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Title:

"Effects on trade sophistication: Vietnam-Korea FTA"

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Effects on trade sophistication: Vietnam-Korea FTA

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Abstract:

This paper studies the Free Trade Agreement (FTA) between South Korea and Vietnam, which entered into force in December of 2015. We study the change in trade relationships between these nations, focusing on the levels of exports and imports between them and also their Gross Domestic Product (GDP). The data on bilateral trade between these two countries are gathered from the World Integrated Trade Solution (WITS) database covering the period of 2010-2020. We also used the UNCTAD and WTO databases to obtain necessary statistics on GDP, exchange rates and FTA, to conduct the data analysis, we use the vector autoregressive function (VAR) test and conduct Granger causality test on its basis to estimate short-term effects of FTA on bilateral trade between these countries. Then, we explore the properties of the Impulse-Response function test to estimate long-term impact of FTA on trade. As the data show, the effects of FTA on Vietnamese exports were significant in the medium term. Whilst the agreement has had a larger effect in the long term on Vietnamese imports from Korea, the results do show that it is worthwhile for both Korea and Vietnam to re-examine the agreement and either revise the document to reflect modern needs or enact policies to encourage trade between both nations. The outcomes of the agreement were similar to those of NAFTA.

JEL Classifications: F13, F15, G28
Keywords: Doimoi, FTAs, integration, trade liberalization

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1. Introduction

With the passage of the Renovation reforms, Doimoi, in 1986, Vietnam began integrating itself into the global economy. Through a concerted effort targeting unilateral, bilateral, and regional integration and liberalization, the nation has changed a great deal since the reforms were first enacted. Among the many free trade agreements signed is the one with the Republic of Korea (i.e, South Korea, hereafter simply Korea) which was brought into effect in 2015. Though this agreement is lost in the discourse of most scholars about the Vietnam-US and Vietnam-Japan free trade agreements, (FTA), Nguyen (2016) still notes that this was an important step on the country's ongoing drive to deepen its global economic integration. The comprehensive agreement lowered tariffs on a variety of goods in the manufacturing and agriculture sectors and, at the same time, put forth a comprehensive set of guidelines for investment between the two nations. With the passage of time, we can now reflect on the effects of the trade deal on both nations.

The paper is structured as follows. Section 2 offers a brief review of the literature. Section 3 will discuss the data used in the study, its origins and what variables were deemed to be dependent and independent. Section 4 introduces the models used for analysis and discusses the results from the model. Section 5 concludes the paper.

