An Assessment of the Potential Economic Impacts of RCEP on Vietnam Automobile Sector

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This research aims at examining impacts of ASEAN+6 trade agreements on automobile industry in Vietnam. Vietnam automobile industry competes with Thailand, Indonesia and those ASEAN countries as well as China, Korea, Japan and those assigned with ASEAN agreement. By 2018, the automobile import tariff from China, Korea and Japan will reduced to 5%. In the context of multiple trade agreements, the study of automobile industry has recently become an interesting topic, especially for the policy debate.

AN ASSESSMENT OF THE POTENTIAL ECONOMIC IMPACTS OF RCEP ON VIETNAM AUTOMOBILE SECTOR[1]

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1. Introduction

1.1. *Overview of Vietnam automobile market and import*

The formation of automobile market in Vietnam was relatively late compared to the world. In 1986, Vietnam kicked off the Renovation initiative. Along with political and economic reform efforts of the country, relations with capitalist countries have been gradually resumed, which facilitated the automobile market in Vietnam become more dynamic with various types of automobiles from different foreign branch names such as Toyota, Ford, Honda, Mercedes Benz, etc.

The automobile market in Vietnam has two major segments: Completely Knocked Down (CKD) and Completely Build Up (CBU). A CKD vehicle means a vehicle is assembled locally using all the major parts, components, and technology imported from the country of its origin. A CBU import means a vehicle is completely built out of the country. If a vehicle is tagged as CBU import, it means the vehicle is imported to the country as a whole piece.

Generally speaking, the localization ratio of Vietnam automobile industry is still very low. Thus, importation of both final and intermediate products related to automobile manufacture plays a very important role. For Vietnam, value of trade in automobile products accounts for a good proportion in total value of trade in commodities. According to Trade Map[5] database, in 2015, products in the HS[6] 87 group (Vehicles other than railway, tramway) ranks at the 6th among the top 10 product groups with highest import value.

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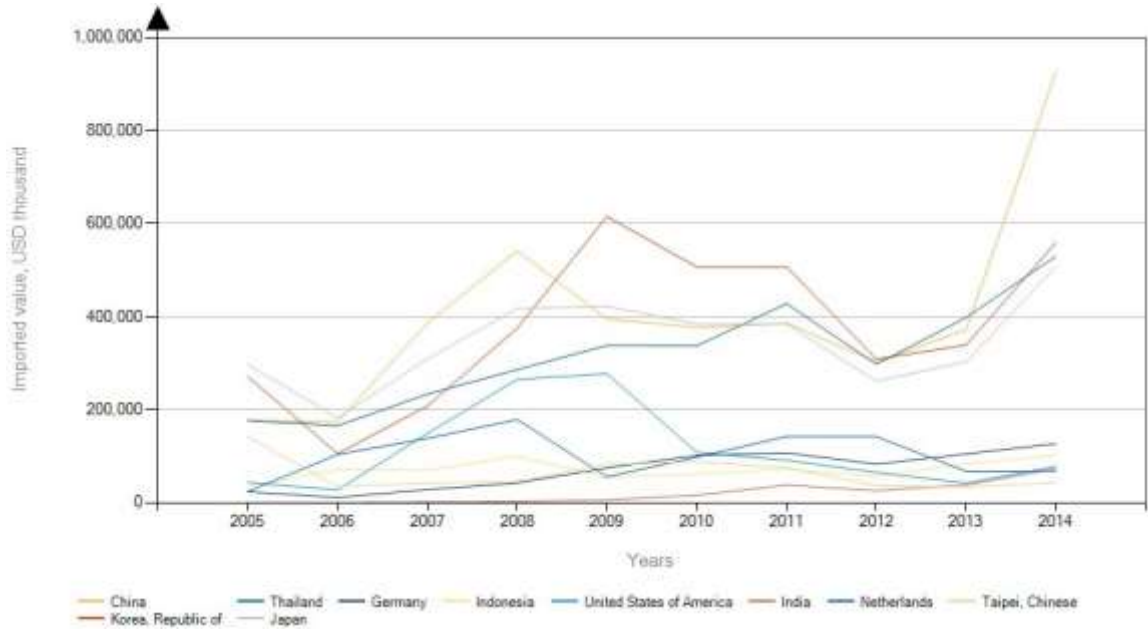[5] http://www.trademap.org/
[6] Harmonized System.

Figure 1: Import values of top 10 products imported by Viet Nam

Figure 2: Top 10 supplying markets for the product group HS - 87 (Vehicles other than railway, tramway) imported by Vietnam

Table 1: List of supplying markets from ASEAN+6 for the product group HS – 87 (Vehicles other than railway, tramway) imported by Viet Nam

<div align="right">Unit: US Dollar thousand</div>

| Imported value / Exporters	2010	2011	2012	2013	2014
World	2,304,410	2,437,897	1,721,976	1,886,317	3,183,011
ASEAN +6 Aggregation	1,720,374	1,851,378	1,279,530	1,555,345	2,722,195
ASEAN +6 Aggregation (*as percentage in total imported value from the world*)	**75%**	**76%**	**74%**	**82%**	**86%**
China	376,786	385,845	303,227	371,893	926,484
Korea, Republic of	506,942	507,022	308,393	338,772	558,983
Thailand	337,005	427,782	297,664	397,849	529,845
Japan	383,882	384,067	261,216	302,965	508,234
Indonesia	61,475	72,255	55,991	83,543	101,591
India	15,909	37,921	25,967	38,180	72,768
Malaysia	8,197	9,031	10,501	9,728	14,244
Philippines	23,603	22,734	13,210	8,868	7,328
Singapore	5,179	3,996	2,715	2,263	1,243
Australia	1,097	710	273	1,180	1,195
Cambodia	112	8	346	96	259
New Zealand	23	7	27	8	21
Lao	164	0	0	0	0
Myanmar	0	0	0	0	0
Brunei Darussalam	0	0	0	0	0

