ASEAN Bilateral Seafood Trade Duration Analysis

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Introduction

Why does seafood international trade matter?

- 39% of world seafood consumption is traded (Smith et al. 2010, Tveterås et al. 2012).

- The seafood industry provides essential food, employment, and export earnings (Smith et al. 2010).

- Developing countries plays important role in seafood trade, half of fish exports by value originating from developing countries (FAO 2016).

- The Association of Southeastern Asian Nations (ASEAN) countries are among the largest seafood exporters in the world (Indonesia, Thailand and Vietnam, top ten exporters).

Study Purpose

- To explore trade duration of bilateral seafood trade from ASEAN countries to the rest of world.

✓ Determinants of trade duration.
✓ Differences among importers and products.

Survival Analysis

- In survival analysis, the outcome variable of interest is time until an event occurs (Kleinbaum and Klein 2006).

- Event refers to death, disease incidence (or recovery) or any designed experience of interest that may happen.

- In our case the event is the end of a trade relationship between bilateral trade partners.

- We treat interrupted relationships between same exporter and importer independently.

Trade Duration

- Trade duration is a measure of the longevity of a trade relationship.

- Trade duration indicates the number of consecutive years with non-zero exports of a certain product to one specific market (Shao, Xu, and Qiu 2012).

- Besedeš and Prusa (2006a) explore the trade duration problem based on U.S import, and conclude that international trade is more dynamic than previously thought.

Literature Review—Trade Duration

- The length of trade relationship is critical to the growth in trade of emerging countries (Chen 2012).

- Besedeš and Prusa (2011) find that the survival of existing trade relationships contributes more to long-run export growth than building new trade relationships.

- Although different trade data and countries are analyzed the researchers confirm short trade duration, overall aggregate commodity's trade spell length is around 3 years. (Hess and Persson, 2011; Shao, Xu, and Qiu 2012; Esteve-Pérez Requena-Silvente, and Pallardó'-Lopez 2013; Stirbat, Record, and Nghardsaysone 2013; and Lejour 2015).

Literature Review—Determinants of Trade

- Empirical estimation shows that, in East Asia, intermediate machinery products has more stable international relationship than finished machinery products (Obashi 2010).

- Cultural and geographic ties between trading partners as well as economic size of exporters and importers, and exporting experience are important to the survival of new export flows (Brenton, Saborowski, and Von Uexkull 2010).

- Trade policy matters, Tran et al. (2013) argue that small-scale shrimp producers in Vietnam and the traders are likely to become marginalized from the most lucrative markets (the U.S. and the EU) if the NGO certification is implied in the future.

Data and Methodology

- 8 ASEAN countries (Cambodia, Indonesia, Malaysia, Myanmar, Philippine, Singapore, Thailand, Viet Nam) from 1996 to 2014.

- The 1996 Harmonized System (HS) six-digit level (chapter 03: fish & crustacean, mollusk & other aquatic invertebrate) trade data are obtained from the UN Comtrade.

- 87 products species and 195 countries and districts.

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Table 1. Statistics Summary

variable	label	Mean	Std. Dev	Min	Max
ln(Product)	Log of exporter's seafood products	14.24	2.22	8.55	16.19
ln(Value)	Log of trade value	10.34	3.17	0.00	20.71
ln(Weight)	Log of trade weight	9.05	3.33	0.00	19.14
ln(GDP-e)	Log of GDP per capita of exporter	7.84	0.72	5.69	10.93
ln(GDP-i)	Log of GDP per capita of importer	7.84	0.72	5.69	10.93
ln(Pop-e)	Log of population of exporter	18.05	0.16	15.12	18.41
ln(Pop-i)	Log of population of importer	16.90	2.04	9.19	21.03
ln(Distance)	Log of distance	8.40	0.90	6.23	9.89
ln(Area-e)	Log of area of exporter	13.03	0.31	6.47	14.47
ln(Area-i)	Log of area of importer	11.92	2.82	2.30	16.65
Landlocked	Landlocked country	0.04	0.20	0.00	1.00
Import	Imported goods over GDP (%)	54.87	48.52	0.12	246.81
Credit-e	Credit to private sector over GDP (%)	76.75	40.96	5.99	158.50
Urbanization	Percent of urbanization	69.96	22.44	8.04	100.00
ASEAN	ASEAN member	0.20	0.40	0.00	1.00
Sub-Saharan	Belong to sub-Saharan area	0.04	0.18	0.00	1.00

Methodology

- The Kaplan–Meier estimator, also known as the product limit estimator, is a non-parametric statistic used to estimate the survival function.