2. Literature Review:

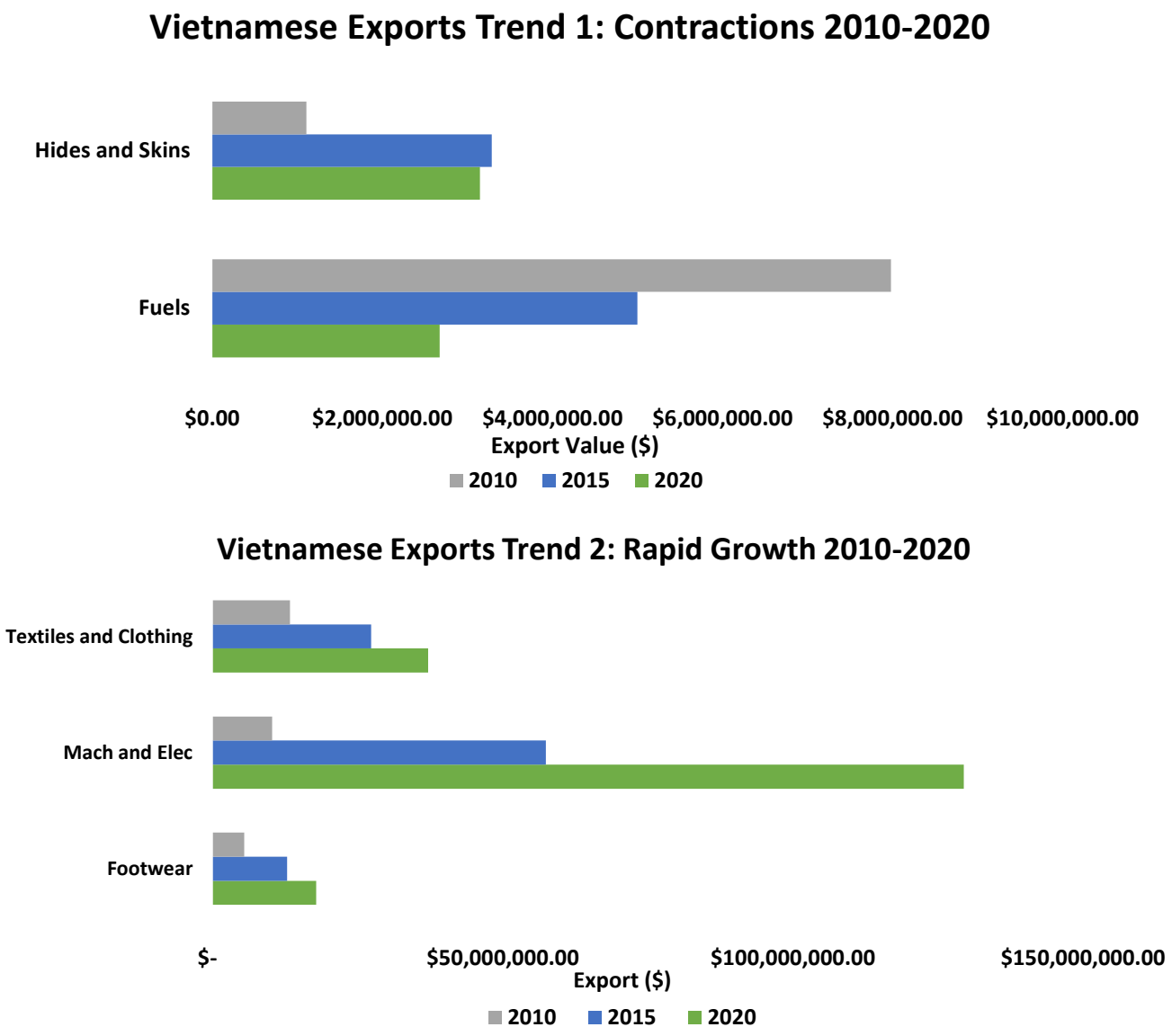
In the immediate period after the passage of the reforms, Vietnam sought to make up for lost ground, with a special focus on transitioning away from the central planning of the prior decades towards a market-oriented economy, as Nguyen (2016) notes this decision was part of the reason the nation would apply to and become the 7th member of the Association of Southeast Asian Nations (ASEAN), being formally inducted on the 28th of July 1995. The nation would

then sign several unilateral, bilateral, and regional trade agreements, both as an individual state and as a partner within ASEAN. Vietnam signed trade agreements with ASEAN and amongst the plus 3 nations (Japan, China, and Korea) and the ASEA Free Trade Area (AFTA), which were important in achieving economic growth through an expansion of its trade balance. To Minh (2010), using a Generalized Tukey Lambda (GTL) Model, indicated that Vietnam's economy in sectoral production adjustment saw rapid growth in the manufacturing and machinery. This is in line with Nguyen (2021), who also noted that it was also enabled by the country's ability to quickly attract FDI through the implementation of many industrial parks and export processing zones, collectively known as special economic zones throughout the country. Reflecting on this, the FTA more clearly shaped investment decisions between the participating nations, and the lowering of tariffs resulted in Vietnam receiving a significant increase in FDI from Korea. As Duong et al. (2019) concluded, Korea sought to set up factories to harness the intellectual potential and present expertise in the country, quickly becoming the nation's top investor in 2017. Given the focus on industrial parks and other manufacturing facilities, the effects on the nation's exports have been somewhat self-evident. The data from Tran et al. (2019) shows shifts in the nation's exports from raw products and low complexity manufactured goods like fuel and footwear in 2000 towards complex machinery and electronics in 2015, with the segment contributing the largest portion of Vietnamese exports, something which continues to this day.

Additionally, the effects of the FTA between Vietnam and Korea favor export makeup and its sophistication as the foreign direct investments (FDI) targeted production of high value-adding industries. Korean FDI in the country has generally been from companies in high complexity electronic goods, who choose Vietnam as a center of operations and manufacturing due in large part to the strength of its workforce. This is expected to have a favorable effect on

the host nation. As Tran et al. (2019) determined, Vietnamese firms were able to produce more sophisticated products when foreign companies were able to locate intermediate inputs in the domestic market supply.

