I acknowledge the potential problems of left-censoring in the data, but choose to focus my analysis on the full sample, given the large number of observations that otherwise must be deleted.

The mean length of the trade spells will also differ between destination markets. In figure 4, I show that there are significant differences in the survival rates from the 20 largest Norwegian exporters to four different important markets. The five-year survival for the large exporters that trades with France are about 75 percent. This is more than the one-year survival in model 2 shown in figure 3. For the firms that trade with Russia, I observe a significant drop of almost 25 percent in the survival rates after the 3rd year. For trade relationships for the 20 largest exporters, the overall 5-year survival to France and Spain are over 50 percent, while it is much lower for Japan and Russia.

5. Determinants of export survival

A Cox (1972) model is the common choice for investigating how different determinants influence duration data. Greene (2008) argues that the Cox model is a reasonable compromise between the semi-parametric Kaplan-Meier estimator and more structured, possibly excessively structured, parametric models. I follow Besedeš and Prusa (2006a, 2006b) and employ the Cox model to analyze the effects of different covariates on the hazard rate.

5.1 The Cox model

The Cox model is given as (Greene, 2008):

(6) $\lambda(t_i) = \exp(\boldsymbol{x}_i'\boldsymbol{\beta})\lambda_0(t_i)$,

where λ_0 is the "baseline" hazard that accounts for individual heterogeneity. The Cox model allows estimation of **β,** without requiring estimation of the "baseline" hazard. This implies that no assumptions about the shape of the hazard function is made.

As independent variables, I include a set of standard variables from the existing literature, and a new set of firm-specific variables, which I am able to calculate and include due to the detailed nature of our data. The aggregation level of the data in the different models will, to some extent, determine which independent variables I include.

First, following the existing literature I include geographical distance between Norway and the destination market, GDP in the destination market, the annual average unit value, total imports of salmon from Norway to the destination, the initial transaction volume, and spell-specific share of import as explanatory variables. Data for geographical distance is obtained from the CEPII[4] Geodist-database, and GDP data is taken from the World Bank (World Development Indicators (WDI)). The distance variable is a standard variable used as a measure for transportation costs, while the GDP is measured in real 2000 prices, and reflects the size of the economy in the destination market. The annual average unit value reflects different qualities in shipments in the relevant trade relationship. The total imports of Norwegian salmon in the destination market reflect the importance of the specific market. Initial transaction volume is included to check if it is an empirical regularity that relationships that starts out with large volumes also tend to last longer. This is in line with the findings in Besedeš and Prusa (2006b) who also show that duration tends to increase with initial trade size. The share of spell-specific import from Norway are included to check if large spells fail more often than smaller spells (in terms of volume). The share of spell-specific import reflect the size of export volume in each spell relative to the total imports in the destination country during the spell. Finally, I address the cases of multiple spells with a dummy variable, which takes on the value one for higher order spells as suggested by Besedeš and Prusa (2006a).

[4] Centre d'Etudes Prospectives et d'Informations Internationales

For model 2, I also include the number of employees in the exporting firm, the annual frequency Norwegian exporters serve a given market, and the annual frequency of markets active in imports from Norway. The number of employees is included as a control for the size of the exporter. The two frequency variables are included to capture the market activity on both the supply- and demand sides of the market. A dummy variable denoting whether the exports are to an EU-country is included to capture potential advantages of serving the trading block. Table 3 provides descriptive statistics.

Figure 5 indicates how some key explanatory variables influence the survival probabilities in model 1. Each line in the panels represents the survival function for a group of countries with certain characteristics. In the left panel, destination countries are grouped by distance from Norway. The survival probability increases with geographical proximity indicating that the hazard rate increases with distance. In the right panel, destination countries are grouped by their economic size (GDP). Again, I observe that the survival probability is influenced by the market size of the destination country. The larger the destination market, the lower the probability for failure.