- The Kaplan-Meier product limit estimators of the survival function is

$$\widehat{S}_t = \prod_{t_i \leq t} \frac{n_i - d_i}{n_i}.$$

- Hazard function focuses on the probability that a particular trade relation terminates over a given time interval (Hess and Persson 2012).
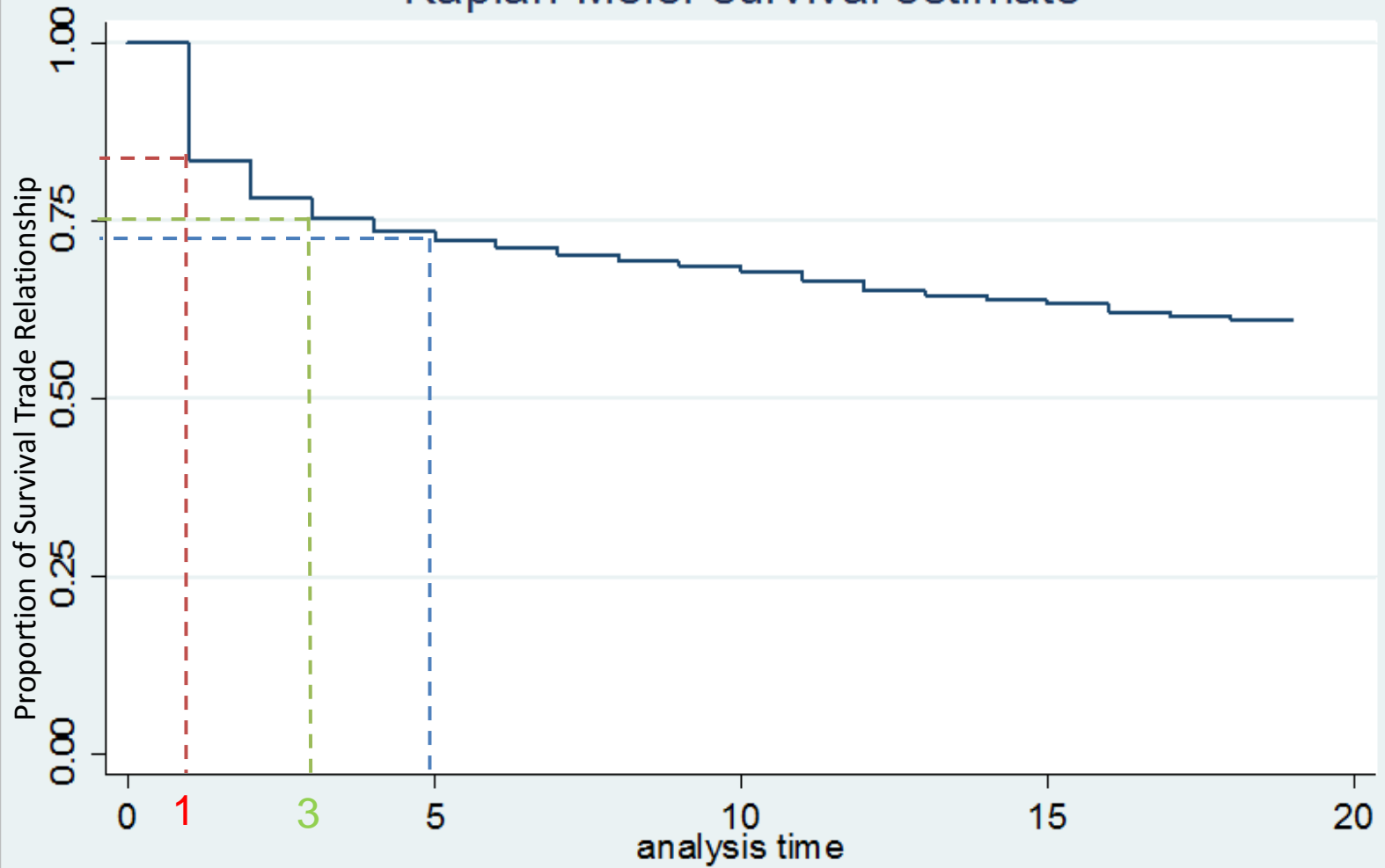
$$h_{ik} = P(T_i < t_{k+1} | T_i \geq t_k, \boldsymbol{X}_{ik}) = F(X'_{ik}\beta + r_k)$$