Figure 1. Vietnamese Export Trends in 2010,2015 and 2020. Source: WITS



This is explained somewhat by how multinational corporations (MNCs) tend to operate in Vietnam, as they tend to focus on cooperation between local partners to produce intermediate products, which not only benefits the MNC through reduced costs, but also helps Vietnamese firms become more competitive, improving their production capability through learning and

observation. As such, the initial decision for an MNC choosing to invest in the country has had ripple effects in industries that are adjacent to the core operations of the company (Figure 1). As such, the export data from 2010-2020 reveals two major trends. The first is that 2 sectors suffered contractions during this time, with the largest contraction coming from the fuels section at a 7% contraction per year during this time. The second trend is that certain sectors saw a great deal of growth during the same 2010-2020 period, with machines and electronics growing on average 30% per year during this time. Overall, the trend for all the other export categories is that they trended upwards.

3. Data:

3.1 Independent Variables:

The analysis conducted in this paper uses a set of variables to determine the effects on trade between Vietnam and Korea following the ratification of the free trade agreement. As such, the first variable to note is FTA_{kvn}, a binary variable, which controls whether the agreement has come into force, with a value of 1 denoting that the agreement is being enforced and a 0 otherwise. To create this binary variable, we use the database on FTAs compiled by the World Trade Organization. Two other variables are the GDPs of Vietnam (GDP_{vn}) and Korea (GDP_{kr}); they control the total productive capacities of both trading nations. The data is retrieved from the United Nations Conference on Trade and Development (UNCTAD) database. The same data source is used to collect data on the exchange rate of the Vietnamese Dong to the Korean Won (Er_{kvn}). Due to the specifics of the exchange rate of Vietnamese Dong to Korean Won, 3 decimal places were used when reporting the data. This is a long-term analysis, as we focus on

the effects of FTA on trade for the period of 2010-2020. The descriptive statistics and their data sources have been summarized in Table 1.

3.2 Dependent Variables:

The data on bilateral trade, exports and imports, between Vietnam and the Republic of Korea were collected from the World Integrate Trade Solution (WITS), a flagship database offered by the World Bank. We selected a data range of 10 years from 2010 to 2020, so that we could measure an equal amount of time before and after the ratification of the FTA between the nations.

Table 1. Descriptive Statistics and data sources.

Variables	Description	Mean	Std. Dev.	Min	Max	Source
FTA_{kvn}	FTA between Vietnam and Korea Rep.	0.55	0.52	0.00	1.00	WTO
Imp_{vn}	Imports to Vietnam from Korea Rep. (Billions USD)	10.87	6.13	3.09	19.73	WITS, World Bank
Exp_{vn}	Exports from Vietnam to Korea Rep. (Billions USD)	29.91	14.95	9.76	47.58	WITS, World Bank
GDP_{vn}	Vietnamese GDP in 2015 prices (Billions USD)	196.85	50.66	115.93	271.16	UNCTAD
GDP_{kr}	Korean Rep. GDP in 2015 prices (Billions USD)	1,466.77	187.19	1,144.07	1,724.76	UNCTAD
Er_{kvn}	Exchange rate of VND to KRW	0.546	0.004	0.049	0.621	WITS, World Bank

4. Methodology:

Technical analysis was performed through the Vector Autoregressive Models (VAR). We use the econometric strategy discussed in Sedrakyan (2019), where the properties of the VAR model are used to run the Granger causality and Impulse -Response Function tests. The VAR model creates

a system of equations where the variables are modeled in terms of their past performance. As such, there is one equation for determining each variable and where other variables and the past values of the variable of interest are used as independent variable. In other words, each equation uses a set of time-lagged values of each of the included variables, including the dependent variable as well. For two series of data, labeled X_t and Y_t the VAR model will consist of these equations:

$$X_t = \delta_0 + \alpha_1 X_{t-1} + b_1 Y_{t-1} + \alpha_2 X_{t-2} + b_2 Y_{t-2} + \ldots \textit{and}$$

$$Y_t = \eta_0 + c_1 X_{t-1} + d_1 Y_{t-1} + c_2 X_{t-2} + d_2 Y_{t-2} + \ldots$$

Each of these equations contains an error that will equate to zero based on the past information on *X* and *Y*. For both VAR models conducted, the *t* periods were from 2010-2020. Current analysis requires to explore two VAR tests, for exports and imports. In each of those tests the system of VAR equations, in addition to exports or imports, also contains four other variables, which include GDP of both countries, exchange rate and FTA. These variables are modeled according to the abovementioned strategy. We used the logarithmic transformation of our data, except FTA, and applied a lag value of 1 before running the VAR models of both imports and exports.