5.2 Results

Table 4 reports the results from the Cox-regressions on both groups of trade relationships with, and without, accounting for left censoring. All reported coefficients are hazard rates. If the hazard rate takes a value between zero and one, an increase in the relevant independent variable reduces the probability for failure of a trade relationship. If the hazard rate takes on a value larger than one, an increase in the relevant independent variable increases the probability of failure. The hazard rates are the exponential coefficients from the fitted values in a Cox model. This implies that the significance levels reported should be interpreted as the significance level of the log of the hazard rates. E.g. the coefficient determining the significance level of ln Distance in Model 1 - full sample is ln (1.3808)=0.32.

From the table, it is obvious that I drop a large number of observations, especially for model 1, when properly correcting for left-censoring[5]. I believe that the best approach for our study

[5] Norway is by far the largest salmon producer, with a market share above 80 % in many countries, so it would be virtually impossible for these countries to be supplied without Norwegian salmon.

is to rely on the full samples when the hazard rates are calculated. If I drop all left censored observations, too many observations have to be dropped. In particular, for Model 1, we only have the least important destination markets left when all left-censored observations are dropped, as 98 percent of the data will be dropped. Still, with the exception of the effect of distance in Model 1, the parameters reported when excluding the left-censored observations do not change very much.

For the rest of the analysis, I focus the discussion on the coefficients where the left-censored variables are included. An increase in geographical distance increases the risk of failure in a trade relationship in Model 1. An increase in the GDP in the destination market, in the unit values, in the annual import of salmon in the destination market, and in the spell-specific share of total import, reduce the probability for failure of trade relationships in Model 1. All these effects are as anticipated, and in line with previous findings in the literature. The effect from increased GDP is in line with the findings in Besedeš and Prusa (2006b). Larsen and Asche (2011) investigated the use of contract for export of Norwegian salmon to France in 2006. They argue that more sales are carried out using spot prices than using fixed-price contracts, and that fixed-price contracts are primarily used by large firms that trade frequently. Our results with respect to spell-specific share of total import and unit value supports the findings in Larsen and Asche (2011). The variable that controls for multiple spells increases the probability for a failure, as in Besedeš and Prusa (2006b), but is not significant for the relationships defined in model 1. Neither is it clear what sign we should expect from this variable. It can be argued that the re-entry of a firm into the export market may result in lower hazard rates due to past experience for the firm. On the other hand, multiples exits and re-entries of a firm may describe the behavior of a firm that is seeking short-time profit in the market, and has no intension in investing in stable trade relationships.

For the trade relationships defined in Model 2, I find that increased geographical distance, to the destination market increases the hazard rate. There is a positive effect on the hazard rate from increased GDP in the destination country. The effect is not significant but the change in sign on the coefficient could be an indication of greater competition among suppliers to the largest markets, as also reported by Nitsch (2009). There is no significant effect on the estimated hazard rates in model 2 from increased unit value or from increased import volume to destination. The larger the initial transaction, and the spell specific share of import is, the lower is the hazard rate. I also find that the existence of multiple spells significantly increases the probability for failure in the trade relationships in Model 2. Trade relationships to EU countries increases the fragility of the trade relationships. The EU is a very important market for Norwegian salmon export, and it is not surprising that many of the trade relationships may be of short durations due to keen competition.

In Model 2, I also include the number of employees in the exporting firm, and market concentration measures. I find that an increase in the number of employees reduces the hazard ratio. Larger firms tend to make more long-lasting relationships. Increased market activity, on both the supply-and demand side, results in lower hazard rates and reduce the probability for failure. This gives further support to Kvaløy and Tveteras (2008), Olsson and Criddle (2008) and Asche et al (2013) in that larger companies behave differently, presumably due to different capacities to e.g. reduce transaction costs and in making deeper relation specific investments.

6. Conclusion

Survival of exporting firms in international markets are important to achieve growth and income stability for firms operating in a highly export driven industry such as Norwegian salmon production. As the industry continues to grow and become more competitive, it is of interest to better understand the factors that are important for export growth. In this paper, it is argued that survival of trade relationships is a success criterion for export growth for firms that exports fresh-farmed salmon from Norway. Furthermore, the paper examines the survival of trade relationships for Norwegian exports of fresh-farmed salmon. Access to detailed firm export data makes it possible to study the trade dynamics in the salmon industry in more detail than most of the existing literature on trade duration.

