

Evaluation of Impacts of Regional Comprehensive Economic Partnership on Vietnam oil imports

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ABSTRACT: *This paper assesses impacts of Vietnam's participation in the Regional Comprehensive Economic Partnership on its oil import. Based on a partial equilibrium analysis and gravity regression framework, it is clear that potential tariff elimination according to commitments as expected in RCEP is going to boost import volume of oil products and create a huge loss in the tariff revenue of Vietnamese government. While the tariff is gradually removed along with the participation of the country in FTAs, para-tariff and non-tariff measures play an increasingly important role as protectionism tools for the infant oil sector in Vietnam.*

KEYWORDS: *Economic integration, Free trade agreement, Regional Comprehensive Economic Partnership, tariff, non-tariff measures, Vietnam oil import.*

I. Introduction

1.1. Background

1.1.1. Overview of Vietnam oil import

Vietnam has been considered as a potential market in Asia given large population and impressive gross domestic product (GDP) growth rate recently. The country's rapid economic growth, industrialization, and export market expansion have spurred domestic energy consumption.

Almost one-quarter of energy consumption in the country is from oil. In spite of having a substantial crude oil reserves and being a net exporter of crude oil, Vietnam remains a net importer of petroleum products due to a poor oil refining industry. Crude oil proved reserves¹ of Vietnam is 4.4 billion barrels, ranking at the 24th among the countries with highest proved reserves of crude oil all over the world.² Up to now, Vietnam has had only one operating refinery, the 130,000-b/d³ Dung Quat, which came online in 2009. Vietnam still needs to import about 70 percent of refined products and petrochemicals since the output from the Dung Quat refinery does not satisfy domestic demand. Vietnam's state-owned Vietnam Oil & Gas Corporation (PetroVietnam) plans to increase the crude distillation capacity and to develop Dung Quat's ability to handle less expensive sour crude oil from Russia, the Middle East, and Venezuela. The refinery's addition of 40,000 b/d is scheduled to be operational by early 2022. In addition, the Vietnamese government expects to commission the country's second refinery, Nghi Son oil refinery in Thanh Hoa Province, by 2018. Needless to say, Vietnam's oil industry is still limited in both productivity and quality; and Vietnam thus far largely relies on foreign supply of oil products.

Based on the Harmonized System⁴ (HS) oftariff nomenclature, which is developed and maintained by the World Customs Organization, *oil products* (crude oil excluded) are arranged in the heading coded by 4 digits – 2710, and described as “Petroleum oils and oils obtained from bituminous minerals, other than crude; preparations not elsewhere specified or included, containing by weight 70% or more of petroleum oils or of oils obtained from bituminous minerals, these oils being the basic constituents of the preparations; waste oils containing mainly petroleum or bituminous minerals”. According to International Trade Center (ITC) database,⁵ the import value of Vietnam represents 1.02% of world imports for this product group in 2015, and Vietnam's ranking in world imports is 27.

Proved reserves of crude oil are those quantities of petroleum which, by analysis of geological and engineering data, can be estimated with a high degree of confidence to be commercially recoverable from a given date forward, from known reservoirs and under current economic conditions. 1 US barrel corresponds to 158.9873 liters and 0.136 tons of oil.

² The World Fact Book, Central Intelligence Agency, access at <https://www.cia.gov/>, last updated on September 28, 2016

³ b/d means barrels per day

⁴ The full name is “The Harmonized Commodity Description and Coding System”

