



## FTA and Duration of Vietnam Exports

Thi Hoang Oanh, Nguyen<sup>a, b</sup>

<sup>a</sup>Economics Department, National Chung Cheng University, Taiwan

<sup>b</sup>Thai Nguyen University of Technology, Vietnam

nguyenthihoangoanhtn@gmail.com

### Abstract

*A product can serve long in foreign markets if it can compete with other products. Could FTAs help increase duration of Vietnamese products exported? This paper investigates the factors affecting the probability of survival in export markets, framing to FTAs, by using Vietnam export data at 6-digit level from Comtrade from time period 1990-2015, country-product relationships, and non-parametric estimations and parametric model collectively. By controlling development level-developed and developing, this paper finds that FTAs help to increase the competitive ability of Vietnamese products, the probabilities of survival in member-market is greater than in non-member-market. This result is strongly confirmed for trade transactions having greater values. Product quality and un-broken trade relationships during this period also are important factors affecting duration of Vietnamese products exported.*

**Keywords:** Duration, survival, hazard rate, export, FTAs.

### Introduction

Duration of products traded in international markets, is the length of time that it serves in one foreign market un-disruptively, this length predicted will not be terminated very quickly by international trade theories because trade patterns predicted are stable over time. Surprisingly, mean of duration of a product is very short, two or four years, however if a product can survive the first few years its duration increases sharply (Besedeš & Prusa, 2006.a). Why does duration of products have these characteristics? Some researchers found the factors that affect product's survival ability such as differentiated product's duration is longer than homogenous product's duration (Besedeš & Prusa, 2006.b); or the greater initial transaction size of products the longer duration they have (Besedeš & Prusa, 2011). The other factors impacting duration include reliability of suppliers, search cost (Besedeš, 2008); innovation (Chen, 2012). Nitsch (2009) and Fugazza and Molina (2011) found those determinants, also. Nitsch used 8-digit German import and found that duration of products exported to Germany was also affected by reliability of suppliers, transportation cost, trade value, elasticity of substitution, product type and market structure. And the length of time to serve in the German market by imported products is often one to three years. Fugazza and Molina analyzed duration of trade relationships from 96 countries from 1995 to 2004 and found these factors, also, especially duration of trade change across regions. Other authors use plant-and firm-level data to analyze the survival ability of products such as Bernard and Jensen (2004), Ilmakunnas and Nurmi (2010) or Cadot et.al (2011). Besedeš argues that plant/firm-level data would only make the results stronger but product-level data highlights the significant dynamics not observed at the firm level.

Duration of goods reflects the dynamics of goods and the competition between products in one market. If a product fails, it gets out of the market and suppliers do not continue to sell these products in that market, thus they must find the new buyers.



Suppliers also pay the search cost to sell the products. Besedeš (2008) introduced the search cost that buyers must pay if they want to purchase products and if search costs are low the product's probability of survival increases. If an exporter succeeds in maintaining a presence for several timeperiods, then this exporter need not pay any search cost for surveying the taste of consumers, rules, regulations... or only pay a little some years later. If a product enters one year, exits some years then re-enters, it has experienced multiple spells, and if it remains unbroken for the duration of the timeperiod, then it has one spell. As suggested in Besedeš (2006.b) if products experience multiple spells they may either have higher or lower hazard rates in turn back. Their results show that multiple spells have higher hazard rates which mean the first failure makes the second failure more likely. FTAs creating preferential schemes for members to increase trade volume between them are proven in a numerous papers. For Vietnam trade transactions increasing with her member-partners is found in Nguyen & Nguyen (2015) and Nguyen (2017), also. FTAs ensuring the longer survival for Vietnamese products in member markets remain in question, I hope to find an answer to this question in this paper.

The first FTA was signed between Vietnam and Asean countries in 1995, Vietnam became the seventh member in Asean. By 2015, Vietnam had trade relationships, from a FTA prospective, with sixteen countries<sup>1</sup>. Members including Vietnam committed to reduce the import tariffs and create other advantages in custom clearances. In the favorite position, do Vietnamese products have longer duration or can compete with other competitors in FTA-markets?