Source: Authors' compilation from Trade Map database

As shown by Figure 2, among the 10 biggest supplying markets of vehicles imported by Vietnam, there are six countries belonging the proposed free trade area of ASEAN + 6, namely China, Thailand, Indonesia, India, Republic of Korea and Japan. China, Korea, Thailand and Japan that are the 4 biggest supplying markets are all participating members in ASEAN+6 negotiating FTA. It means that ASEAN+6 could be considered as a critical significant group of partner countries of Vietnam's automobile sector. Thus, the formation of ASEAN+6 free trade area is expected to bring remarkable effects on this sector of Vietnam. Table 1 supplements further statistics of imported value by Vietnam from ASEAN+6 supplying market compared to the total imported value from the world, which confirm the importance of ASEAN+6 partners to the Vietnam's trade in vehicles.

Vietnam is considered as a transitional economy, shifting from the centrally-planned economy with state subsidies to a socialist-oriented market economy. As the domestic automobile industry has not been developed, the automobile market has been still under a moderate control of the Government. However, along with the irreversible process of economic integration, this control has been relaxed. Before 2004, the Government controlled the domestic automobile market by tariffs and quotas, especially import tariffs. For example, vehicles under 12 seats were not allowed to be imported into Vietnam market

to serve the purpose of personal consumption. Special Purpose Vehicle (SPV) import was restricted by quotas, in order to ensure competitiveness of domestic products (mainly SPV at that time). Until 2005, the CBU import duty to all vehicles for passengers and under-five-ton cargos was over 100%.

Figure 3: Sales in Vietnam automobile market from 2005 to 2015

Unit: vehicle
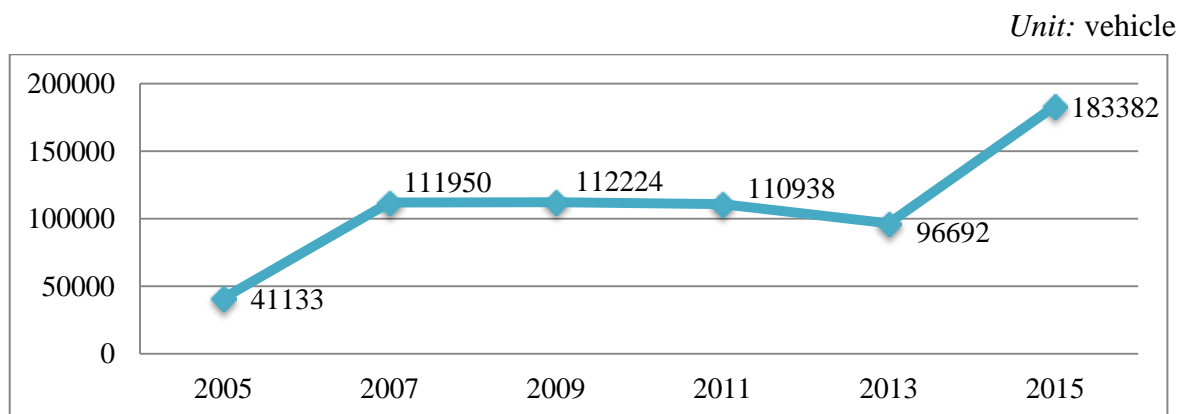
Source: OICA[7] Report, 2015

In the context of globalization and economic integration, the regulatory policies of the Government are in conformity with terms and conditions negotiated and stipulated in international trade agreements. After the accession to the World Trade Organization (WTO) in 2007 and by implementing the commitments of tariff reduction, import tariffs imposed by Vietnamese government on imported automobiles started being cut. Outputs, as well as consumption quantity of vehicles in all segments have increased over the years. Sales in Vietnam automobile market increased 4.5 times in ten years (from 2005-2015), from 41,133 to 183,382 vehicles (Figure 3). It is noteworthy that demand for cars increased nearly three times (from 41,133 to 111,950) during the period from 2005 to 2007, which marks the obvious effect of the Government's policies on the automobile effects, especially the policy of tariff reduction.

1.2. Overview of the Regional Comprehensive Economic Partnership (RCEP)

The Regional Comprehensive Economic Partnership (RCEP) is a FTA negotiation that has been developed among 16 countries: the 10 members of ASEAN and the 6 countries with which ASEAN has existing FTAs – Australia, China, India, Japan, South Korea, and New Zealand, which is also considered as ASEAN+6. When completed, the agreement will comprise of 16 countries, which represent over 45% of the world population (3,435 million in 2013) and contribute about a third of the world's GDP (US$21.3 trillion, in 2013), and make up almost 30% of world exports (WEF, 2014, 33).

On November 2012, RCEP negotiations were launched in Phnom Penh. The 1st round of RCEP negotiations was held on 9–13 May 2013 in Bandar Seri Begawan, Brunei.

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[7] Organisation Internationale des Constructeurs d'Automobiles

Recognizing the ASEAN Framework for RCEP, the objective of launching RCEP negotiations is to achieve a modern, comprehensive, high quality and mutually beneficial economic partnership agreement that will cover trade in goods, trade in services, investment, economic and technical cooperation, intellectual property, competition, dispute settlement and other issues among the ASEAN Member States and ASEAN's FTA Partners. RCEP will broaden and deepen current engagement that has already been achieved through the existing ASEAN+1 FTAs. Compatibility with WTO trade rules on goods and services is also a principle for RCEP negotiations.