These developed VAR models for exports and imports between Vietnam and Korea, while not allowing statements on causal relationships, do initiate the steps required for a more comprehensive analysis. As such, one can determine the effects of the FTA and the consequent exports and imports can be obtained by performing a Granger causality test. The most important idea of a Granger causality test is as such: variable *Y* is considered a Granger-cause for variable *X*, if *X* can be better predicted using the past values of both *X* and *Y* than if only using the past values of *X*. A simplified version of the causal model is as follows:

$$X_t = \sum_{i=0}^{n} a_j X_{t-j} + \sum_{i=0}^{n} b_j Y_{t-j} + \varepsilon_t$$

$$Y_t = \sum_{i=0}^{n} c_j X_{t-j} + \sum_{i=0}^{n} d_j Y_{t-j} + \varepsilon_t$$

with X_{t-j} and Y_{t-j} are a defined and static period of time. Expected outcomes from the Granger causality test, as defined by the aforementioned equation implies that Y_t causes X_t , provided that b_j does not equal 0. It also implies that the reverse is true, provided that c_j does not equal 0. If both events occur, then a feedback relationship can be inferred between X_t and Y_t. The null hypothesis of the causality test is that the lag values of Y_t as a whole do not cause X_t. A more formal statement of this as a hypothesis would be $H0$: $b_j = 0$. If the probability value $p < 5\%$, then the null-hypothesis can be rejected, and we can infer a short-run causality from *Y* to *X*.

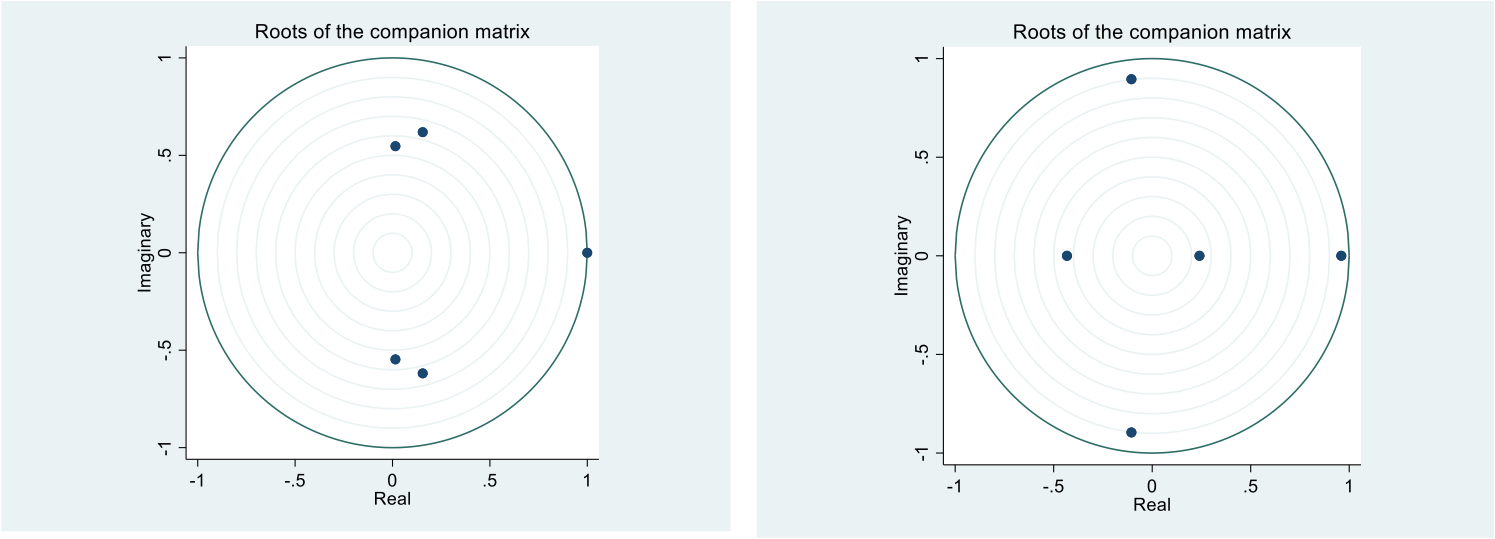
In addition, an Impulse-Response Function (IRF) test was conducted to identify the dynamic changes across variables in the long-term perspective. IRF estimates the response of a variable to a unit alteration, which is described as a shock or innovation in the value of one of the VAR errors. It also means that should the other VAR errors equal zero, the VAR error being examined should then itself revert to zero in future periods. A more in-depth explanation would be that if the VAR system presented below is considered with a lag in time of $(T - I)$, the IRF function aids in identifying the responsiveness of variables X_t and Y_t when an impulse is applied as error terms ε_1 and ε_2.

