The trade relations between Japan and Visegrad Group countries in the light of Linder's Overlapping Demand Theory

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Abstract

Factors that influence trade relations between countries have always been the center of scholars' attention. Throughout the centuries many different theories have been introduced. One of them, which is widely used nowadays, is Staffan Burenstam Linder's Overlapping Demand Theory. In accordance with this theory countries which have similar structure of preferences tend to keep closer trade relations with each other. The proxy for preferences is, as Linder has indicated, Gross Domestic Product (GDP) per capita.

This study is aimed at analyzing whether Linder's Overlapping Demand Theory provides accurate explanation for trade relations between Japan and Visegrad Group countries (Czech Republic, Hungary, Poland and Slovakia). Is GDP per capita the main factor which influences the trade turnover? Or are trade relations completely unrelated to structure of preferences between analyzed countries? This research paper is focused on finding answers to above questions.

Keywords: Japan, Visegrad Group, Trade relations, Linder's Overlapping Demand Theory

The purpose of the study

Economic relations, especially trade relations, between Japan and Visegrad Group countries (Czech Republic, Hungary, Poland and Slovakia) remain an area which so far has not been widely researched. Existing publications are mainly focused on presenting flows of Japanese foreign direct investments into this region. However, most of them are limited to the analysis of investment links in the 1990s or at the beginning of 21st century. Latest trends in FDI as well as Japanese - Visegrad Group trade relations have not been the center of researchers' attention. There is knowledge niche in this area. That is why, the purpose of this study is to fill the existing knowledge gap by providing complex analysis of current state of relations. This paper focuses on examining the validity of one of the main modern theories of international trade, Linder's Overlapping Demand Theory, from the perspective trade relations between Japan and Visegrad Group countries.

The plan of this study is as follows. The next section discusses the assumptions of

Linder's hypothesis as well as reviews the existing literature on empirical validity of this model. Section 3 examines the overlapping demand between Japan and Visegrad Group countries, while section 4 presents results of empirical study of trade relations between Japan and Visegrad Group countries in the light of Linder's Overlapping Demand Theory. The final section – section 5 offers conclusions from conducted research as well as closing remarks.

Linder's Overlapping Demand Theory

The history of economic thought shows that trade relations between countries have been kept even 5000 years B.C., which means that this phenomenon has history of more than 7000 years. It is no surprising then that many scholars have been trying to find satisfying answers to the following questions: why countries develop trade relations with each other? What factors determine trade turnover? Why some countries trade more than the others? Why trade relations are kept between specific types of countries? Why a country exports and imports specific types of goods? Throughout the history many trade theories have been introduced. Each of them has been analyzing this phenomenon from different perspective. Recently, one of modern theories - Staffan Burenstam Linder's Theory of Overlapping Demand has been gaining much recognition worldwide. This study examines this theory in relation to Japan - Visegrad Group countries trade relations.

According to Linder's research, which was published in "*An Essay on Trade and Transformation*", the major factor that influences the trade relation between two countries is the structure of preferences, which is presented as demand for goods. He argued that "*The more similar the demand structure of the two countries the more intensive potentially is the trade between these two countries*" (Linder, 1961). Linder based his reasoning on the assumption that countries tend to produce those goods for which there is a demand on domestic market, and then export existing surplus of production. As a result, countries which are willing to acquire this surplus are bound to have the same or very similar demand patterns as exporting ones. The trade turnover between countries is dependent on the existing level of overlapping demand between them. In other words, the bigger overlapping demand between countries, the stronger their trade ties.

In "*An Essay on Trade and Transformation*" Staffan Burenstam Linder has suggested to use Gross Domestic Product (GDP) per capita as a proxy of preferences in order to measure overlapping demand between countries. Countries which are close in terms of GDP per capita, according to Linder's thesis, should have similar patterns of demand preferences. Theory of Overlapping Demand is based on assumption that countries which are on similar level of economic development tend to have stronger economic ties than those between which there are significant differences in terms of industrialization.

Previous researches concerning validation of Linder's hypothesis do not provide conclusive evidence for its accuracy. Favorable evidence for Linder's theory was found, among others, in studies conducted by Sailors, *et al.* (1973); Greytak and McHugh (1977); Thursby and Thursby (1987); Hanink (1988, 1990); Grevtak and Tuchinda (1990); Francois and Kaplan (1996) and Bukhari, *et al.* (2005). However, researches conducted by Hoftyzer (1984); Qureshi, *et al.* (1980); Kennedy and McHugh (1980, 1983); Linnemann and van Beers (1988), shows that there is no support for Linder's hypothesis.