The latest 13th round was held in Auckland in June 2016. All RCEP countries have now submitted initial offers for trade in goods and trade in services, as well as initial reservation lists for investment. In goods, negotiators continued to engage in discussions on the way forward, in light of the statement last year that leaders were looking forward to the conclusion of RCEP negotiations in 2016. The next round is scheduled for August 2016 and will be held in Ho Chi Minh City, Viet Nam. The RCEP appears to overlap and compete with the Trans-Pacific Partnership (TPP) agreement which has become heavily influenced by the United States' economic and geopolitical agenda in the Asia-Pacific. (7 of RCEP's member governments belong to the TPP.) Additionally, China has recently decided to champion the Free Trade Area for the Asia-Pacific (FTAAP), an old US-initiated proposal to have a single free trade agreement covering all Asia-Pacific Economic Cooperation (APEC) member states.

Participating in such great FTAs like RCEP or TPP is placing numerous issues on FTA negotiating capacity of countries involved including Vietnam. Preparing well for the negotiations, which makes the actual negotiations a more manageable undertaking, is the first and foremost concern. In order to work out the negotiating objectives and strategies, it is necessary for policymakers and stakeholders to determine the potential economic effects of an FTA. Ex-ante economic assessment of an FTA may be not only an estimation of overall effects on an economy participated in the FTA as a whole but also an anticipation of impacts on particular sectors in a country that plans to join the FTA. Assessments of potential impacts of TPP are relatively extensive while those of RCEP are fairly modest, especially analyses for a specific sector of the economy, like the automobile. The more RCEP negotiation rounds Vietnam participates in, the more urgent the need to assess potential impacts of RCEP on Vietnam. Given the context, this paper is aimed at examining the potential impacts of the proposed RCEP on the automobile sector in Vietnam.

2. Impacts of RCEP on Vietnam oil import – a partial equilibrium analysis
2.1. The partial equilibrium SMART model

In FTA impact assessment, policymakers may want to focus on examining how an FTA will affect production, consumption, and trade flows in the domestic market for a single commodity. We will consider a model that is partial equilibrium. Partial equilibrium

implies that the analysis only considers the effects of a given policy action in the market(s) that are directly affected. In general, by virtue of their simplicity, partial equilibrium models tend to be more transparent and easy to implement. Modelling is straightforward and results can be easily explained. However, due to their simplicity, partial equilibrium models may miss important interactions and feedback between various markets. Moreover, as it is only a "partial" model of the economy, the analysis is only done on a pre-determined number of economic variables.

There are several partial equilibrium modelling techniques. This paper adopts the partial equilibrium model known as the SMART model – Software for Market Analysis and Restrictions on Trade – that can be used in assessing the trade, tariff revenue, and welfare effects of an FTA. This model and the simulation tools are part of the World Integrated Trade Solutions (WITS) trade database and software developed by the World Bank (WB), in close collaboration and consultation with the various International Organizations such as the United Nations Conference on Trade and Development (UNCTAD), International Trade Centre (ITC), United Nations Statistical Division (UNSD) and World Trade Organization (WTO).

2.2. *Methodology and data sources*

For the purpose of this paper, the authors define only one scenario representing a total opening of Vietnamese market to the rest of 15 RCEP negotiating partners. This should not be the exact outcome of FTA negotiations in general and RCEP negotiation in particular. Article XXIV of the GATT, under which the WTO compliance of RTAs will be established does allow for some products to be excluded from the coverage of liberalization. For RCEP, one of the Guiding Principles[8] for negotiating is stated that "Taking into consideration the different levels of development of the participating countries, the RCEP will include appropriate forms of flexibility including provision for special and differential treatment, plus additional flexibility to the least-developed ASEAN Member States, consistent with the existing ASEAN+1 FTAs, as applicable." However, analysing the impact of full liberalization in a partial equilibrium framework allows distinguishing the products and sectors where the impact is greatest. Identifying the products for which the impact of liberalization is greatest may help Viet Nam to define the most "sensitive products" for which the country may want to benefit from the provision of Special and Differential treatment. The sensitivity parameters analysed here are import increase and tariff revenue loss. Therefore, the authors apply a 100 per cent tariff reduction to all products at the HS-6 level.

The WB, in close collaboration and consultation UNCTAD, ITC, UNSD and WTO have developed WITS for access and retrieval of information on various merchandise trade and tariffs data compilation maintained by various International Organizations:

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[8] Guiding Principles (ASEAN, n.d.) were approved by Economic Ministers on 30 August 2012 and endorsed by Leaders and provide a roadmap for negotiators.

- The Commodity Trade (UN Comtrade) database maintained by UNSD;
- The Trade Analysis Information System (TRAINS) maintained by UNCTAD; and
- The Integrated Data Base (IDB) and the Consolidated Tariff Schedule Data Base (CTS) maintained by WTO.