I use product-level data for Vietnam exports to 170 countries during 1996-2015 and I find that 57% products in sample exit after one year, 84% products fail after four years and the median of duration of products Vietnam exports is 2.8 years. To understand how the FTAs affect the survival probability of products, I divide Vietnams trade partners into FTA and non-FTA-member, I cannot figure out any difference of duration of goods between two groups. Then I separate the sample into four groups: developed and developing-FTA members, developed and developing-non members<sup>2</sup>, survival probabilities between them are different in both non-parametric and parametric methods. KM survival estimate shows that the order of probability of survival of products exported to four groups is arranged as the greatest in developed-member, then in developed-non-member, following in developing-member, and the less in developing-non member. The results from Cox proportion hazard estimate are strongly consistent with the outcome of KM survival estimate for observations that initial transaction values are greater than \$ 55000. Quality of products is also an important factor in helping to increase the time to exist in foreign markets, beside preferential schemes from signing FTAs. And the probability of failure of products re-entering into a foreign market (multiple spells) is very high, greater than 60% a product having a spell. The negative dependence between probability of survival and re-entering products holds for every scenario.

The following parts of current paper are organized as: part two is data description, part three is estimate results, part four is robust check, and the last is conclusion.

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<sup>1</sup>List of FTA-countries in table 4 in appendix

<sup>2</sup>List of countries in each group in table 4 in appendix



## Data

I use the most disaggregated data of Vietnam exports from Comtrade recorded in 6-digit for the current purpose. Because the data is recorded by H1-H2-H3-H4 (HS1996, HS2002, HS2007, and HS2012, respectively) the censor should be more cautioning (more detail later). Exchange rate is nominal exchange rate and it is calculated by a unit of foreign currency in term of number of domestic currency. Exchange rate data is downloaded from IMF then I transfer to a foreign currency in term of number of VND. If exchange rate increases, meaning VND depreciates, Vietnamese goods become relatively cheaper and exports increase. This factor can help to increase the length of survival of goods exported in one market. I also include GDP as a factor helps to increase duration of goods. Transportation costs affect negatively to durations, both these data stem from CEPII.

My interest is to study the length of time until Vietnam ceases to export its products to each partner, an event which will be referred to as a failure. For instance, Vietnam exported commodity code 851810 to Australia from 1999 to 2005 this product was failure in 2005, then we called this products fail in 2005 and length of its spell is six years. The treatment of censored observation is needed in survival analysis. Censors appear from two cases, one is from the start and end of the observation period and the other stem from reclassification. In the first case, relationships observed in 1996 have an uncertain starting date as those are the first years under observation-they may have commenced in 1996 or before, so I put all commodities traded in 1996 as censor. The same situation happens with all commodities traded in 2015, they might be continued to trade after that. In the second case, some commodities recorded by HS1996, the others by HS2002..., reclassification might split a single code into several new ones, for instance, commodity code 071190 in HS1996 is recoded into three product codes 071151, 071159, and 071190 in HS2002; or several codes are merged into a single new code. Suppose Vietnam exported product code 071190 to Australia during 1996-2001, after 2002 if I still observe three product codes 071151, 071159, and 071190 exported to Australia so product code 071190 might be continuous, I cannot assert if one or two of three codes is omitted, however. So for simplicity, I arrange them as censor.

In sample data, there are two commodity codes: 999999 and 9999AA that are used to record all products not clearly defined, and their durations last twenty years. They might impact other products' duration I drop them out of the sample.

The other thing relating the spells of goods is that to create spells annual data for each country-product pair are used. If Vietnam exports product *i* to country *c* continuously during 1996-2015 then this represents a spell of twenty years. Some products enter in a market, then exit, after some years they re-enter that market however, they have more than one spell. Some products have two spells, the other have four spells. As mentioned in Besedeš and Prusa (2006.a), they used some specifications to deal with spells of goods as multiple spells, single spell, first spell, and adjusted spell and they found that lengths of time of one product serving in U.S. market is quite the same across the specifications. In the current work, I use specification as multiple spells.

## Duration of Products Exported

### *Survival Functions*

Signing FTA with her partners, Vietnam hopes to increase her competitive capacity via raising her export value and duration of product in member markets through getting preferential conditions. Vietnam's member partners include both developed and developing countries. By 2015 there were eight FTAs with sixteen countries signed and being en- forced. The trade creations from signing FTAs are figured out by researchers as Nguyen & Nguyen (2015) or Nguyen (2017), duration of trade relationship is investigated in current paper.