It has to be emphasized that in previous researches different methods were used in order to test Linder's Overlapping Demand Theory. In addition to that, empirical studies on Linder's hypothesis were applied to different set of countries than analyzed in this research. No studies in the past have been dedicated to the relations between Japan and Visegrad Group countries. That is why, this study provides an additional insight into accuracy of Linder's hypothesis.

Overlapping Demand between Japan and Visegrad Group countries

In order to verify whether Linder's theory provides an accurate explanation for trade relations between Japan and Visegrad Group countries, in the first step the analysis of overlapping demand between analyzed countries has been conducted. As it has been stated in Linder's research, countries which have similar level of GDP per capita will have stronger trade ties than those between which there are differences in economic development. The results of analysis of overlapping demand between Japan and Visegrad Group countries have been presented in Table 1.

Table 1 Overlapping Demand between Japan and Visegrad Group countries

Country	GDP per capita
Japan	41 296
Czech Republic	33 529
Hungary	27 700
Poland	27 741
Slovakia	31 403

Source: Own elaboration based on: *World Economic Outlook Database*, International Monetary Fund, https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx [Access: 06.06.2018].

According to data presented in Table 1. out of all analyzed countries Japan is the most developed one. That is why, in accordance with Linder's theory, it should have the strongest trade ties with this Visegrad Group country, which is the most similar in terms of GDP per capita. In other words, East-Central European country with the highest GDP per capita should be the main trade partner for Japan. International Monetary Fund's statistics shows that it should be Czech Republic since it has the highest level of GDP per capita out of all Visegrad Group countries. On the other hand, Japanese-Hungarian trade relations should be the weakest since there is a significant difference in income per capita level between those two countries. Based on Linder's theory, the following order of Japanese trade partners should be observed: Czech Republic, Slovakia, Poland and Hungary.

Based on analysis of overlapping demand between Japan and Visegrad Group countries the following hypothesis has been made:

1. The higher GDP per capita, the stronger trade relations with Japan

This hypothesis will be verified in an empirical study of trade relations between Japan and Visegrad Group countries in the next section. Positive verification of this hypothesis would imply that Japan develops its trade relations in accordance with Linder's Overlapping Demand Theory, meaning that it has the strongest economic ties with country similar to its own. On the other hand, negative verification would imply that Japanese-V4 trade relations are not mainly influenced by partner's economic development level but by other factors.

Empirical study of trade relations between Japan and Visegrad Group countries

Since in his research Linder has not presented any formal model to test his hypothesis, in order to verify it, economist have used a wide range of different methods. For the purpose of this study, author has tested the correlation between Gross Domestic Product per capita of Visegrad Group country and its trade turnover with Japan between 2004-2015, using Pearson correlation coefficient (PPC). This approach provides answers to the following questions: are Japanese-V4 trade relations dependent on the similarity of economic development? Or are there any other factors which influence them?

Correlation using using Pearson correlation coefficient (PPC) is calculated as follows:

$$r_{xy} = \frac{\mathrm{cov}(x, y)}{Sd_x \cdot Sd_y} \qquad \mathrm{cov}(x, y) = \frac{\Sigma(x_i - \overline{x})(y_i - \overline{y})}{n}$$

Where x denotes Gross Domestic Product per capita of Visegrad Group country and y equals Visegrad Group country's trade turnover with Japan between 2004-2015. *Sd(x)* denotes standard deviation of x sample, while *Sd(y)* denotes standard deviation of y sample. *Cov* equals covariance between two variables.

Pearson correlation coefficient ranges from -1 to 1. A value of 1 implies that there is a linear relation between X and Y, meaning that when X increases Y increases as well. On the other hand, a value of -1 means that all data points lie on a line for which Y decreases as X increases. A value 0 implies that there is no relation between X and Y. In general, the closer PPC value to 1 or -1, the stronger correlation between two variables.

In the case of this study, achieved outcome equaled 0 would imply that there is no relation between GDP per capita of Visegrad Group country and its trade relations with Japan, while outcome less than 0 would mean that there is negative correlation between those two variables. On the other hand, outcome bigger than 0 would imply that Visegrad Group country's GDP per capita is positively correlated with its turnover with Japan. It would also suggest that Linder's Overlapping Demand Theory accurately explains analyzed trade relations.