$$X_t = \alpha_1 + \alpha_2 X_{t-i} + \alpha_3 Y_{t-i} + \varepsilon_1 + \ldots \textit{and}$$

$$Y_t = \beta_1 + \beta_2 X_{t-i} + \beta_3 Y_{t-i} + \varepsilon_2 + \ldots$$

To check the stability of the VAR model, an Eigenvalue stability analysis was conducted on both the export and import datasets, with their respective analyses determining that all values of both sets were within the unit circle, ensuring that the datasets satisfied the stability condition. As Figure 3 shows, all of the variables used were within the matrix and as such meant that the analysis was done correctly and that the dataset was stable (Figure 1).

Figure 1: Eigenvalue stability test results for both Exports (left) and Imports (right)



4.1 Results:

This paper determines the impact of FTA signed between Vietnam and Korea and examines this effect both in the short-term and long-term perspectives. The results of the Granger causality test allow us to observe the short-term effect of the FTA. They have been summarized in Table 2 for both exports and imports. In the case of exports, the passage of the FTA between both trading nations is determined to have a causal relationship with exports to Korea and Korean GDP, whilst not having a relationship with Vietnamese GDP and the exchange rate of Vietnamese Dong (VND) to Korean Won (KRW). In the case of imports, the FTA is shown to have a strong causal relationship with imports from Korea, Korean GDP, and the VND/KRW exchange rate. The results of the Granger causality test are summarized in Table 2 in the appendix. The values

in the vertical column represent the value we are taking as independent to examine for short-run causality, whilst the variables in the horizontal rows show how corresponding variables react to the unit shock given to the independent variable. For instance, a unit shock is the signing in effect an FTA (first row) then we can observe how other variables react to that policy change (or shock).

Table 2: (Granger causality Wald Tests for exports and imports)