⁵ www.trademap.org

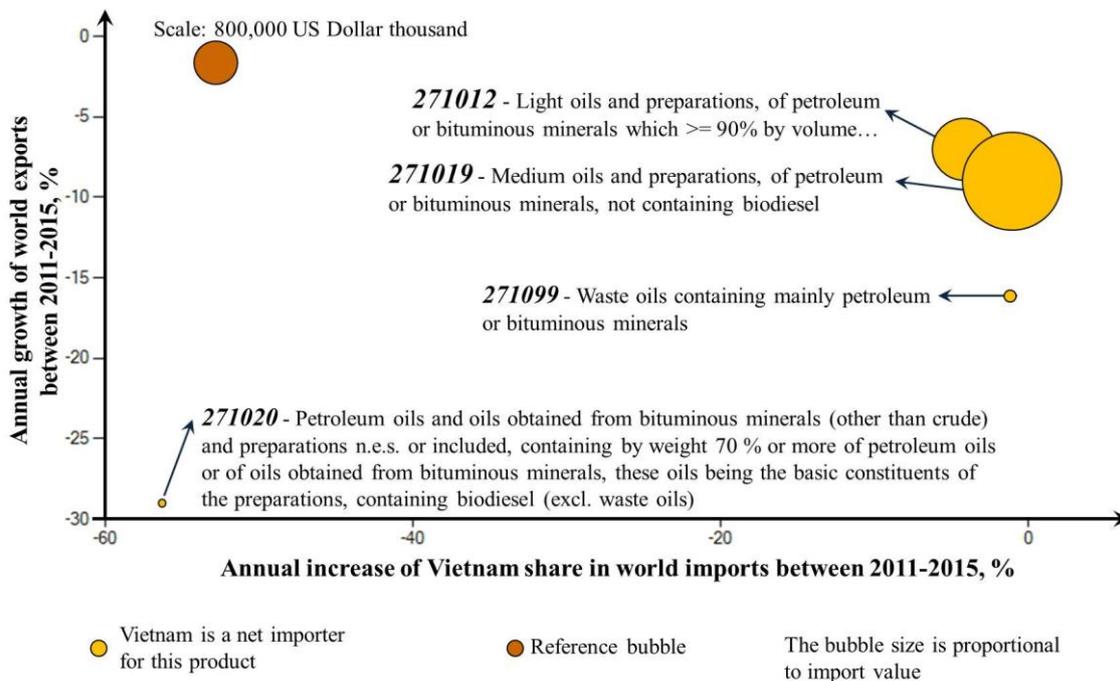


Figure 1: Growth of Vietnam's demand and international supply for products imported by Vietnam between 2011 – 2015

Source: ITC's database, www.trademap.org

At a more disaggregated level (HS-6 digits), Vietnam currently imports 4 products with the following codes and descriptions: **271012** – Light oils and preparations, of petroleum or bituminous minerals which $\geq 90\%$ by volume "incl.⁶ losses" distil at 210°C "ASTM⁷ D 86 method" (excl.⁸ containing biodiesel); **271019** – Medium oils and preparations, of petroleum or bituminous minerals, not containing biodiesel, n.e.s.⁹; **271020** – Petroleum oils and oils obtained from bituminous minerals (other than crude) and preparations n.e.s. or included, containing by weight 70 % or more of petroleum oils or of oils obtained from bituminous minerals, these oils being the basic constituents of the preparations, containing biodiesel (excl. waste oils); and **271099** – Waste oils containing mainly petroleum or bituminous minerals (excl. those containing polychlorinated biphenyls [PCBs], polychlorinated terphenyls [PCTs] or polybrominated biphenyls [PBBs]). Among them, 271012 and 271019 account for the overwhelming majority of the total import value of the 2710 group, with the highest annual increase in world import in the period between 2011 and 2015. Fig.1 demonstrates that 271019 has the highest import value in 2015 (4,074,275 US Dollar thousand) and annual increase in world import between 2011 and 2015 (-1.1%). The second highest import value (1,809,868 US Dollar thousand) belongs to 271012, of which the annual increase in world import between 2011 and 2015 is -4.3%.

When considering the supplying sources for the oil products in 2710 group, it is noticeable that most of the important supplying countries for oil products imported by Vietnam are members of the Association of Southeast Asian Nations (ASEAN), such as Singapore, Thailand, Malaysia, etc., and the Free Trade Agreement (FTA) partners of ASEAN like China or Republic of Korea. Fig.2 shows some of the top supplying countries in terms of both import value and share in Vietnam's 2710 imports. The three biggest partners of Vietnam are Singapore, Thailand and China, which together make up approximately three quarters of Vietnam's total 2710 import value.