Trade duration is investigated by estimating hazard rates, as suggested by Besedeš and Prusa (2006a, 2006b). Trade relationships at the firm-country level has a mean survival of only four years. Hence, salmon exports have in common with other industry's relatively short trade duration for the majority of relationships. Negative duration dependence is present in the industry; as the survival time increases, the probability for failure decreases. One particularly interesting result that trade relationships seem to be shorter in larger markets within the EU being served by many companies, and where competition, accordingly, seems keen. This implies that there may be a potential for higher profits, and export growth, for firms that seek to enter new markets with a growing demand for fresh salmon like the U.S. and South-Africa.

In general, both market specific- and firm-specific variables has a significant impact on the duration of trade. Trade duration are more stable for an industry between countries, than between exporting firms and importing countries. More generally, standard gravity-type variables commonly used to describe bilateral trade flows has a significant impact on the duration of trade. The results indicate that the volatility in observed duration of trade relationships are caused by more than comparative advantages.

The results shows that duration analysis of trade relationships should be carried using disaggregated data to avoid overestimation of the survival rates. In this paper a large presence of failures in the established trade relationships is documented, one should be aware that such failures might not be unwanted nor unexpected by the firms. On the contrary, it may be the result of optimal endogenous choices at the firm level. An exporter serving well-functioning supply chains that face low costs of exporting, who captures signs of increased demand in “new” markets, may increase its profit by serving those markets in the short run.

For Norwegian exporters of salmon seeking to invest in stable trade relationships e.g. to reduce transaction costs, the results in this paper provides some recommendations. The exporters should focus on trade with nearby partners outside of the European Union where they meet competition from other Norwegian exporters, and they should signalize commitment through large initial trades.

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Table 1: Number of trades and length of spells in the data

	Length of spells				**Number of trades**				**# observations**
			Percentiles				Percentiles		
	Mean	Median	5^{th}	95^{th}	Mean	Median	5^{th}	95^{th}	
Model 1	10	11	1	11	11291	2463	5	52739	667
Model 2	5	4	1	11	863	109	1	4141	6703

Table 2: Number of trades and length of spells in the data, left-censored observations dropped

	Length of spells				Number of trades				# observations
			Percentiles				Percentiles		
	Mean	Median	5^{th}	95^{th}	Mean	Median	5^{th}	95^{th}	
Model 1	6	6	2	10	707	65	2	3738	117
Model 2	4	3	1	8	286	48	1	1307	3948

Table 3: Descriptive statistics.

Variable	Mean	SD	Min	Max
Distance (km)	3,220	3,234	417	15,963
GDP (100.000.000 USD)	11,827	15,753	4.38	116,609
Annual unit value (Statistical value in NOK/kg)	28	6.40	0.34	688
Annual import volume (tons)	21,010	19,851	0.05	88,983
Initial volume (tons)	11,6	3,88	0.05	39.428
Spell share	0,8	0,83	0.0002	1
EU	0,21	0,41	0	1
Multiple spells	0,11	0,32	0	1