The SMART model runs on information contained in TRAINS database. SMART, therefore, uses TRAINS data for tariffs (applied tariffs) and trade values. For trade values, TRAINS data is based on the data collected in the COMTRADE database. With regard to tariffs, the SMART model uses applied tariffs as recorded in TRAINS.
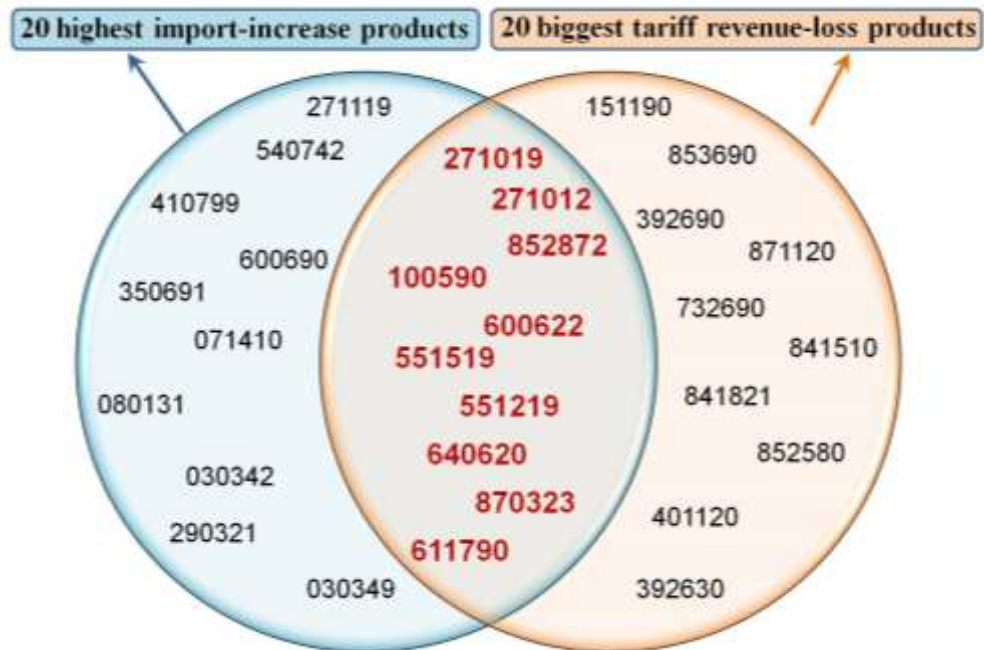
2.3. Results

The assessment of impacts on import and tariff revenue is based on results from Market View Report and Revenue Impact Report, which are created by the SMART. Table 2 reports on the top 20 products at HS 6-digit level arranged in order of highest to lowest increase in imports to Viet Nam. A half of these 20 products will increase by more than 100 per cent in imports. The most remarkable product is 611790 (Parts of garments/of cloth accessories, of textile materials, knitted) which has the biggest import increase in terms of both absolute value (1,425,183,125 USD) and percentage (803%). This product might be an important input for the sector of textile and clothing. In the context of trade liberalization, Vietnam specializes and exports more textile and clothing products – the sector which Vietnam has comparative advantage, which leads to the high demand for inputs of this sector.

Table 3 reports on simulation results for the top 20 products at HS 6-digit level arranged in order of biggest to smallest loss in tariff revenue of Vietnamese government when Vietnamese market is 100-per-cent-open to the RCEP partners. The government will lose the biggest revenue of 314,369,344 USD from import tariff imposed on the product of 271019 (Other petroleum oils and preparations). Since the gap between old weighted rate (6.63%) and new weight rate (1.48%) is not large, the loss of revenue may be mainly caused by the fact that this is one of the biggest import sector of Vietnam. The losses in overall budget revenue seems significant. Clearly, the country will need to enhance the fiscal base to be able to cope with the loss in tariff revenue.

It is interesting to find that there are 10 products that appear in both Table 2 and Table 3, meaning that the RCEP impacts on these products not only raise a concern to the government with regards to the revenue loss, but attract attention of the market regarding the import increase also. These most notable products are presented in the intersection of "20 highest import-increase products" collection and "20 biggest tariff revenue-loss products" collection (Figure 4). Their HS 6-digit codes are 271019, 271012, 852872, 100590, 600622, 551519, 551219, 640620, 870323, and 611790. These product groups critically deserve a cross check of their importance to the economy and a deeper assessment of RCEP's impacts on the sectors producing these products. Regarding automobile sector, the product coded 870323(Automobiles with diesel engine displacing

more than 1500 cc to 2500 cc) which belongs to the product group HS – 87 would be examined more carefully in order to understand more deeply the effect of RCEP on automobile sector in Vietnam.

**Figure 4: Top 20 products with the highest increases in imported value
vs. Top 20 products with the biggest losses in tariff revenue**

20 highest import-increase products	20 biggest tariff revenue-loss products

271119
540742
410799
600690
350691
071410
080131
030342
290321
030349

271019
271012
852872
100590
600622
551519
551219
640620
870323
611790

151190
853690
392690
871120
732690
841510
841821
852580
401120
392630

Source: Authors' compilation from SMART – WITS simulation results.

Table 2: Increases in imports of merchandise from RCEP negotiating partners to Vietnamese market after RCEP

Ranked by Import Change	Product Code	Product Description	Imports Before (USD)	Import Change (USD)	Percentage change (%)
1	611790	Parts of garments/of cloth accessories, of textile materials, knitted	177,413,172	1,425,183,125	803.31
2	271019	Other petroleum oils and preparations	6,359,577,500	890,558,625	14.00
3	100590	Maize (corn) nes	462,771,438	508,894,125	109.97
4	271119	Petroleum gases and other gaseous hydrocarbons nes, liquefied	289,447,469	448,035,125	154.79
5	540742	Woven fabrics,>/=85% of nylon/other polyamides filaments, dyed,	99,630,055	426,730,719	428.32
6	551219	Woven fabrics,containg>/=85% of polyester staple fibres,o/t unbl	384,841,438	321,091,188	83.43
7	600622	Dyed cotton fabrics, knitted or crocheted, of a width of > 30 cm	632,906,000	280,819,344	44.37
8	410799	Leather "incl. parchment-dressed leather" of the portions, strips or	355,410,469	209,517,750	58.95
9	600690	Fabrics, knitted or crocheted, of a width of > 30 cm (excl. of artific	219,725,438	197,040,422	89.68
10	350691	Adhesives based on rubber or plastics, nes	83,920,320	186,685,125	222.46
11	071410	Manioc (cassava), fresh or dried, whether or not sliced or pelleted	159,636,047	180,043,344	112.78
12	640620	Outer soles and heels, of rubber or plastics	126,958,938	162,135,547	127.71
13	271012	Bituminous coal	2,995,499,750	160,285,297	5.35
14	080131	Cashew nuts, in shell, fresh or dried	321,547,281	148,598,219	46.21
15	030342	Tunas, yellowfin, frozen excluding heading No 03.04, livers and	82,962,016	142,660,766	171.96
16	290321	Vinyl chloride (chloroethylene)	194,141,266	100,954,461	52.00
17	551599	Woven fabrics of synthetic staple fibres, nes	163,549,344	95,079,703	58.14
18	**870332**	**Automobiles with diesel engine displacing more than 1500 cc to 2500 cc**	**11,859,014**	**86,078,422**	**725.85**
19	852872	Reception apparatus for television, colour, whether or not	290,416,219	82,636,336	28.45
20	030349	Tunas nes, frozen, excluding heading No 03.04, livers and roes	27,804,104	79,824,320	287.10

Source: Authors 'compilation from SMART – WITS simulation results.