⁶ incl. = including

⁷ ASTM = American Society for Testing and Materials

⁸ excl. = excluding

⁹ n.e.s. = not elsewhere specified

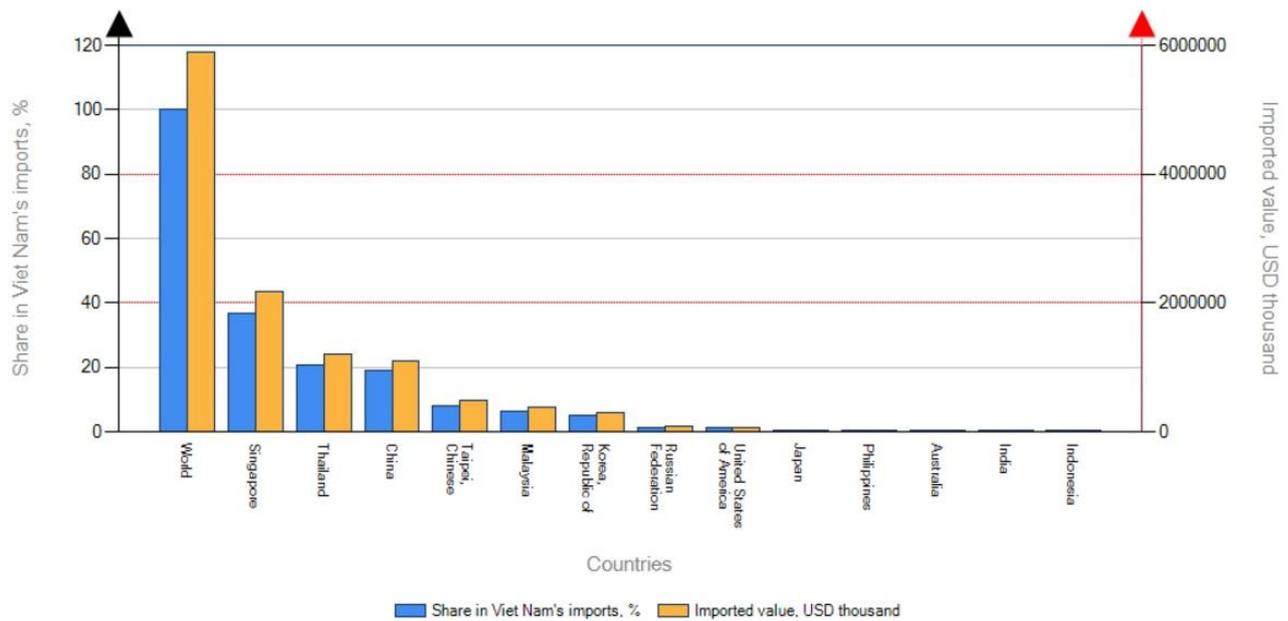


Figure 2: Top countries supplying products in the 2710 group imported by Vietnam

Source: ITC's database, www.trademap.org

1.1.2. Overview of RCEP

Vietnam is in the process of negotiating the Regional Comprehensive Economic Partnership (RCEP), which 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. When completed, the mega-regional trade agreement which comprises of 16 countries will cover half of the world's population, 38% of the world economy and nearly 30% of the world's trade volume.

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. 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 14th round was held in Ho Chi Minh City, Vietnam, in August 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 on October 11th – 22nd in Tianjin, China.

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 oil sector. 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 oil import of Vietnam.

1.2. Research objectives and scope

The main objective of the research is to provide an ex-ante assessment of FTA impacts on a participating country at sectoral level.

The specific aims of the paper are to:

- Briefly describe the situation of oil demand, supply and importation in Vietnam;
- Introduce one of the important free trade agreements in the Asia – Pacific region, the Regional Comprehensive Economic Partnership (RCEP)
- Assess the potential impacts of RCEP on all commodities with HS 6 digit codes separately
- Analyze the impacts of important gravity factors on the oil products classified in the two HS sub-heading of 271012 and 271019.

The assessed FTA in this paper is the **RCEP** – a mega regional trade deal which is under ongoing negotiations. The assessment has been carried out with trade data of the 16 participating countries of RCEP: 10 ASEAN member countries (Brunei, Cambodia, Indonesia, Lao, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam) and 06 FTA partners of ASEAN (Australia – New Zealand, China, India, Japan, and South Korea).

This paper examines commodities that are classified under HS with 6-digit codes with a special focus on the two HS headings for oil products (excluding crude oil): **271012** and **271019**. The paper also focuses on the potential impacts of *elimination of tariffs and non-tariff measures* under RCEP on the **import** of oil products in Vietnam.