I use Vietnam exporting data to 170 her partners for this purpose and during this period there are 5718 product codes Vietnam exported to her partners, where 5480 products exported to her FTA-partners and 5430 to her non-FTA partners. The mean of duration for all products is 2.8 years, for member and non-member are 3 and 2.7 years, respectively. The percentage of Vietnamese products that fail in foreign market after one year is 57%, and for four years is 85%.

**Table 1. Summarized statistics**

	Observed Spell Length (Years)		Percentage of spells that fail after			Total number of spells	Total number of product codes
	Mean	Median	1 year	2 years	4 years		
Pooled	2.8	1	56.88	72.37	84.63	313280	5718
Non-member	2.7	1	57.91	73.18	85.37	226660	5430
FTA member	3	1	54.17	70.26	82.67	86620	5478
Developed-member	3.6	1	50.97	66.25	78.78	26673	4549
Developed-non-member	3.1	1	54.31	69.78	82.67	130332	5290
Developing-member	2.8	1	55.59	72.04	84.40	59947	5370
Developing- non-member	2.2	1	62.79	77.76	89.03	96328	4664

The difference of mean and percentage of failure after some years between member and non-member partners is very small, although all indicators show that FTA-members' duration is a little bit better. I apply KM survival estimate to distinguish two groups' length of product existing. The result in fig.1 indicates their durations of products are quite similar. Then I divide sample into subgroups: developed-and developing-member, and developed- and developing-non-member. Mean durations of products four groups are 3.6, 3.1, 2.8, and 2.2 (developed-member, developed-non-member, developing member, and developing-non-member, respectively) years. Failure ratios after serving some years between them are distinctive. After one year, 50% of products in the former are failure, 54% and 55% in two middle and 63% in the latter. Applying KM to estimate probability of survival for four groups and ranking of survival probability of products are likely as in order of mean of durations. Survival probability of products exported to developing-non members is the lowest, following in developing-member, then in developed-non-member, and the greatest in developed-member in all level of durations. After four years existing in foreign markets, survival probabilities in four group-markets are 32, 27, 20, and 18%, respectively. Receiving advantage conditions from FTA-partners, Vietnamese products seem likely getting higher competitive ability in FTA-markets if controlling her partner's development levels. In the following part I apply Cox hazard estimate to add more variables affecting Vietnamese products' survival to analyze, focus on developed, developing-member and non-member.

### *Cox Hazard Estimates*

I estimate the Cox proportional hazard rate to control other factors as the form:

$$h(t, x, \theta) = h_0(t) \exp(x'\theta)$$

Where  $x$  denotes a vector of explanatory variables and  $\theta$  is to be estimated. The baseline hazard,  $h_0(t)$ , characterizes how the hazard function changes as a function of time. Beside FTA group dummy variable taking zero if her partners are developing-non-member, one if developing-member, two if developed-non member, and three if developed-member, I include GDP and as well-known larger GDP encourages trade more so it might help to increase products' duration; I also include distance between Vietnam and her partners as proxy of transportation costs and the longer distance the higher cost exporters' payment, beside the shipping fee if the longer distance the more quality of products affected, might be lower quality so the competitive ability might be reduced, particularly for agricultural products. Exchange rate also is included and I use nominal exchange rate getting from IMF (the price of a unit of US dollar is expressed in terms of the domestic currency), then I convert one foreign currency in term of Vietnamese currency. If Vietnamese currency (VND) appreciates (nominal exchange rate decreases) firms should become less relative competitive to other foreigners and more likely to exit in foreign markets and versa. Multiple spell dummy also included taking one if a trade relationship is re-connected, zero otherwise. All variables not dummy variables are taken in natural logarithm. The estimation result for pooled products is considered as benchmark. As found in Besedeš (2006.b), the effect of initial transaction sizes on duration of products after controlling by eliminating all observations less than \$ 100000, they find the hazard rate for homogenous and referenced priced products are greater than differentiated products. In my work, I also control the initial transaction size to investigate the effect of FTAs on duration of Vietnam products exported. The outcomes are in table 2. In benchmark model, GDP, nominal exchange rate and distance impact on hazard rate of Vietnamese products are as expected. The greater GDP the lower hazard rate if her partner's GDP increases one percent the hazard rate reduces 11%. For exchange rate if one unit of logarithm of exchange rate increase, hazard rate of Vietnamese products is lower than 1%; distance increases one percent, hazard rate increases 7%. Multiple spells are statistically significant in all scenarios. Hazard rate of products re-entering is greater than 60% comparing to products surviving full durations. Particularly for re-entering-transactions that initial value greater than \$ 55000 and \$ 100000, proportion hazard rate sharply increase and greater than trade relationships unbroken 146% and 170%, respectively. This means for observations the greater initial transaction value are, if they fail in first time they are more likely fail in second time. The reason might be buyers shifting to other suppliers and keep those trade relationships for longer periods because they find more reliable alternative suppliers or buyers do not continue to believe suppliers' reputation because suppliers do not adhere the commitments then failure of trade relationships occurs. The effects of FTAs on Vietnamese products' durations from Cox proportion hazard estimates are consistent with KM survival estimates for developed groups. Hazard rate of time existing in both is lower than in developing-non-member (16% and 11%, respectively), and hazard rate in developed-member is lower than in developed-non-member. Survival probability in