Table 3: Decreases in tariff revenue of Vietnamese government after RCEP

Ranked by Revenue	Product Code	Product Description	Tariff Revenue	Revenue Effect	Percentage change (%)
1	271019	Other petroleum oils and preparations	421,321,990	-314,369,344	-74.61
2	271012	Bituminous coal	348,761,840	-292,687,906	-83.92
3	852872	Reception apparatus for television, colour, whether or not	101,645,670	-101,550,500	-99.91
4	151190	Palm oil and its fractions refined but not chemically modified	99,831,220	-99,830,914	-100.00
5	853690	Electrical app for switchg/protec elec circuits,not exced 1,000	84,884,480	-80,789,461	-95.18
6	100590	Maize (corn) nes	80,985,000	-64,813,410	-80.03
7	600622	Dyed cotton fabrics, knitted or crocheted, of a width of > 30 cm	75,948,720	-63,315,211	-83.37
8	392690	Articles of plastics or of other materials of Nos 39.01 to 39.14 nes	57,277,570	-49,086,445	-85.70
9	871120	Motorcycles with reciprocatg piston engine displacg > 50 cc to 250	49,639,570	-48,788,090	-98.28
10	551519	Woven fabrics of polyester staple fibres, nes	57,012,890	-48,303,727	-84.72
11	732690	Articles, iron or steel, nes	52,159,210	-43,851,891	-84.07
12	841510	Air conditioning machines window or wall types, self-contained	41,568,090	-41,405,449	-99.61
13	841821	Refrigerators, household type, compression-type	39,556,540	-39,543,414	-99.97
14	551219	Woven fabrics,containg>/=85% of polyester staple fibres,o/t unbl	46,180,970	-36,903,680	-79.91
15	852580	Television cameras, digital cameras and video camera recorders	35,854,080	-35,091,855	-97.87
16	640620	Outer soles and heels, of rubber or plastics	38,087,680	-34,417,313	-90.36
17	**870323**	**Automobiles w reciprocatg piston engine displacg > 1500 cc to 3000 cc**	**50,608,140**	**-34,039,328**	**-67.26**
18	611790	Parts of garments/of clothg accessories,of textile materials,knittd	35,482,630	-33,852,867	-95.41
19	401120	Pneumatic tires new of rubber for buses or lorries	32,147,810	-30,183,547	-93.89
20	392630	Fittings for furniture, coachwork or the like, of plastics	29,868,210	-29,183,293	-97.71

Source: Authors' compilation from SMART – WITS simulation results.

3. Impacts of RCEP on Vietnam oil import – an econometric analysis

3.1. Econometric model

Gravity has been one of the most frequently used models in economics. An interesting fact is that, though widely used in the field of economics, gravity model based on Newton's Law of Gravitation, not an economic theory. As Murat Genç and David Law (2013), the main idea of this model is that a mass of goods or factors for production like labour, capital… from country i, M_i, is attracted to the demand for them at country j, M_j, but the distance between i and j, D_{ij}, causes trade cost to transport the goods and makes the actual trade flow lower than it should be. G indicates proportionality constant. Traditional gravity is expressed by the formula below

$$X_{ij} = G \frac{M_i^{\alpha} M_j^{\beta}}{D_{ij}^{\theta}}$$

The larger the supply and demand from i and j, the larger the trade flows; the larger the distance between the countries, the smaller the trade flows. By taking logarithms of both sides of the multiplicative form above, we have this additive form

$$ln\ X_{ij} = lnG + \alpha\ lnM_i + \beta\ lnM_j - \theta lnD_{ij}$$

which can be estimated by OLS or other methods. Broadening the view, we can use various structures of gravity model to estimate many factors that influent trade flows among countries. M_i and M_j can be represented by data of GDP, GDP per capita, population…or in other words, size of the economics. D_{ij} is any factor affecting trade friction, for instance, distance as in the traditional model, language, border or Governments' trade policies… There are many empirical researches based on gravity models have stated that tariff and non – tariff policies cause certain impact on trade cost. For instance, Linders *et al.* (2008) analysed the effects of trade barriers by using trade-weighted applied bilateral importer tariffs and dummy variable for 'low tariff and non-tariff barriers', and found out both tariffs and non-tariff barriers have negative impact on the volume of trade; Winchester (2009) investigates the tariff equivalents of NTMs for New Zealand using bilateral tariffs, ad valorem export subsidy paid to exporters, and some dummy variables for NTBs and behind-the-border costs, NTBs are found to be strongly significant; Bao and Qiu (2010) examine the influence of tariffs and technical barriers to trade in case of China, using frequency index and coverage ratios to measure NTMs, the results they get are varied through different periods; Hoekman and Nicita (2011) find that tariffs, NTMs and behind-the-border transaction costs are all statistically significant determinants of bilateral trade.