1.3. Research methodology

The paper firstly adopts the partial equilibrium analysis in order to investigate the potential impacts of RCEP on all commodity sectors which are defined by HS 6-digit codes. The paper will then dig deeper into the case of Vietnam's import from RCEP countries with specific groups of oil products. By employing the gravity econometric model, it will examine the degree to which the variables of gravity affect the import value of the oil products.

II. 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 [1]. 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. Modeling 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 modeling 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 Center (ITC), United Nations Statistical Division (UNSD) and World Trade Organization (WTO).

There are a number of studies that use the WITS-SMART simulation model. This partial equilibrium model is used for analyzing effects of regional trade agreements (RTAs) with different scopes and scenarios. Othieno and Shinkyekwa [2] used the SMART to obtain insights on the effect of the East African Community Customs Union on Uganda with regard to trade, welfare and revenue effects. This model can also be used to evaluate effects on both members of a bilateral trade agreement like Chodhry, Kallummal and Varma [3]. This study attempts to analyze the trade creation and trade diversion effects of the India – SriLanka FTA (ISFTA) at the sectoral level. Overall, the results suggest that ISFTA will cause significant trade creation between the member countries than trade diversion among the non-member countries.

The SMART model can be adopted to do a partial equilibrium analysis to simulate the impact of tariff reduction scenarios among a large number of countries. Lang [4] tried to assess the impact of liberalization under the EPAs, assuming full liberalization of imports from the European Union (EU) into the Economic Community of West African States (ECOWAS). The study more specifically looked at trade creation and diversion results as well as the impact on tariff revenues. It also identified which products are likely to show the greatest impact, and how the results vary across countries.

This paper attempts to assess the impact of liberalization under RCEP, assuming full liberalization of imports from the RCEP negotiating partners into Vietnam.

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 GATT¹⁰, 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 Principles¹¹ 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, analyzing 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 analyzed 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:

- 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 1 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. Table 2 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**. 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 sectors 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.

¹⁰World Trade Organization (WTO), GATT Article XXIV, available at:http://www.wto.org/english/tratop_e/region_e/regatt_e.htm.

¹¹Guiding Principles (ASEAN, n.d.) were approved by Economic Ministers on 30 August 2012 and endorsed by Leaders and provide a roadmap for negotiators.

Table 1: Increases in imports of merchandise from RCEP negotiating partners to Vietnamese market after RCEP

Ranked by Import	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	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 2: Decreases in tariff revenue of Vietnamese government after RCEP

Ranked by Revenue Effect	Product Code	Product Description	Tariff Revenue (USD)	Revenue Effect (USD)	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 incorporati	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 exceed 1,000 V,nes	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 (excl	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 reciprocating piston engine displac > 50 cc to 250 cc	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,containing >=85% of polyester staple fibres,o/t unbl or bl	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 reciprocating piston engine displac > 1500 cc to 3000 cc	50,608,140	-34,039,328	-67.26
18	611790	Parts of garments/of clothg accessories,of textile materials,knitted	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

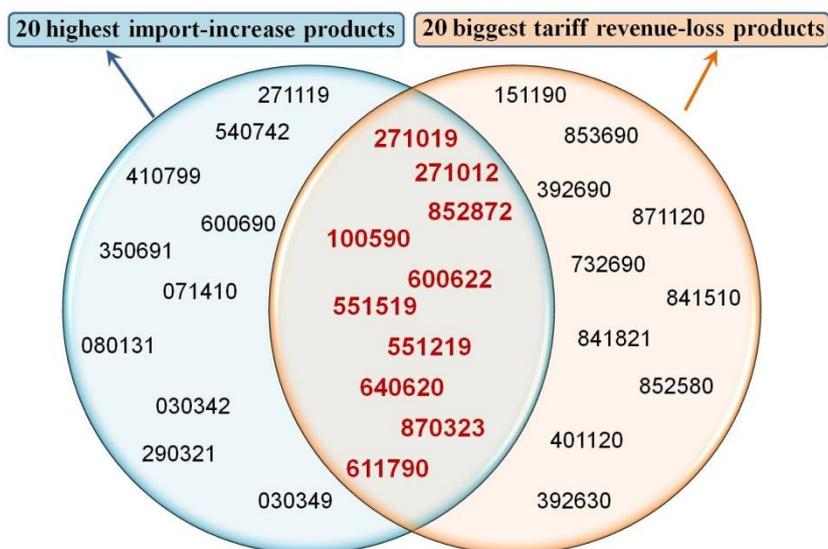


Figure 3: Top 20 products with the highest increases in imported value vs. Top 20 products with the biggest losses in tariff revenue