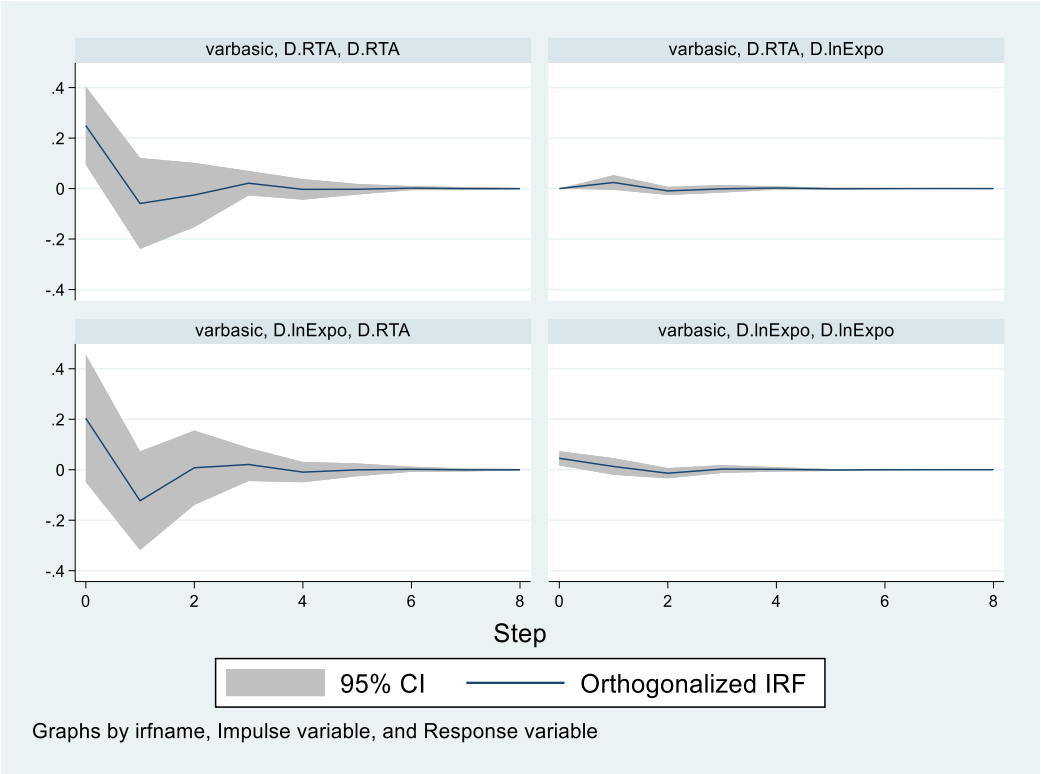
	Dependent Variables				
Independent Variables	*Case of Exports*				
		FTA_{kvn}	Exp_{vn}	GDP_{vn}	GDP_{kr}	Er_{kvn}
	FTA_{kvn}		13.49***	0.03	15.77***	0.01
	Exp_{vn}	2.12		0.06	12.67***	18.797***
	GDP_{vn}	32.19***	639.9***		0.64	73.408***
	GDP_{kr}	28.09***	25.46***	11.60**		57.70***
	Er_{kvn}	30.14***	16.51***	0.92	0.04	
	Case of Imports					
		FTA_{kvn}	Imp_{vn}	GDP_{vn}	GDP_{kr}	Er_{kvn}
	FTA_{kvn}		231.86***	3.78*	312.42***	47.745***
	Imp_{vn}	1.35		8.45**	0.56	4.16**
	GDP_{vn}	0.00	28.1***		3.13*	0.33
	GDP_{kr}	47.77***	56.9***	20.52***		46.12***
	Er_{kvn}	103.48***	137.51***	1.86	20.10***	

Note: Reports chi^2 Statistics, with *,** and *** representing scores that are significant at p-values of .1,.05 and .01 respectively.

The long-term effects of the FTA on exports and imports are determined by the impulse-response function (IRF) test. In the case of Vietnamese exports to Korea, the implementation of FTA (Figure 2) show an initial shock that causes exports to increase immediately after the agreement came into force, then the exports adjust and lower exports in the next years. After that, the exports adjust again, leading to a smaller rise, then a smaller decrease before reaching a

baseline value of exports by period 4. As such, the graph indicates that the FTA had a largely short-term effect on exports and that the Vietnamese government could stand to enact additional policies to encourage exporting goods to Korea, or to re-examine the FTA and draft a newer agreement, with additional considerations for the times.

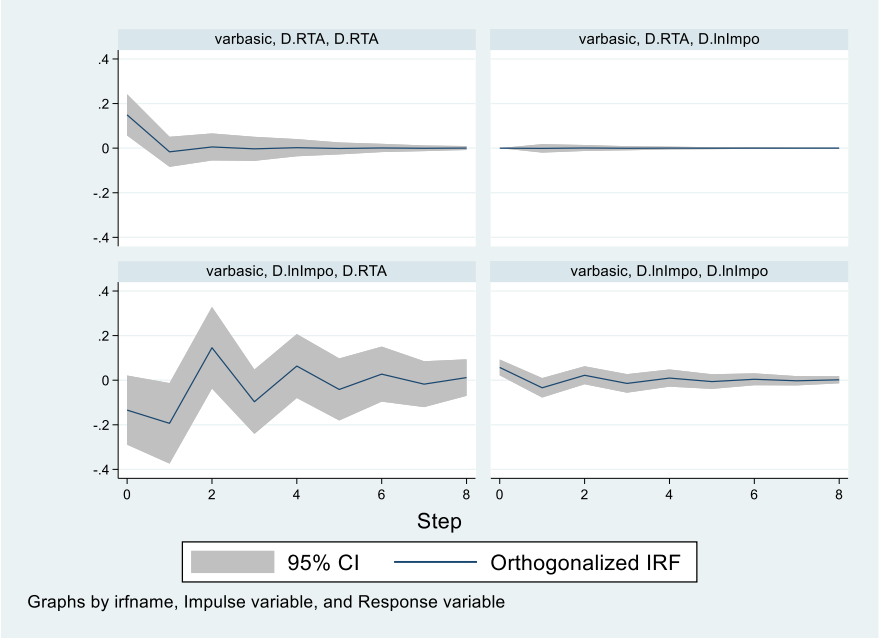
Figure 2: Impulse-Response Function for FTA on Export