developing-member is less than 11% in developing-non-member. Some may argue that longer durations in developed-markets might stem from the higher qualitative products exported to them than developing-markets. I control the quality of products by price variable as in Stiglitz (1987). Quality of products impacts clearly on competitive ability of Vietnam goods in foreign markets. The higher quality product the lower hazard rate gets out of foreign markets, 2% in benchmark model and 4% for observations having initial transaction size greater than \$ 100000. The difference duration of Vietnamese products exported to developed, developing- FTA and non-partners still holds in controlling price scenario. Economic structures might be caused of these results. Developing-members' also concentrate on products labor intensive and have comparative advantages in some sectors likely Vietnam such as agricultural products, textile, articles of apparel and clothing accessories, footwear, gaiters and the like, parts thereof... Vietnamese products must compete with other competitors also getting preferential scheme and also compete with domestic developing-markets themselves so Vietnamese products' duration in this kind of markets is shorter. Developed-members' economic structures are different from that of Vietnam. They focus on sectors that are capital intensive, the products specialization is not agricultural or textile or footwear products as in Vietnam so general duration of products in this kind of markets is longer. Getting preferential conditions to exports in developed-markets help increase Vietnamese advantages to compete with domestic products and their other partners.

**Table 2. Cox proportion Hazard estimates**

	Benchmark		Obs>20000	Obs>55000	Obs>100000	
	(1)	(2)	(2)	(2)	(1)	(2)
Lngdp	0.909	0.910	0.906	0.902	0.897	0.902
Lnexch	0.993	0.994	0.990	0.993	0.993	0.996 <sup>a</sup>
Lndist	1.069	1.072	1.052	1.037	1.000 <sup>a</sup>	1.002 <sup>a</sup>
Multiple spell dummy	1.595	1.603	2.169	2.456	2.701	2.704
Developed-member	0.843	0.838	0.644	0.578	0.541	0.543
Developed-non-member	0.893	0.893	0.753	0.699	0.653	0.658
Developing-member	1.111	1.098	0.998 <sup>a</sup>	0.957	0.907	0.892
Lnprice		0.978	0.966	0.962		0.955
Number of observations	311272	296359	71387	39225	26823	25963

<sup>a</sup> Denotes estimates not significant at the 10% level; (2) estimates include price variable, (1) otherwise

How about Vietnamese competitive ability under preferential scheme in developing-member? Hazard rate in this market is greater than 11% in developing-non-member. If I control the initial transaction value by keeping only initial transaction values greater than \$ 20000, hazard rate in developing-member now is less than in developing-non-member, insignificant however. By controlling the development level and initial transaction value by eliminating values less than % 55000 and % 100000, hazard rate in developed-FTA partners is the lowest, following in developed-non-member, then in developing-member and the highest in developing-non-member ( 42%, 30%, and 4% for former size and 46%, 34%, and 10% for latter size, respectively). Why does this order of hazard rate in developing-markets not hold with product's initial trade less? Under preferential scheme, gaining from exporting is tariff rate that exporters need not to pay they must satisfy the rule of origins, however. The costs that exporters pay might be greater than the benefit from tariff rate for less value traded. That might be the reason why duration of products initial transaction value less than \$ 20000 in developing-

member is not greater than in developing-non-member. For the great value trading as in table 2, payments from tariff are quite large so exporters prefer using the rule of origins more, under this scheme helps increase Vietnamese products' duration in FTA-partners. The reason also is the same from buyer' options, they will choose the suppliers under the same FTAs with large value of trade because they might be buy products with cheaper prices.