Hypothesis

- Bilateral trade pattern is different by importers and products.

- Gravity variables which are positive to trade will reduce the hazard rate of trade relationship.

- Economy openness reduces the hazard rate of trade relationship.

- Social development helps trade development.

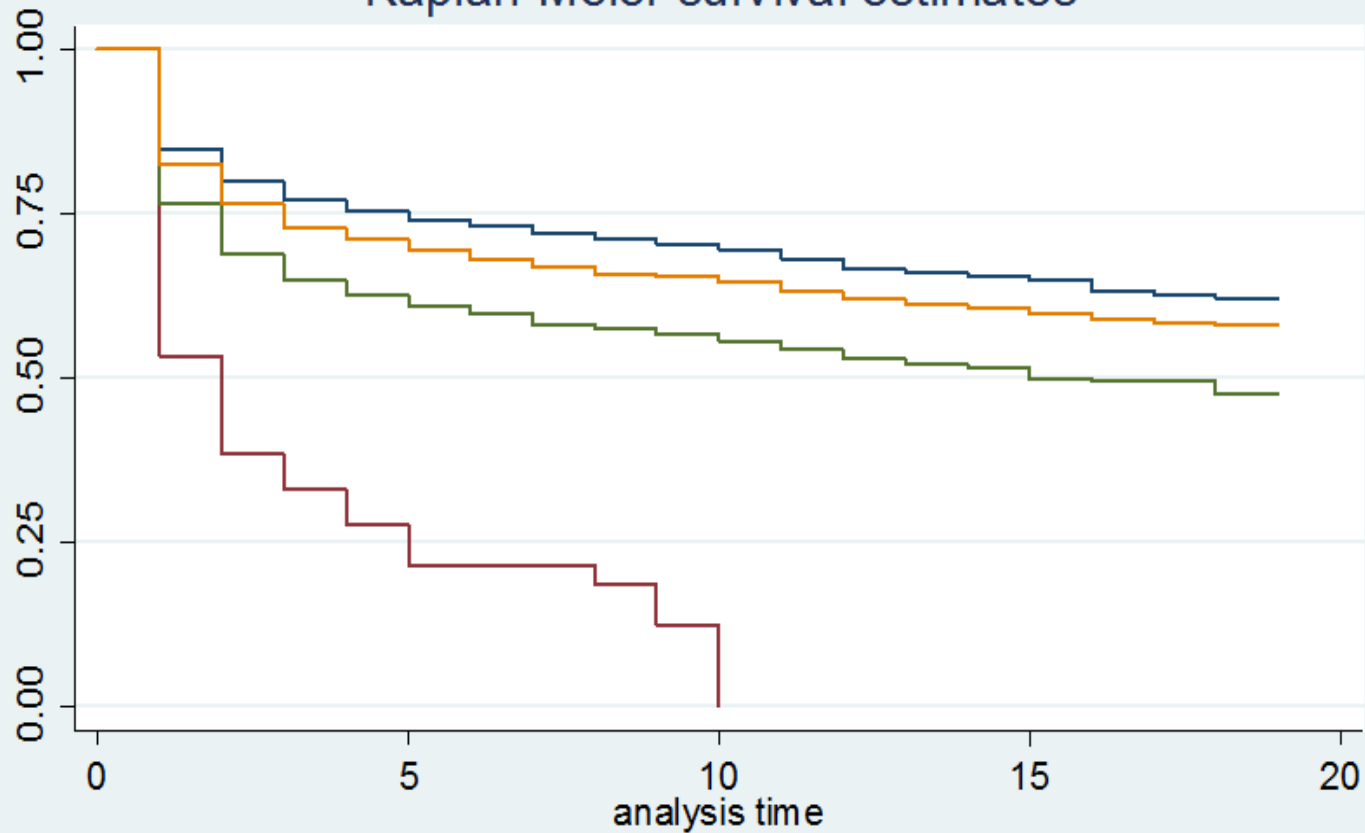## Kaplan-Meier survival estimates