Empirical studies based on gravity models state that tariffs and non-tariff measures (especially technical barriers to trade) are important factors affecting trade cost. However, those studies investigate TBTs under the form of dummy variable then converted into ad-valorem equivalents (AVEs), frequency ratio or coverage ratio. There has no research

estimate TBTs with specific requirements in order to particularly analyse how the change in policies of NTMs determine trade value. This paper will dig deeper into a specific case of Vietnam's import value from RCEP countries with products in group 870323[9] – Vehicle with spark-ignition internal combustion reciprocating piston engine of a cyliner capacity exceeding 1,500 cc but not exceeding 3,000 cc; using gravity model as follows:

$$\ln IM_{it}^{t} = \beta_1 + \beta_2 \ln \ln dis_{ij} + \beta_3 GDP_{ij}^{t} + \beta_4 \ln POP_{ij}^{t} + \beta_5 \ln GDPpc_{ij}^{t}$$
$$+ \beta_6 \ln exrate_{ij}^{t} + \beta_7 \ln tariff_{j}^{t} + \beta_8 \ln NTM_{j}^{t} + u_{ij}^{t}$$

The volume of trade is expected to be greater when the size of partner's economics is larger. The distance variable expresses that more distant countries have a tendency to trade less due to the rise of transportation costs. Exchange rate is expected to have negative impact on our import[10]. Similarity, tariff should promote trade volume when it is lessened. In case of NTMs variables, we expect the higher the numbers[11] are, the more opened the policy is, which leads to a larger trade volume. Result of the model will show how traditional variables of gravity affect Vietnam's vehicle import from RCEP countries. Also, it will shed light on the possible impacts of exchange rate and especially tariff and NTMs variables on import value.

3.2. *Data description*

Data are assembled for a panel of 16 RCEP countries on average for the years 1988 to 2014, so that the sample size is 432. However, the actual number of observations is far smaller because of the inadequate statistic data of developing countries in RCEP. Data on imports come from UNCOMTRADE, based on statistical value of vehicle exports[12] of other 15 RCEP countries in order to surmount the missing problem when Vietnam's reported data is not very adequate.

Data on tariffs come from WITS. We use two types of tariffs which are Effectively Applied Tariffs (AHS) and Most Favoured Nation Tariffs (MFN) because of the difference between them. According to WITS, MFN tariffs are what countries promise to impose on imports from other members of the WTO, unless the country is part of a preferential trade agreement. Besides, AHS is the lowest available tariff. If a preferential tariff exists, it will be used as AHS; or else the MFN applied tariff will be used. It seems to be more reasonable to use AHS in case of RCEP countries, which have widely applied preferential tariffs in most goods thanks to many regional FTAs. But AHS has a problem that it only exists when there has trade on the product, which means when a very high tariff leads to zero trade, it will not count as AHS. So we use both types of tariffs in the model. There are two ways to calculate AHS and MFN. The first one is simple average tariff, which is calculated as in the equation below:

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[9] Code of product line in HS 6-digit
[10] In this study, we use indirect exchange rate.
[11] We use the specific number of maximum allowed quantity of emission for product 870323, regulated by Vietnam Government.
[12] Value of exports is based on FOB price.

$$\tau_{sa} = \sum \tau_k / n$$

in which τ_k is the tariff of product k, n is the number of tariffs. The second one is weighted average tariff, calculated as

$$\tau_{wa} = \sum w_k \tau_k$$

in which w_k is the proportion of trade of product k, τ_k is the tariff of product k. Because we analyse the product in HS 6-digit code so these calculations show the same results. There is only difference between AHS and MFN in the model.

Data on NTMs are collected from Vietnam's legal documents, which stipulate technical requirements with product 870323.

Other important variables such as each country's GDP, GDP per capita come from IMF. Data on population come from WB. Data on distance are taken from Google map.

The variables are listed in Table 4.

Table 4: Variables used in the model

Variable name	Definition
lnIM	Log of the vehicle' import value of Vietnam from RCEP countries.
lnexrate	Log of the real exchange rate. An increase in this variable is associated with an depreciation of Vietnamese Dong.
lndis	Log of the distance between the foreign country's capital and Hanoi.
lnPOPi	Log of a foreign country's population.
lnPOPvn	Log of Vietnam's population.
lnGDPpci	Log of a foreign country's nominal GDP per capita.
lnGDPpcVN	Log of Vietnam's nominal GDP per capita.
lnGDPi	Log of a foreign country's nominal GDP.
lnGDPvn	Log of Vietnam's nominal GDP.
lnAHS	Log of the average AHS tariff level that applies in Vietnam.
lnMFN	Log of the average MFN tariff level that applies in Vietnam.
dummy	A dummy variable taking a value of one if there is a regulation on maximum allowed quantity of emission.
CO	The maximum allowed quantity of CO emission in Vietnam.
HC&NOx	The maximum allowed quantity of HC & NOx emission in Vietnam.

Summary statistics for the data are provided in Table 5.

Table 5: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lnIM	151	14.14294	2.66577	7.984122	19.13778
lnexrate	405	5.650958	2.973612	0.281411	9.978851
lndis	405	7.722761	0.7751562	6.171463	9.196306
lnPOPi	405	17.31113	2.118032	12.39979	21.03389
lnPOPvn	405	18.16601	0.1054445	17.96281	18.3234
lnGDPpci	395	8.243594	1.759465	3.611242	11.12511
lnGDPpcVN	405	6.173223	0.8875727	4.576338	7.626166
lnGDPi	395	4.818673	2.21604	-1.287354	9.245371
lnGDPvn	405	3.61664	0.9868947	1.839438	5.225193
lnAHS	113	0.4345642	0.0679725	0.0953102	0.5108456
lnMFN	113	0.4600981	0.0484795	0.3113742	0.5108456
dummy	405	0.5185185	0.500275	0	1
CO	210	2.422857	0.2579482	2.2	2.72
HCNox	210	0.7014286	0.2331455	0.5	0.97

The correlation matrix among variables is provided in Table 6.