## Robust check

As mentioned in part 2, some products are censored because of reclassification, if most of this list of censor-products belong to one of four groups the results might be bias. To recheck the effect of FTAs on duration of Vietnam products exported, I drop all products being censors causing by reclassification and run all non-parametric and parametric models again. After controlling development level FTAs help Vietnam products raising duration of products in FTA-markets even with initial transaction trade values from \$ 35000 comparing to \$ 55000 in holding reclassified-products. To save I only report Cox proportion hazard estimate as in table 3.

**Table 3. Cox proportion hazard estimate after dropping products reclassified**

	Benchmark		Obs>35000		Obs>100000	
	(1)	(2)	(1)	(2)	(1)	(2)
Lngdp_d	0.917	0.917	0.902	0.905	0.900	0.904
Lnexch	0.995	0.996	0.993	0.994	0.997 <sup>a</sup>	0.999a
Lndistw	1.062	1.064	1.047	1.047	1.007 <sup>a</sup>	1.006a
Multiple spell dummy	1.348	1.356	1.814	1.825	2.045	2.057
Developed-member	0.823	0.820	0.584	0.585	0.515	0.518
Developed-non-member	0.877	0.878	0.699	0.700	0.630	0.635
Developing-member	1.078	1.067	0.969 <sup>a</sup>	0.954	0.889	0.877
Lnprice		0.981		0.976		0.971
Number of observations	266203	253622	44120	42649	21373	20707

<sup>a</sup> Denotes estimates not significant at the 10% level; (2) estimates include price variable, (1) otherwise

## 5. Conclusion

Maintaining longer in foreign markets and unbroken trade relationships proves that Vietnamese products increase their competitive abilities in international arena. By signing FTAs, authorities hope to create opportunities to increase Vietnamese product's competitive ability. These FTAs really help increase Vietnam goods' durations in processing international integration beside other factors impacting goods exported, too.

Half of products fail after being exported to foreign market in one year and above three-fourth products fail after four years. Mean of duration of products exported is 2.8 years. This indicator is a little higher in FTA-members. However probability of survival is not different between them. Probability of failure is clearly different in developed and developing markets, however. Hazard rate of products in developed-market is lower than in developing-market in all scenarios. The effect of FTAs on duration of goods in two kinds of markets is likely the same way. In developed-markets the survival duration is higher in developed-FTA-markets than in developed-non-member. In developing-



markets, signing FTAs also helps increase Vietnamese competition for transactions having greater values in developing-member than developing-non-member. The impact of FTAs on duration of product is more confirmed for initial transaction size greater than \$ 55000 and \$ 100000. Hazard rate in developing-non-member is the highest, then in developing-member, after that is developed-non-member and the lowest in developed-member.

Multiple spells do not help Vietnam turn back old markets more easily in opposition makes her more difficult in competition. The hazard rate is very high, especially with all initial transaction size greater than \$ 55000 and \$ 100000. Quality of products also is a factor help Vietnam can stand firmly in foreign markets, increase the quality of products is solution we cannot ignore.