Country	Mean
High	4.76
Lower-M	3.41
Upper-M	4.26
low	1.69

chi2(3) = 1153.22
Pr>chi2= .0000

Legend:
— High income
— Low income
— Lower middle income
— Upper middle income

Kaplan-Meier survival estimates
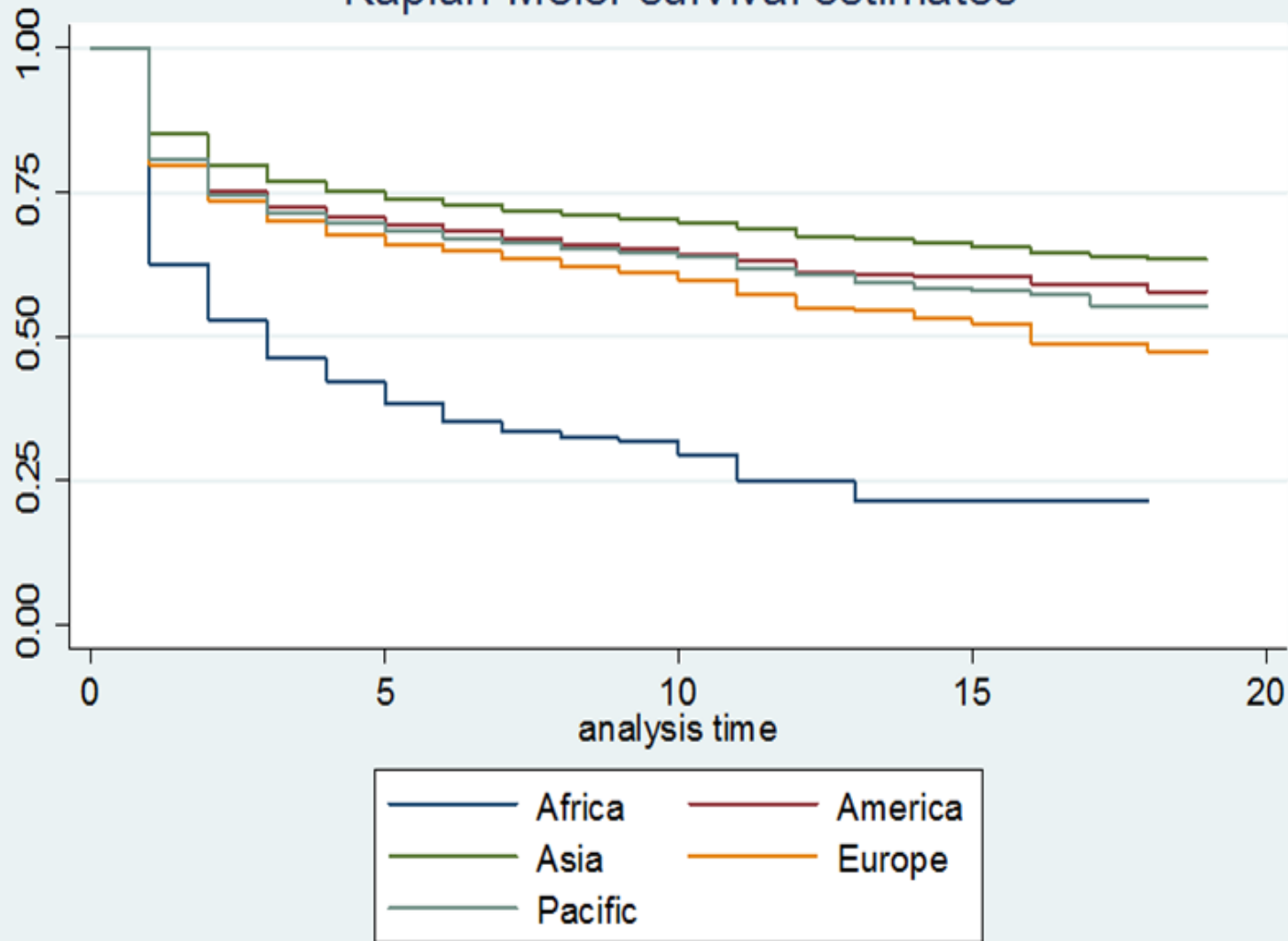
Region	Mean
Africa	2.11
America	4.39
Asia	4.75
Europe	3.85
Pacific	4.27