Table 4: Main results, Cox-regressions

	Model 1		Model 2	
	Full sample	Left-censored	Full sample	Left-censored
ln Distance	1.3808*	2.4824***	1.0811***	1.0847**
	(0.260)	(0.844)	(0.032)	(0.037)
ln GDP	0.8410**	0.8865*	1.0227	1.0110
	(0.071)	(0.061)	(0.014)	(0.016)
ln Unit value	0.5548*	0.5218*	1.0282	0.9265
	(0.170)	(0.178)	(0.074)	(0.072)
ln volume import dest	0.6939***	0.8697*	0.9919	1.0229
	(0.049)	(0.067)	(0.024)	(0.026)
ln Initial volume	1.0998	1.1809*	0.9424***	0.9271***
	(0.083)	(0.106)	(0.008)	(0.009)
ln Spell share	0.7945***	0.7994**	0.8141***	0.8368***
	(0.042)	(0.082)	(0.010)	(0.013)
Dummy, mult.spells	1.1817	0.3531*	1.8079***	2.0710***
	(0.677)	(0.219)	(0.154)	(0.234)
Dummy, EU			1.1265**	1.1714**
			(0.064)	(0.076)
ln # employees exp.			0.9435***	0.9648***
			(0.012)	(0.013)
ln frequency imp.			0.7308***	0.7544***
			(0.014)	(0.016)
ln frequency exp			0.9156***	0.8944***
			(0.027)	(0.029)
Observations	667	117	6,703	3,948
No. Subjects	85	28	2184	1568
No.Failures	58	33	1951	1315
log-likelihood	-183.8	-81.3	-13399	-8631.1
Year-dummies	No	No	Yes	Yes

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

Figure 1: Total production of salmon. 1980-2014.

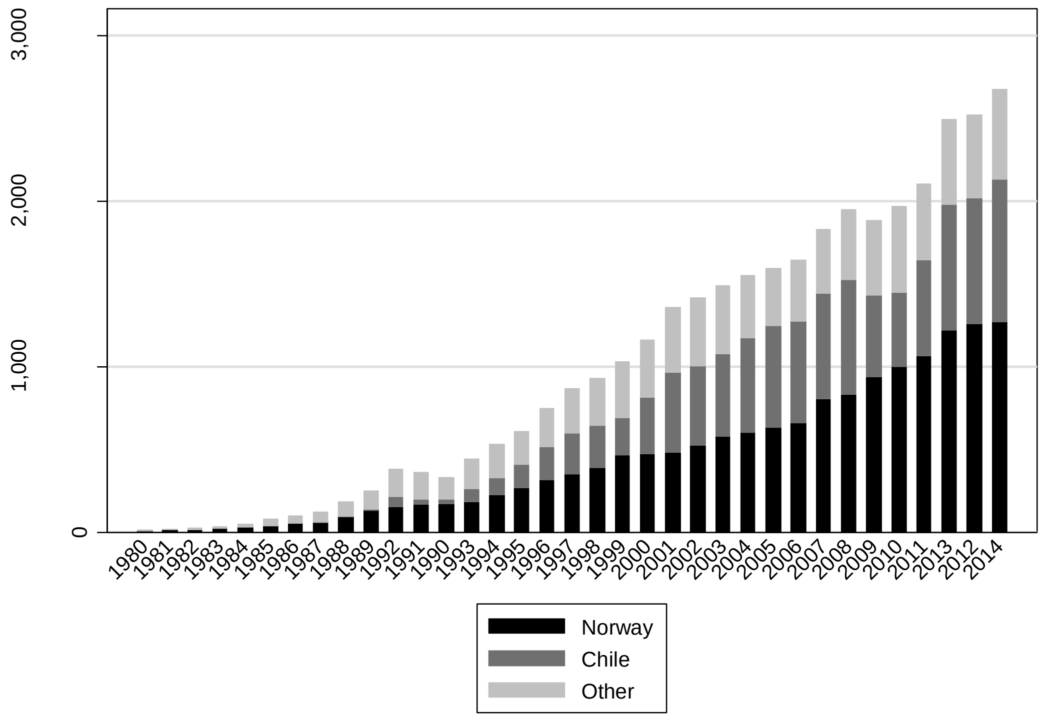

Figure 2: The 20 largest/smallest destination markets for fresh salmon, 1999-2009