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

It is interesting to find that there are 10 products that appear in both Table 1 and Table 2, 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 (Fig.3). 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.

With regards to oil products, the products coded **271019** and **271012** – the two remarkable products among imported oil products mentioned in Section 1.1.1 of the Paper – would be examined more carefully in the following section, in order to understand more deeply the effect of RCEP on oil import of Vietnam.

III. 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 trade economics. According to Murat Genç and David Law [5], the main idea of the model is that a mass of goods or factors for production like labor, 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:

$$X_{ij} = G \frac{M_i^\alpha M_j^\beta}{D_{ij}^\theta} (1)$$

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:

$$\ln X_{ij} = \ln G + \alpha \ln M_i + \beta \ln M_j - \theta \ln D_{ij} \quad (2)$$

Broadening the view, we can use various structures of gravity model to estimate many factors that influence trade flows among countries. M_i and M_j can be denoted by data of GDP, GDP per capita, population... or in other words, size of the economies. D_{ij} is any factor affecting trade friction, for instance, distance as in the traditional model, language, border or Governments’ trade policies that impede bilateral trade between the countries.

Apart from typical gravity variables tariff and non-tariff barriers that significantly raise trade cost could also be captured by the D_{ij} variable. There are many empirical researches based on gravity models that have stated that tariff and non – tariff policies cause certain impact on trade cost. For instance, Burger et al. [6] analysed the effects of trade barriers by using trade-weighted applied bilateral import tariffs and dummy variables for ‘low tariff and non-tariff barriers’, and found out that both tariff and non-tariff barriers have negative impacts on the

volume of trade; Winchester [7] investigated the tariff equivalents of non-tariff measures (NTMs) for New Zealand using bilateral tariffs, ad valorem export subsidy paid to exporters, and some dummy variables for non-tariff barriers and behind-the-border costs, non-tariff barriers are found to be strongly significant; Bao and Qiu [8] examined the influence of tariffs and technical barriers to trade (TBTs) in the case of China, using frequency index and coverage ratios to measure non-tariff measures, the results they got were varied through different periods; Hoekman and Nicita [9] found that tariffs, NTMs and behind-the-border transaction costs are all statistically significant determinants of bilateral trade.

In this paper, we also take into account the impacts of tariff and non-tariff barriers on Vietnam oil import from RCEP countries with products in the two HS sub-headings of 271012 and 271019, using gravity model as follows:

$$\ln IM_{iVN}^t = \beta_1 + \beta_2 \ln dis_{iVN} + \beta_3 \ln GDP_i^t + \beta_4 \ln GDP_{VN}^t + \beta_5 \ln GDPpc_i^t + \beta_6 \ln GDPpc_{VN}^t + \beta_7 \ln POP_i^t + \beta_8 \ln POP_{VN}^t + \beta_9 \ln exrate_{iVN}^t + \beta_{10} \ln tariff_{VN}^t + \beta_{11} \ln NTM_{VN}^t + u_{iVN}^t \quad (3)$$

The volume of import is expected to be greater when the size of the partner's economy is larger. The distance variable expresses that the more distant countries have a tendency to trade less due to higher costs of transportation. Exchange rate is expected to have negative impact on the import volume.¹² Similarly, trade should be promoted when tariff is lessened. With regards with NTM variables, we expect that the more opened the trade policy is, the larger the import volume is. Result of the model will point out how traditional variables of gravity affect Vietnam's oil import from RCEP countries. Also, it will shed light on the possible impacts of exchange rate and especially tariff and non-tariff measures 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. Due to limited statistic data of developing countries in RCEP, the sample size is 89 for the product 271019 and 32 for the product 271012.