chi2(4)=1289.24
Pr>chi2=0.0000

Kaplan-Meier survival estimates
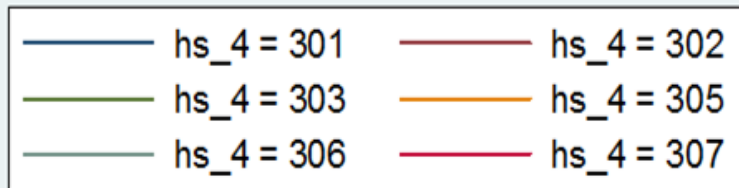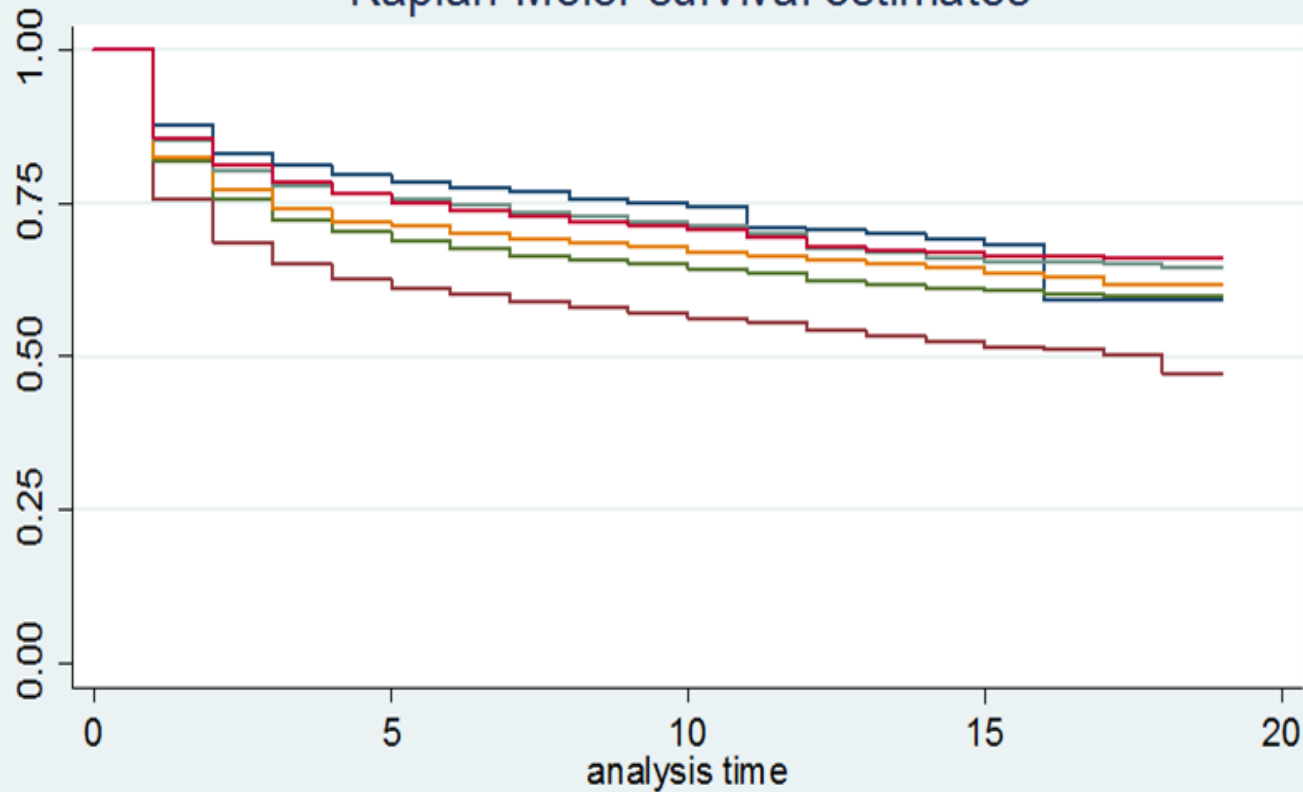
Product	Mean
0301	5.06
0302	3.92
0303	4.35
0305	4.64
0306	4.95
0307	4.73

