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Trade Logistics – the Gravity Model Approach[*1]

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Abstract

Over the past decade, a number of papers attempt to capture the decisive impact of trade facilitation on international trade. Since the emergence of trade liberalization and tarrif reduction, trade facilitation analysis has been put in the spotlight. Trade facilitation is defined as all measures that reduce trade costs other than lowering tariffs. Therefore, the aim of this paper is to empirically examine the impact of trade facilitation from the logistics perspective on international trade distinguishing between low, middle and high income importing countries. We used the augmented gravity model to estimate this relationship across 150 countries within the period 2007-2016. The Logistic Performance Index (LPI) created by the World Bank is used as a proxy variable for trade facilitation. The results of our analysis show that all used variables are significant and show the expected signs correspondingly to our hypotheses, suggesting that trade will increase with trade facilitation. The results also lead to the conclusion that exporter logistics performance seems to be more important than importer logistics performance. This paper supports the World Bank trade facilitation initiatives to assure lower trade costs as they serve as a barrier to enjoying the benefits of increased trade.

Key words: *trade logistics, trade facilitation, international trade, gravity model, LPI*

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1. Introduction

Trade facilitation is nowadays treated as one of the most important aspects affecting the international trade, especially since the emergence of trade liberalization through tariff reduction. Trade facilitation, in its broadest sense, includes both hard and soft infrastructure including customs administration. Hard or physical infrastructure includes roads, railways, sea ports, airports, and information and communication technology (ICT), while soft infrastructure refers to "elements related to border, transport and customs efficiency that is signified in the time, cost, and number of documents needed for export and import procedures" (Ismail and Mahyideen, 2015, p. 5).

As far as our concern, there is no standard measure of trade facilitation. Moreover, Wilson et al. (2005, p. 3) state that "empirical research on the issue of trade facilitation faces three challenges: defining and measuring trade facilitation; choosing a modeling methodology to estimate the importance of trade facilitation for trade flows; and designing a scenario to estimate the effect of improved trade facilitation on trade flows". Based on the examined literature, in this research we use the Logistic Performance Index (hereinafter: LPI) as a relevant proxy variable for trade facilitation because LPI together with its subcomponents provide a comprehensive measure of the different aspects of trade facilitation (Felipe and Kumar, 2012). LPI is created by the World Bank and indicates the trade facilitation score across 150 countries worldwide. The LPI rates countries based on their logistics performance, i.e. provides the information on countries' "competitiveness" in several areas important for facilitating trade, i.e. the customs procedures, timeliness, logistics quality and competence, and the quality of the infrastructure necessary for overland and maritime transport (Arvis et al., 2016). According to Gani (2017), not only do transport and logistics services facilitate international trade, but also play a pivotal role in the country's growth and development. Although logistics performance has an essential role in supporting international trade, trade-related research has often examined these two issues separately. Thus, the aim of this research is to empirically investigate the impact of trade facilitation on international trade by focusing on area of trade logistics and distinguishing between low, middle and high income countries. This paper analyses the trade facilitation from the logistics point of view, that we believe is likely to have a profound impact on the international trade.

To estimate the effects of trade facilitation on international trade, we use the augmented gravity model on the sample of 150 countries around the world. Furthermore, following the World Bank GNI *per capita* classification, we grouped countries into three categories: low income, middle income and high income countries. Our results correspond to the initial hypotheses, namely that the size of the economy and trade facilitation have a positive impact on bilateral trade, while distance has a negative impact on bilateral trade. Furthermore, dummy variables

representing social and political similarities between trade countries have a positive impact on bilateral trade. Finally, when estimating the gravity model separately per each group of countries, the results suggest significant differences between low and high income countries. This papers contributes to the literature covering the connection between logistics performance and international trade.

The remainder of the paper is structured as follows: Section 2 reviews the literature related to trade facilitation research. Section 3 presents the gravity model methodology used in the empirical part of the paper. Section 4 explains the data and variables included in the analysis. Section 5 discusses the results and policy implications, and finally, Section 6 presents concluding remarks.