According to International Monetary Fund data Japan had the highest level of GDP per capita among all analyzed countries. Out of Visegrad Group countries Czech Republic was the leader in terms of GDP per capita, followed by Slovak Republic, Poland and Hungary. Thus, this ranking should also reflected Japanese trade partners provided that Linder's assumptions are correct.

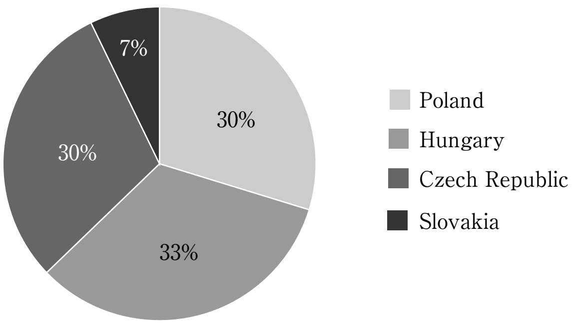
Table 2 Pearson correlation coefficient between GDP per capita and trade turnover

PPC	GDP per capita
r	− 0.34

Source: Own elaboration based on: *Trade Statistics of Japan*, Ministry of Finance, http://www.customs.go.jp/toukei/info/index_e.htm [Access: 06.06.2018]; *World Economic Outlook Database*, International Monetary Fund, https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx [Access: 06.06.2018].

Empirical study shows that there is negative correlation: -0.34, between level of GDP per capita of Visegrad Group country and its trade turnover with Japan. This result implies that the lower the level of GDP per capita, the stronger trade ties with Japan. However, as it has been stated before, Japan has the highest level of GDP per capita of all analyzed countries, thus according to Linder's theory, opposite result should have been observed. Result of the study suggests that Linder's theory does not accurately explain trade relations between Japan and Visegrad Group countries. Based on this analysis, it cannot be concluded that GDP per capita plays a crucial role in shaping Japan-V4 trade relations.

Graph 1 Accumulated trade turnover between Japan and Visegrad Group countries between 2004-2015



Source: Own elaboration based on: *Trade Statistics of Japan*, Ministry of Finance, http://www.customs.go.jp/toukei/info/index_e.htm [Access: 06.06.2018].

The result of empirical study is even more evident when we analyze Graph 1. which presents accumulated trade turnover between Japan and Visegrad Group countries between 2004-2015. According to statistical data, in the analyzed period Hungary, which had the lowest level of GDP per capita out of all analyzed countries, was the main trade partner for Japan. However, this outcome is contrary to Linder's research hypothesis. Czech Republic, which had the highest level of GDP per capita from V4 countries, was tied with Poland as the second main trade partner for Japan. Even though there was a significant difference in the level of GDP per capita between those two countries, it had no influence on trade turnover level since in both cases it was equal to 30%. Slovakia, which according to Linder's Overlapping Theory should be one of the main trade partners for Japan from Visegrad Group, turned out to have the weakest trade links. Share of trade with Slovakia constituted for only 7% of total Japanese trade turnover with Visegrad countries. It was significantly lower compared to other countries.

Conducted research indicates that Japanese trade relations with Visegrad Group countries does not follow the hypothesis of Linder's Overlapping Demand Theory. In this case similar structure of preferences is not a deciding factor for Japan to develop its trade ties with countries from analyzed region. Factors other than GDP per capita influence bilateral level of trade.

Conclusion

Linder's Overlapping Demand Theory is one of widely used modern theories of international trade, which provides a complex explanation for motivations behind developing trade relations between two countries. According to this theory, countries which have similar patterns of demand preferences tend to have stronger trade ties than those which have different ones. The degree of preferences' similarity is reflected by Gross Domestic Product per capita - the closer the GDP per capita between countries is, the more similar their demand preferences are. This study was aimed at analyzing whether Japan develops its trade relations with Visegrad Group countries in accordance with Linder's assumptions. The empirical study showed that there is a negative correlation between GDP per capita and level of trade turnover with Japan, meaning that similar patterns of preferences are not conclusive reason to develop bilateral trade ties. Similar demand structure is not a deciding factor for keeping trade relations between Japan and Visegrad Group countries.

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