Legend:
- hs_4 = 301
- hs_4 = 302
- hs_4 = 303
- hs_4 = 305
- hs_4 = 306
- hs_4 = 307

$chi2(5) = 800.34$
$Pr>chi2 = 0.0000$

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Table 3. Estimated KM Survival Rate

				Estimated KM Survival Rate		
	Mean	1 Year	3 Years	10 Years	15 Years	19 Years
All Data	4.64	0.83	0.75	0.69	0.63	0.61
Income						
High	4.76	0.85	0.77	0.69	0.64	0.62
Lower middle	3.41	0.76	0.65	0.55	0.50	0.47
Upper middle	4.26	0.82	0.73	0.64	0.60	0.58
Low	1.69	0.54	0.33	0.00	0.00	0.00
Continent						
Africa	2.11	0.63	0.46	0.30	0.21	0.00
America	4.39	0.81	0.72	0.64	0.60	0.58
Asia	4.75	0.85	0.77	0.70	0.66	0.63
Europe	3.85	0.80	0.70	0.60	0.52	0.47
Pacific	4.27	0.81	0.71	0.64	0.58	0.55

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	Mean	1 Year	3 Years	10 Years	15 Years	19 Years
				Estimated KM Survival Rate		
All data	4.64	0.83	0.75	0.69	0.63	0.61
HS-4						
0301	5.06	0.88	0.81	0.74	0.68	0.59
0302	3.92	0.76	0.65	0.56	0.52	0.47
0303	4.35	0.82	0.72	0.64	0.61	060
0305	4.64	0.82	0.74	0.67	0.64	0.62
0306	4.95	0.85	0.78	0.71	0.66	0.64
0307	4.73	0.86	0.78	0.71	0.66	0.66

Table 4. Hazard Rate Regression Results(discrete---logit)

	Model 1	Model 2	Model 3
lnTrade-value	-0.309***	-0.317***	-0.319***
lnProd-e	0.073***	-0.135***	-0.106***
lnGDP-e	-0.797***	-0.617***	-0.596***
lnGDP-I	-0.361***	-0.361***	-0.316***
lnPop-e	-0.468***	-0.403***	-0.451***
lnPop-I	-0.141***	-0.143***	-0.128***
lnArea-e	-0.102***	0.109***	0.111***
lnArea-I	0.008	0.005	-0.019***
lnDistance	0.501***	0.528***	0.484***
Landlocked	-0.121***	-0.132***	-0.228***
GATT-e		-0.696***	-0.713***
GATT-I		-0.082***	-0.134***
ASEAN		0.053	0.101***
lnImport			-0.002***
lnUrbanization			-0.002**
lnCredit_e			-0.001***
Sub_Saharan			0.349***

Note: Number of obs = 267883   LR chi2(17) = 25452.07 Prob > chi2 = 0.0000 Pseudo R2 = 0.2017

Conclusions

- Compared to previous aggregated commodity simulation results, seafood trade has longer average trade spell length (4.64 vs 3).

- Within ASEAN seafood trade has lower survival rate than between ASEAN and other regions.

- High income country has higher survival trade and longer trade length than other countries. Africa has the shortest trade length (2.45 vs 4.40).

- Gravity variables which are positive to trade reduce the hazard rate of trade relationship.

- Openness of economy can longer seafood trade spell.

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THANK YOU!!