2. Literature review

Over the past decade, the concept of trade facilitation has received remarkable attention. However, empirical evidence based on more rigorous research methods remains limited, mostly because it is hard to define the right measurement method for trade facilitation. In fact, a general definition of trade facilitation in academic and public policy dialogue does not exist. According to Wilson et al. (2005), in a narrow sense, trade facilitation refers to all logistic activities necessary for moving goods and international trade documentation more efficiently. However, the definition of trade facilitation has been broadened to include all measures that reduce trade costs other than lowering tariffs (Shepherd, 2016a), such as the environment in which trade transactions take place, customs efficiency, regulatory environment, simplification of procedures, the usage of digital technology solutions, etc. Wilson et al. (2005) give their own broader definition in which trade facilitation integrates port efficiency, customs administration, domestic regulatory environment, and the hard and soft infrastructure enabling online business performance. Vlahinić Lenz et al. (2018) state that an efficient transport system stimulates the increase in international trade. Furthermore, Wilson et al. (2005) explain trade facilitation with four indicators, particularly "port efficiency, customs, regulation, and utilisation of online trade" and in order to estimate the significance of these indicators, the authors follow WMO metodologhy to measure trade facilitation and use the gravity model approach. Feenstra and Ma (2014) use port efficiency, import tariffs, OECD membership and RTAs, Lidberg and Lindkvist (2018) use two World Bank's World Development indicators (time to import/export (days) and cost to import/export (US$ per container)), Persson (2013) and Djankov et al. (2010) use the time taken to export and import from World Bank's Doing Business Survey. In general, studies on trade facilitation tend to use different measures either by including several possible dimensions of trade facilitation or focusing on the specific components (Felipe and Kumar, 2012). In this study we use one comprehensive measure, general LPI to investigate the gains of trade facilitation on international trade.

Gravity model is a very common tool in international trade, frequently used in many credible research papers (Bergstrand 1985, 1989; Krugman, 1991; Anderson and Wincoop 2003; Ismail and Mahyideen, 2015; Zajc Kejžar et al., 2016, etc.). However, recent studies have integrated the variables representing logistics performance into the gravity model (Hausman et al., 2005; Iwanow and Kirkpatrick, 2009; Marti et al., 2014ab). The World Bank's logistics performance index (LPI) was first published in 2007 and has been commonly used since as a proxy variable of trade facilitation (Behar and Manner, 2008; Marti et al. 2014a, 2014b, 2017; Maurel et al. 2016; Gani, 2017; Luttermann et al., 2017). Soloaga et al. (2006) estimate the effects of changes in trade facilitation in the case of Mexican freight transport and later on, Wilson and Otsuki (2007) measure it in the case of Southeast Asian countries. Felipe and Kumar (2012) investigate how the improvements in trade facilitation in the Central Asian countries impact the international trade and they state that the key issue in trade facilitation research is definition and measurement of trade facilitation. They use LPI as a measure for trade facilitation. Soloaga et al. (2006), Wilson and Otsuki (2007) and Felipe and Kumar (2012) use the gravity model approach. The LPI indicates the level of logistic friendliness of countries around the world. Acording to Arvis et al. (2016), the LPI analyzes countries according to six components: "the efficiency of customs and border management clearance, the quality of trade and transport infrastructure, the ease of arranging competitively priced shipments, the competence and quality of logistics services, the ability to track and trace consignments, and finally, the frequency with which shipments reach consignees within scheduled or expected delivery times". The LPI was published six times (2007, 2010, 2012, 2014, 2016, and the latest LPI in 2018) ranking 150 countries around the world. The index is measured as a weighted average of countries' scores in the six above-mentioned components and aggregated. The components are measured on a 1-to-5 scale, where the highest score represents the best logistics performance (5), and vice versa. Arvis et al. (2007) argue that the countries with the most competent and best organized trade procedures and transport routes are those prone to take the best of technological progress, economic liberalization, and the approach to the global markets. In their latest work, Marti et al. (2017) proposed the data envelopment analysis (DEA) approach in order to calculate "a synthetic index of overall logistics performance (DEA-LPI)". Their results show that high income countries located in the EU are best-scored in the LPI. The results of all five LPIs clearly suggest that there is a gap in the logistics development between up-scale and emerging countries which is difficult to overcome. The top five countries holding the best position in the period from 2007 to 2016 are Germany, the Netherlands, Belgium, Sweden, and Singapore. Yet, it is important to emphasize that some countries with "advanced" customs, efficient ICT application, and a competitive private logistics sector moved up the ranking (Marti et al., 2014a). This was the case for Croatia, that moved up from the 63rd place in 2007 to the 51st place in 2016, although we have to consider the integration into the EU in 2013. Furthermore, Brazil, for instance, moved up