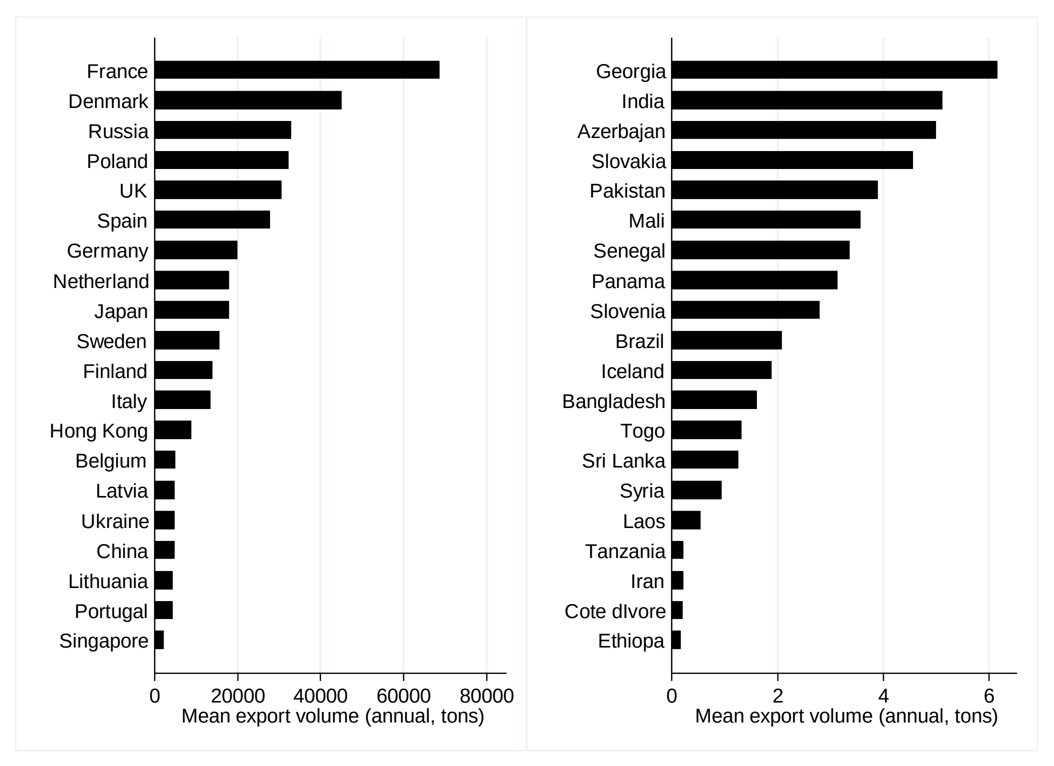

Figure 3: Kaplan-Meier survival functions, country-country and firm-country.