With respect to imports from Korea, the effects of the FTA have been much more significant. Though it has been successful in encouraging imports, the agreement initially saw a decrease in imports, a trend that was only reversed in period 2. It would spark a series of adjustments from there on out that would alternate between periods of positive and negative import growth (Figure 3). However, something to note is that the imports do show a trend of stabilization as time goes on. More specifically, the data shows that from the 6th period that imports are becoming largely stable. As such, a review of the agreement is also recommended to

be conducted to determine if new policies should be made to encourage Korean imports or to expand the benefits granted by the FTA to both parties.

Figure 3: Impulse-Response Function for FTA on Imports



Overall, these outcomes are similar to those found by the US, Mexico and Canada after examining the effects of the North American Free Trade Agreement, henceforth known as NAFTA found that while the three nations of the US, Canada and Mexico saw trade cr).ion between them, the largest effect was documented in the US due to the opening up previously closed economies, in this instance being Mexico (Mehanna and Shamsub, 2002). This outcome mirrors that of the Korea-Vietnam free trade agreement in that the largest effect was on Korean imports to Vietnam, which had the largest effect due to a similar opening of the Vietnamese economy following the removal of trade barriers as outlined by the agreement. However, NAFTA's effects have also become increasingly muted in recent years and as such has led to the US-Mexico-Canada (known henceforth as USMCA) agreement being made, having come into

effect in 2020. As such, a similar review of the existing agreement between Vietnam and Korea is encouraged to allow both nations to continue benefiting from one another.

5. Conclusion

The free trade agreement between Vietnam and Korea is an agreement that had a large effect on both parties. As a part of a larger backdrop of free trade agreements that Vietnam made during the time it came into force, the FTA between Vietnam and Korea played a part in the rapid growth in Vietnamese GDP and more specifically in the machines and electronics categories, due to an agreement to develop and source parts from local intermediaries. From the Granger causality test conducted, a strong causal link was found between the enforcement of the agreement, Vietnamese exports to and imports from Korea and the Korean GDP, whilst the link between the ratification of the FTA and Vietnamese GDP could only be found in the case of imports and only at a 10% significance anyway, indicating that there was not a strong enough quantity of evidence to show a causal link between the two variables. Additionally, the impulse-response function shows that the FTA has had a short-term effect on Vietnamese exports to Korea, which have stabilized after 4 years and a long-term effect on Vietnamese imports from Korea, which has yet to completely stabilize like exports have but has shown signs of stabilization since the 6^{th} period. With outcomes similar to those found in the aftermath of NAFTA, and given the constituent economies of the US, Mexico and Canada's decision to draft a new agreement in response to it, named the USMCA, similar action should be taken by the Korean and Vietnamese governments. As such, it is a sound idea for both the Korean and Vietnamese national governments to revisit the terms of the agreement and either create a revised agreement or enact policies that would solve administrative issues and enable trade between both nations, so that both nations can make the best use of the agreement.

Motivation and Acknowledgements

I wanted to conduct a study on the effects of this trade deal because I come from Vietnam and thus have a vested interest in understanding its outcomes. Additionally, it was a topic of interest amongst the teachers and faculty in my old school in Vietnam and said teachers played a pivotal role in my switch from computer science to focusing on economics and finance. This fellowship will play an important role in my career by allowing me to acclimate to the world of academic publishing and to transition more smoothly to the world of academia after a period of private sector work.

I am thankful for Dr. Gohar Sedrakyan, who operated in an important capacity in providing topics of discussion, possible methods of data analysis and general motivation in completing this paper. Additionally, I wish to thank my parents, Duc Huy Hung Nguyen and Thi Thanh Truc Nguyen, for providing additional motivation, financial support and the opportunities to be able to be at a position to write this paper. Finally, I am indebted to the Bagwell Center for the Study of Markets and Economic Opportunity for the provision of the opportunity to write this paper and in part, the impetus behind it as well.

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