Data on imports come from UNCOMTRADE, based on statistical value of oil exports¹³ 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 Favored 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:

$$\tau_{sa} = \sum \tau_k / n \quad (4)$$

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

$$\tau_{wa} = \sum w_k \tau_k \quad (5)$$

where w_k is the proportion of trade of product k, τ_k is the tariff of product k. Because we analyze 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 the products 271012 and 271019.

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

The variables are listed in Table 3. Summary statistics for the data are provided in Table 4 and 5.

Table 3: Variables used in the models

Variable name	Definition
lnIM	Log of the import value of Vietnam from RCEP countries.

¹² In this study, we use indirect exchange rate.

¹³ Value of exports is based on FOB price.

lnexrate	Log of the real exchange rate. An increase in this variable is associated with a depreciation of Vietnamese Dong.
Indis	Log of the distance between the foreign country's capital and Hanoi.
lnPOP_i	Log of a foreign country's population.
lnPOP_{VN}	Log of Vietnam's population.
lnGDPpc_i	Log of a foreign country's nominal GDP per capita.
lnGDPpc_{VN}	Log of Vietnam's nominal GDP per capita.
lnGDP_i	Log of a foreign country's nominal GDP.
lnGDP_{VN}	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 allowed quantity of substances.
Cetan	The minimum quantity required of Cetan in 271019 products.
Water	The maximum quantity allowed of Water in 271019 products.
Impurities	The maximum quantity allowed of Impurities in 271019 products.

Table 4: Summary statistics of the product 271019

Variable	Obs	Mean	Std. Dev.	Min	Max
lnIM	120	16.409	4.477	3.296	21.697
lnexrate	405	5.651	2.974	0.281	9.979
Indis	405	7.723	0.775	6.171	9.196
lnPOP _i	405	17.311	2.118	12.400	21.034
lnPOP _{VN}	405	18.166	0.105	17.963	18.323
lnGDPpc _i	395	8.244	1.759	3.611	11.125
lnGDPpc _{VN}	405	6.173	0.888	4.576	7.626
lnGDP _i	395	4.819	2.216	-1.287	9.245
lnGDP _{VN}	405	3.617	0.987	1.839	5.225
lnAHS	115	0.085	0.039	0.037	0.173
lnMFN	115	0.089	0.036	0.039	0.173
Cetan	345	45.435	0.496	45	46
Water	345	260.870	190.789	0	500
Impurities	345	4.348	4.964	0	10

Table 5: Summary statistics of product 271012

Variable	Obs	Mean	Std. Dev.	Min	Max
lnIM	32	17.321	2.626	11.216	21.361
lnexrate	405	5.651	2.974	0.281	9.979
Indis	405	7.723	0.775	6.171	9.196
lnPOP _i	405	17.311	2.118	12.4	21.034
lnPOP _{VN}	405	18.166	0.105	17.963	18.323
lnGDPpc _i	395	8.244	1.759	3.611	11.125
lnGDPpc _{VN}	405	6.173	0.888	4.576	7.626
lnGDP _i	395	4.819	2.216	-1.287	9.245
lnGDP _{VN}	405	3.617	0.987	1.839	5.225
lnAHS	23	0.081	0.063	0	0.159
lnMFN	23	0.087	0.068	0	0.159
dummy	405	0.556	0.498	0	1

3.3. Regression strategy and results

We check correlation matrix among variables to choose variables to be included in the model to avoid multicollinearity. The LM test helps us decide between a random effects regression and a simple OLS regression. The null hypothesis in the LM test is that variances across entities is zero. This is no significant difference across units (i.e. no panel effect). To decide between fixed or random effects, we run a Hausman test where the null hypothesis is that the preferred model is random effects versus the alternative the fixed effects. It basically tests whether the unique errors (u_i) are correlated with the regressors. Run a fixed effects model and save the estimates, then run a random model and save the estimates, then perform the test.

We have regressed various models and reported several of them in the Table 6. With 271019 products, the models that fit data the most are the random effect model with tariff to be included in the trade costs (models 1 and 2). In general, most results of gravity variables in the models are as expected. The larger the partners' supply power, the more Vietnam imports from them. The farther the country is, the less Vietnam imports from them. Exchange rate's change seems not affecting the import value. This might be explained by the fact that diesel is considered as an essential product and Vietnam's local supply of this goods is still very limited, so it heavily depends on import no matter how exchange rate fluctuates. However, this situation will soon be different due to the emergence of oil refinery factories in Vietnam.