Figure 1. KM estimates for FTA-member and non-member

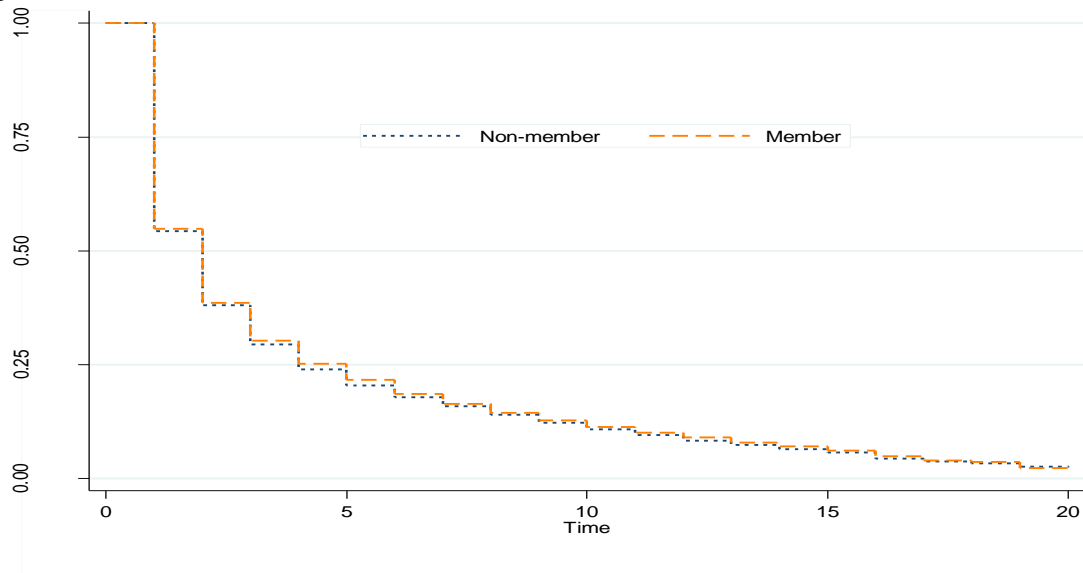
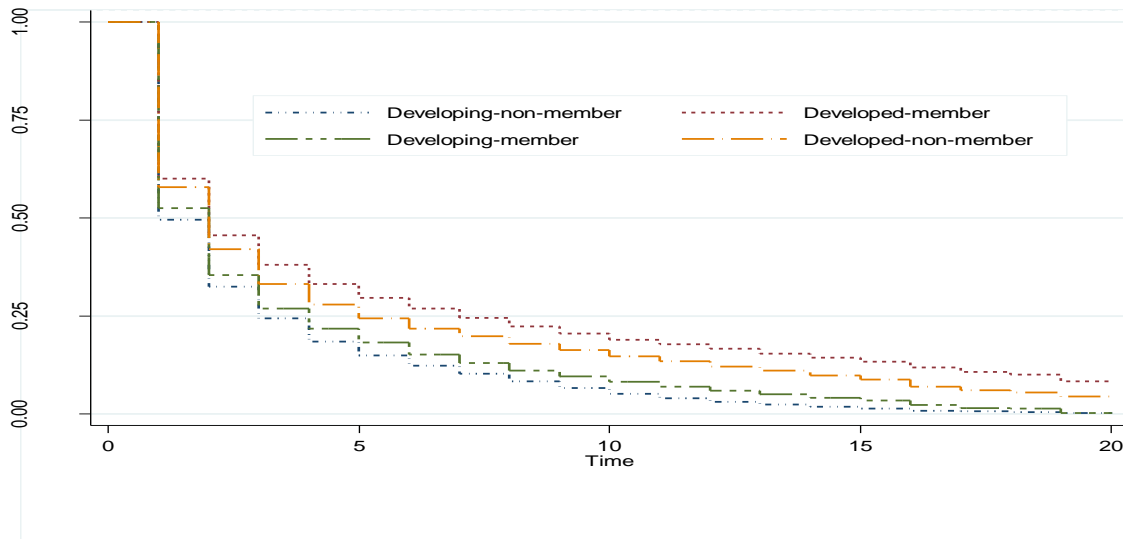


Figure 2. KM estimates for four groups







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## Appendix

**Table 4. List of Countries into each group<sup>b</sup>**

Developing-member	Developed-member	Developed-non member			
Thailand	Japan	Austria	Spain	Poland	China, Hong
Singapore	Australia	Belgium	Sweden	Romania	Kong SAR
Indonesia	New Zealand	Denmark	United Kingdom	Slovakia	Qatar
Malaysia	Chile	Finland	Bulgaria	Slovenia	Kuwait
Brunei	Rep. of Korea	France	Croatia	Iceland	Oman
Philippines		Germany	Cyprus	Norway	Trinidad and
Lao People's Dem. Rep.		Greece	Czechia	Switzerland	Tobago
Myanmar		Ireland	Estonia	Canada	Saudi Arabia
Cambodia		Italy	Hungary	USA	Portugal
India		Luxembourg	Latvia	Taiwan	Malta
China		Netherlands	Lithuania	Israel	

<sup>b</sup> The rest of countries in sample is developing-non-member