Table 6 – Correlations matrix of the main variables

	lnIM	lnexrate	lndis	lnPOPi	lnPOPvn	lnGDPpci	lnGDPppcVN
lnIM	1.0000						
lnexrate	-0.5961	1.0000					
lndis	0.4821	-0.2291	1.0000				
lnPOPi	0.1657	-0.1625	0.0630	1.0000			
lnPOPvn	0.2996	-0.1284	-0.1734	0.2886	1.0000		
lnGDPpci	0.4412	0.1361	0.4428	-0.5219	0.0125	1.0000	
lnGDPpcVN	0.2990	-0.1276	-0.1750	0.2913	0.9963	0.0121	1.0000
lnGDPi	0.5656	-0.0629	0.4502	0.6778	0.3372	0.2734	0.3398
lnGDPvn	0.2993	-0.1281	-0.1749	0.2913	0.9969	0.0118	1.0000
lnAHS	-0.1776	0.2493	0.2061	-0.0296	-0.5439	0.0592	-0.5571
lnMFN	-0.2162	0.1607	0.0783	-0.1992	-0.3723	0.0571	-0.4022
CO	-0.2964	0.1107	0.1352	-0.2564	-0.8532	-0.0413	-0.8709
HCNox	-0.2964	0.1107	0.1352	-0.2564	-0.8532	-0.0413	-0.8709

	lnGDPi	lnGDPvn	lnAHS	lnMFN	CO	HCNOx
lnGDPi	1.0000					
lnGDPvn	0.3396	1.0000				
lnAHS	0.0172	-0.5562	1.0000			
lnMFN	-0.1754	-0.3999	0.6353	1.0000		
CO	-0.3256	-0.8695	0.5852	0.5044	1.0000	
HCNox	-0.3256	-0.8695	0.5852	0.5044	1.0000	1.0000

In the Table 6, correlations between Vietnam's population, Vietnam's GDP and Vietnam's GDP per capita are very large and positive. Correlations between the three variables and NTMs variables (CO and HC&NOx) are strong and negative. CO and HC&NOx is perfectly positive correlated. The remaining variables are not very strongly correlated with each other, so perfect multicollinearity might not happen.

3.3. *Regression strategy and results*

Use of panel data permits models of the form

$$\ln IM_{it}^{t} = \beta_1 + \beta_2 \ln \ln dis_{ij} + \beta_3 GDP_{ij}^{t} + \beta_4 \ln POP_{ij}^{t} + \beta_5 \ln GDPpc_{ij}^{t}$$
$$+ \beta_6 \ln exrate_{ij}^{t} + \beta_7 \ln tariff_{j}^{t} + \beta_8 \ln NTM_{j}^{t} + u_{ij}^{t}$$

where *i, j* refers to country *i, j*, *t* refers to year *t*, u_{ij} is a time-varying idiosyncratic error. We first estimate the model using a Random Effects approach. If the model does not have heteroscedasticity, then we use POLS to estimate. If it does, we do Hausman test to choose between Random Effects and Fixed Effects approach to estimate the model. The models used in this research pass all the diagnostic tests as multicollinearity, autocorrelation, cross – sectional dependent and normal distribution of residual.

The results of the trade equation for imports of products 870323 are presented in Table 7. There are five models estimated. The first model estimates impacts of gravity variables and tariffs on import value. The second model analyses effects of not only those variables, but also dummy variable of NTMs on trade. The third model uses CO instead of dummy variables. The last two models only shows impacts of gravity variables and the two NTMs variables on import.

As this is a log – log model, coefficients can be interpreted as elasticities, which means one percent increase in the explanation variable will be associated with a β% increase in the dependent variable. For dummy variable, the dependent variable will be β% higher when the dummy variable equals one. For the two NTMs variables without log, one unit increase in the variable will be associated with a β% increase in the dependent variable.

The variables GDP and GDP per capita reflect size of the economics effects. The results indicate that those variables have positive impacts on Vietnam's imports of 870323 products. A one percent increase in foreign GDP causes a 1.007% (model 1), 0.992% (model 2), 0.973% (model 3), 0.938% (model 4 and 5) increase in Vietnam's imports.

Similarly, a one percent increase in foreign GDP per capita causes a 0.778% (model 1), 0.829% (model 2), 0.777% (model 3), 0.492% (model 4 and 5) increase in import value. GDP of Vietnam is also found to cause a 0.417% (model 1) increase in imports when increasing one percent. The real exchange rate has an adverse effect on vehicle imports, which is a one percent increase in exchange rate is found to cause a 0.652% (model 1), 0.643% (model 2), 0.626% (model 3), 0.716% (model 4), 0.715% (model 5) decrease in imports.

Surprisingly, both tariffs appear not to have a statistically significant effect on Vietnam's imports. Moreover, the dummy variable shows that when there have regulations on maximum allowed quantity of emission, the import increase 0.981% (model 2). CO and HC&NOx are also found to have significant effects on dependent variable when a one percent increase in CO and HC&NOx in turn causes a 1.41% (model 4) and 1.559% (model 5) decrease in imports of 870323 products.

Table 7 – Estimation results of Vietnam's import value of 870323 products

|	(1)	(2)	(3)	(4)	(5)
	lnIM	lnIM	lnIM	lnIM	lnIM
lnexrate	-0.652***	-0.643***	-0.626***	-0.716***	-0.715***
lndis	-0.383	-0.371	-0.064	-0.142	-0.142
lnGDPpci	1.007***	0.992***	0.973***	0.938***	0.938***
lnGDPi	0.778***	0.829***	0.777***	0.492***	0.492***
lnGDPvn	0.417*			0.087	0.087
lnAHS	1.315	-0.052	-0.249		
lnMFN	-3.402	-3.917			
dummy		0.981**			
CO			-0.815	-1.410**	
HC&NOx					-1.559**
Num.of obs	78	78	69	95	95
R-squared	0.815	0.82	0.796	0.767	0.767

Notes: (***) indicates that the coefficient is significantly different from zero at the 1% significance level, (**) indicates that it is significant at the 5% level, (*) indicates that it is significant at the 10% level.