The effect of tariff on import value of 271019 is different between MFN and AHS according to the estimation results. MFN tariffs are negatively affected the oil import values, while impacts of AHS are controversial.

Fig.4 presents Vietnam's import value from top regional exporters and the tariffs level imposed on their oil products. As can be seen, the import value of 271019 products is quite sensitive to the change of tariff applied. Specifically, in 2008, import values from the five countries were all sharply increased while tariffs were lowered to about a half of level in the previous year. 2009 revealed the opposite trend when the tariffs were soared to nearly 20% and the import value reduced to the level of 2007. We can also see China is a unique case where the import value continuously increased despite the fluctuation of tariff level during the period, which partly shows how competitive China's oil industry is. To encapsulate, tariff can only affect the import value of 271019 in some countries.

Regarding NTMs variables, we can only observe impacts of the barrier if we regress one barrier by one due to correlation between them (models 3, 4, and 5). Estimation results show that non-tariff barriers do have impacts on Vietnam oil imports.

In the case of 271012, since 32 observations are not large enough to estimate the model for the product 271012 separately, we pool the product 271019 and the product 271012 together and have a pooled model of 103 observations and introduce a dummy to test whether impacts on oil imports are significantly different between the two groups; and estimation results support this argument (model 6).

About NTMs, the model reveals that the existence of NTMs does not affect import value. In reality, Vietnam's regulations on maximum quantity of toxic substances in the product 271012 such as lead, benzene, sulfur are among the lowest in the world, therefore they will not be binding.

About tariff barriers, as can be seen in Table 7, between 2013 and 2014, tariffs on 271012 soared, and the import values from most countries decreased (except Singapore, China and Japan).

Table 6: Regression results

Variable	1	2	3	4	5	6
	RE	RE	FE	FE	FE	OLS
	<i>lnimport</i>					<i>lnimport</i>
<i>lngdppc_vn</i>	-0.643 (0.867)					
<i>lngdppci</i>	0.624 (0.392)	1.916 (0.001)***	-0.029 (0.976)	-0.029 (0.976)	-0.029 (0.976)	2.966 (0.000)***
<i>lnpop_vn</i>	28.254 (0.543)					
<i>lnpopi</i>	1.636 (0.009)***	2.286 (0.000)***	-0.863 (0.835)	-0.863 (0.835)	-0.863 (0.835)	1.369 (0.000)***
<i>lndistance</i>	-3.808 (0.038)**	-4.876 (0.005)***				-6.958 (0.000)***
<i>lnexrate</i>	0.014 (0.975)	0.263 (0.515)	2.255 (0.120)	2.255 (0.120)	2.255 (0.120)	0.129 (0.135)
<i>lnmfj</i>	-3.983 (0.011)**	-2.378 (0.034)**	-1.656 (0.150)	-1.656 (0.150)	-1.656 (0.150)	-0.039 (0.985)
<i>lnahs</i>	3.786 (0.007)***	2.128 (0.047)**	1.382 (0.218)	1.382 (0.218)	1.382 (0.218)	0.905 (0.618)
<i>cetan</i>			1.120 (0.020)**			
<i>water</i>				-0.004 (0.020)**		
<i>impurities</i>					0.112 (0.020)**	
<i>D</i>						1.787 (0.026)**
<i>_cons</i>	-500.025 (0.542)	-5.085 (0.775)	-32.889 (0.631)	19.392 (0.784)	17.525 (0.804)	15.195 (0.110)
<i>r2</i>	0.255	0.366	0.024	0.024	0.024	0.585
<i>N</i>	89	89	89	89	89	103