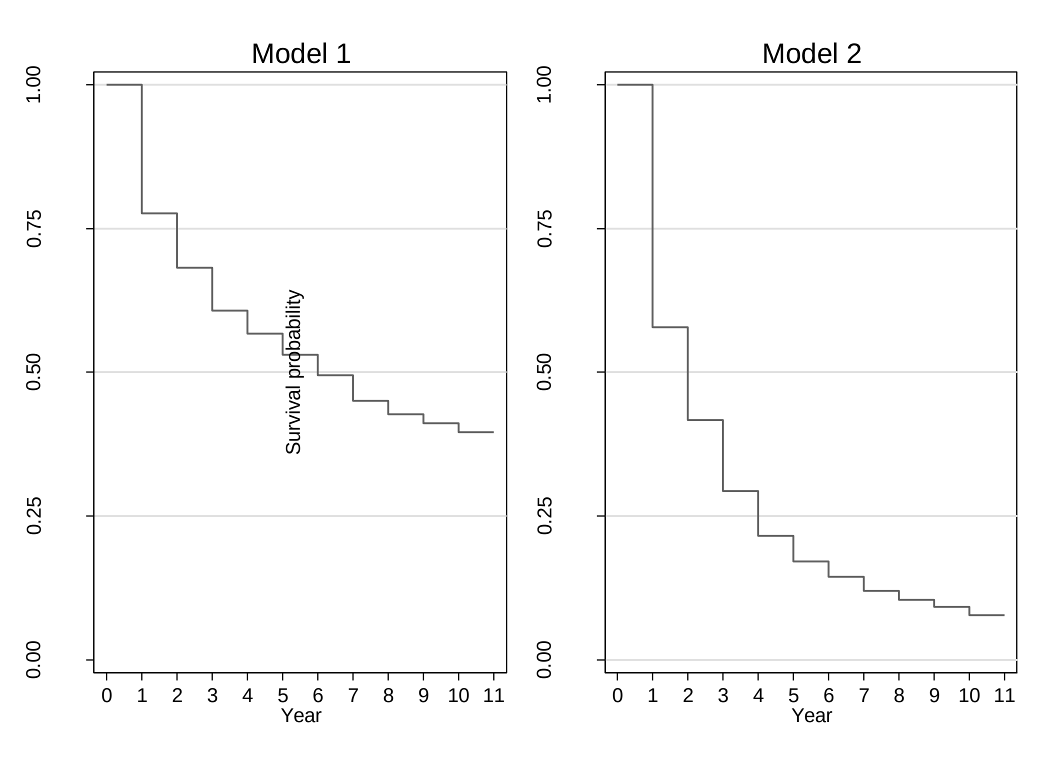

Figure 4: Kaplan-Meier estimates for the 20 largest exporters in four important markets

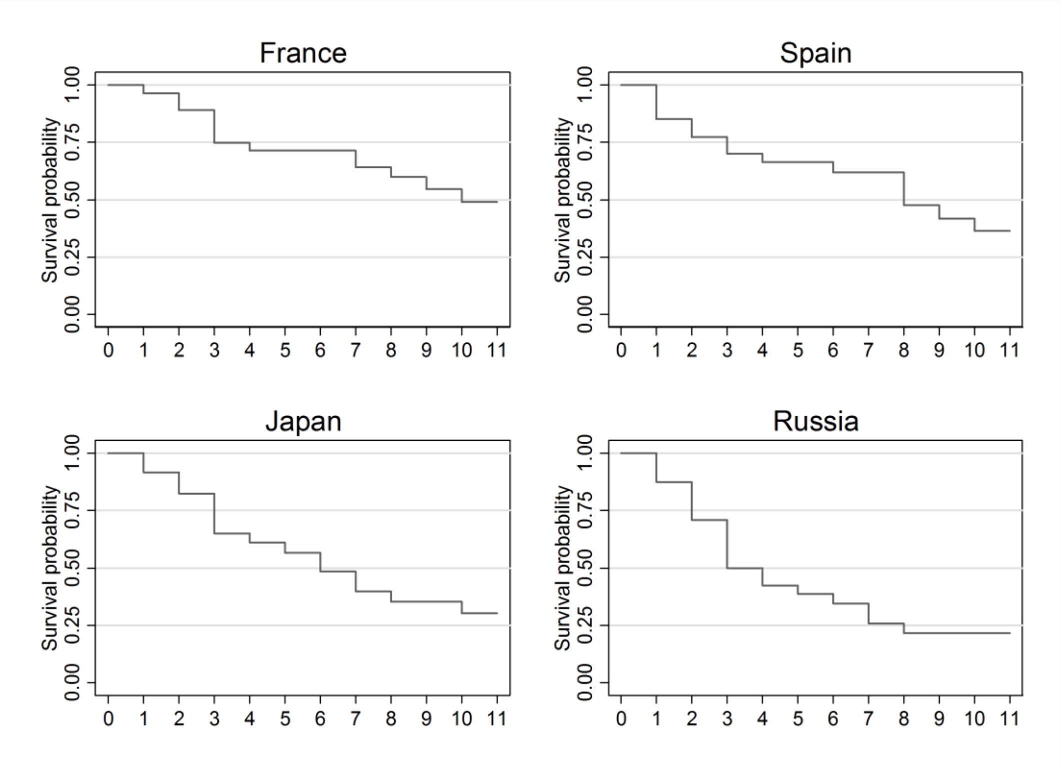

Figure 5: Kaplan-Meier estimates geographical distance, and GDP . Country-Country.