3.4. Interpretation

In general, the results of gravity variables in the models are as we expected. The larger the partners' economics, the more Vietnam imports from them. The more Vietnamese dong is depreciated, the less value Vietnam imports. However, remaining variables show surprised outcomes. The models show that tariffs do not affect the import

value. In fact, Figure 5 presents Vietnam's import value from top regional exporters and the tariffs level imposed on their vehicle products.

Figure 5: Import value and tariffs applied to some RCEP countries
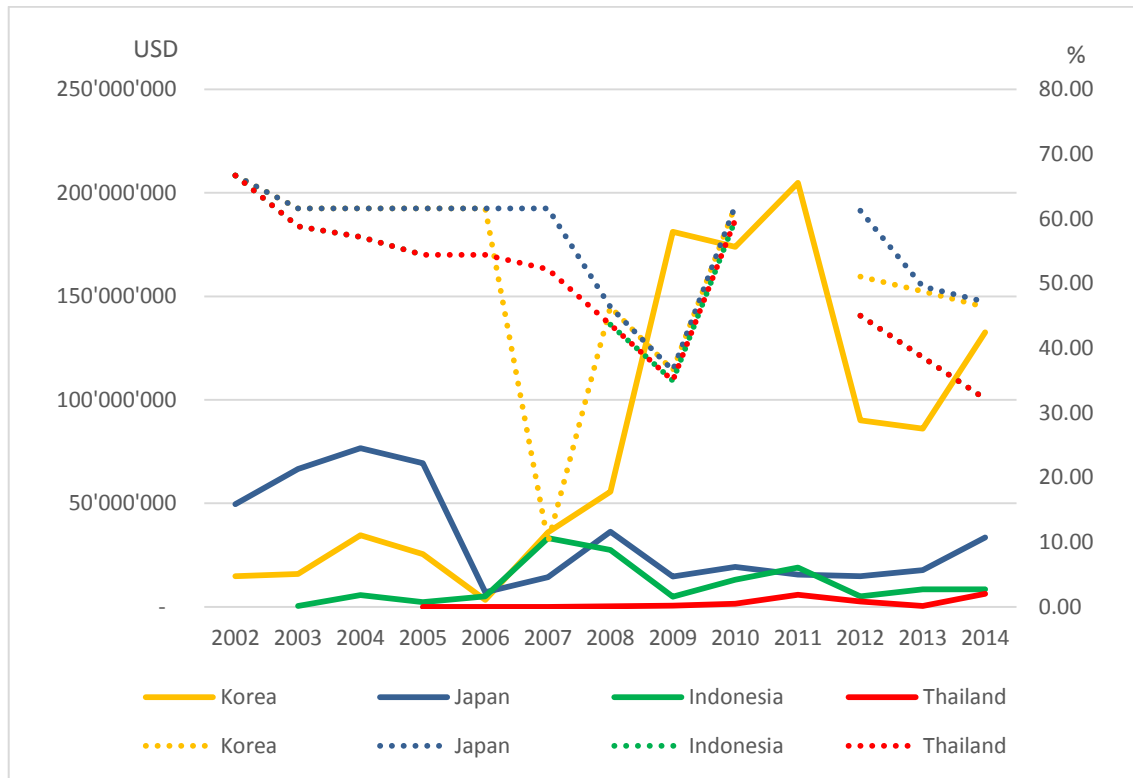
In 2007, Vietnam applied a tariff of below 10% on Korea's vehicle products, make Korea become the biggest partner. After that, the government increases the tariff but the import value from Korea is still the highest. From 2002 to 2014, tariffs on Japan's product tend to be reduced, but the import value from this country shows a down trend. Indonesia and Thailand enjoy the same preferential tariff for ASEAN countries, which is sharply lowered through the period, but imports from these countries seem to increase very slowly. A quick look at the data may explain the estimation's result. Vehicles in 870323 group are listed as discouraged import goods on Document number 1380/QD-BCT stipulated by Vietnam Ministry of Industry and Trade in 2011. They are considered as luxury goods that trigger deficit in trade balance and need controlling. Moreover, demand for luxury vehicles like cars of Vietnamese people nowadays is growing too quickly, makes traffic infrastructure overloaded and many environmental problems. That is the reason why government has used many policies to control the quantity of products in 870323 group. One of them is tariffs. These goods has been imposed the highest tariff level, but only tariffs seems to be not enough because the import value of 870323 group still increases continuously and plays an important role in Vietnam import turnover. The estimation results have already stated that. Also, as can be seen in Figure 1, there is a time lag of about more than one year in the effect of Vietnam's tariff policy. In addition, the international economics integration process requires all countries to remove tariffs for free

trade. So that tariffs is no more an important determinant of trade nowadays. In fact, the government has used other measures to control import such as TBT, para-tariff measures or quantity-control measures… About TBT, the estimation shows adverse results to expectation, which is the stricter the barrier is, the larger import value is. This result maybe the consequence of using TBT to reduce import from big exporters. However, Vietnam, with a low level of technology, can not stipulate TBT regulations strictly enough to affect trade. At present, the government prefers para-tariff measures. To illustrate, an import car in 870323 group has suffered many kinds of tariffs, taxes and fees such as specific tariffs, Value Added Tax, Excise tax, protecting environment fee, traffic maintenance fee… Most recently, by the end of 2015, an amendment of Law on excise tax has changed the way to calculate taxed price, made the cost even higher for customers regardless of the decrease in import tariffs. Besides, prolixity in customs procedures or lack of transparent information are also barriers to import products of 870323 group.

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