Note: In parentheses are p-value, p < 0.10, * p < 0.05, ** p < 0.01, ***

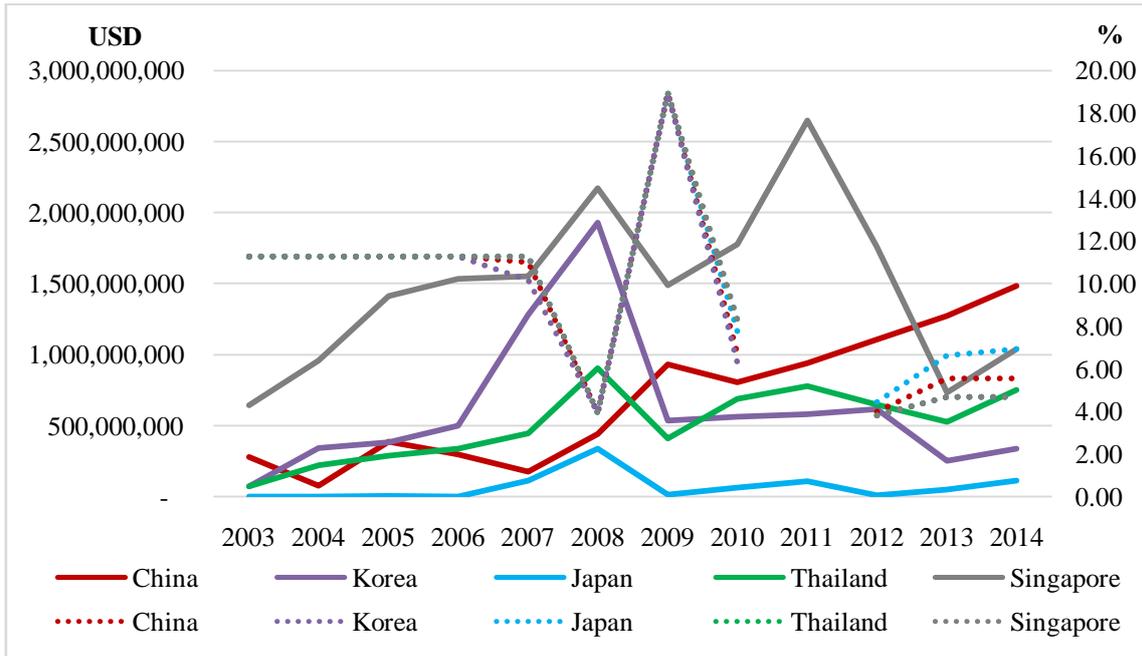


Figure 4: Import value and tariffs applied to some RCEP countries with the product 271019

Table 7: Import value and tariffs applied to some RCEP countries with 271012 products

		Import value (USD)	AHS tariff (%)
Singapore	2013	1,580,716,197	10.79
	2014	1,653,205,148	15.07
China	2013	173,455,742	10.64
	2014	475,541,926	14.93
Korea	2013	502,744,316	11.64
	2014	213,796,775	17.21
Malaysia	2013	115,743,951	10.79
	2014	96,218,441	15.07
Thailand	2013	61,895,169	10.79
	2014	46,223,124	15.07
Japan	2013	1,285,657	11.00
	2014	33,873,807	15.64
Australia	2013	117,958	11.64
	2014	74,338	17.21

IV. Discussion and conclusion remarks

Vietnam government has been strongly involving in the oil market, especially the price. The reason for that action is that they are protecting the local supply. Oil is the sensitive goods which related to national energy security, so no country wants to heavily depend on foreign suppliers. Moreover, Vietnam’s oil industry is really an infant; hence cannot compete fairly with foreign suppliers in a ‘free’ market. The government has influenced the local oil price by using import tariff, value added tax, excise tax, protecting environment fee, subsidization... and also NTMs, but the last one does not seem to have much attention. Tariff and para-tariff policies may help enrich the national budget, but customers have to suffer higher price. In fact, those policies raise the price of gasoline to about 200% (by October 2015, a liter of imported gasoline was 9.000 Vietnam Dong; after suffering four different kinds of tariff, fee and taxes, customers have to spend 19.000 Vietnam Dong

on a liter). Besides, those fee and taxes are supposed to be unreasonable and overlap. Unfortunately, a lot of FTAs have come into force recently so the government has to lower import tariff, which might lead to an increase in using para-tariff measures because they are a lot easier to apply than NTMs. In the near future, the government should consider using NTMs to adjust import value, which helps not only enhance the local companies' ability of competition but also make the local oil market more lucid and increase social welfare.

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