from the 61st place in 2007 to the 41st place in 2010 and back to the 55th place in 2016 indicating that some countries' rank varies for approximately 5-10 places in the observed period.

In their trade facilitation research, Lee and Park (2007), Persson (2008, 2013), Marti et al. (2014a, 2014b, 2017) tend to find a significant impact on international trade by implementing the gravity model theory in their analysis. Moreover, Marquez-Ramos et al. (2011) argue that non-tariff trade barriers, such as institutional barriers, have a higher impact on international trade than tariff barriers. Iwanow and Kirkpatrick (2009) have measured trade facilitation in the case of African export of manufactured goods, and their results suggest that trade facilitation reforms can enhance the export of manufactured goods. Behar and Manner (2008) use the logistics performance index in order to analyze the relationships between bilateral exports and logistics, and their gravity model shows that logistics in both exporting and partner-countries can have an important effect on bilateral exports. Marti et al. (2014a) use the logistics performance index published in 2005 and 2008 as a proxy variable for trade facilitation and they analyze whether international trade flows, both import and export, changed between years 2005 and 2008 in the case of emerging countries. Their results suggest that logistics performance index for both importing and exporting countries shows a positive impact on trade flow, especially in the case of emerging exporting countries. In their later work, Marti et al. (2014b) expand their analysis by estimating the impact of each logistics performance index component on international trade in emerging countries. The baseline of their work was, the gravity model theory and estimation results show that an increase in any component of the logistics performance index can increase international trade in many African, South American and Eastern European countries.

It seems that the majority of empirical studies are conclusive in trade facilitation and its role in international trade. However, this paper differs from the existing literature in what we investigate and that is the heterogeneous impact of trade facilitation on international trade. First, we focus on trade logistics, and second, we differentiate three income levels: low, middle, and high, with regard to the importing country.

3. Methodology

The gravity model is generally used when modeling international trade flows. The gravity model originally relates to the "law of universal gravitation in physics", developed by Isaac Newton back in 1687 (Tinbergen, 1962). However, the gravity model in international trade places the law of universal gravity into the economic context. It is interpreted that the export volume from country *i* to country *j* depends on "the economic masses" (measured by the country's GDP) and the distance

represented by the geographical distance between the two trade countries' capital cities (Head, 2003). Tinbergen (1962) is commonly considered a pioneer of the gravity model's application in international trade.

The canonical gravity model equation relates bilateral trade flows (T_{ij}) to the GDPs of the exporting and importing countries (y_i and y_j) and the distance between them (d_{ij}) and is written as follows:

$$T_{ij} = \beta_0 \beta_1 (y_i) \beta_2 (y_j) \beta_3 (d_{ij}) \tag{1}$$

where T_{ij} stands for the volume of trade from country i to country j; y_i and y_j stand for the GDP of countries i and j, and D_{ij} stands for the geographical distance between capital cities of i and j; β_0 represents a constant; and β_1, β_2, β_3 represent parameters of the variables. It is expected that GDPs of countries i and j have a positive impact on trade volume, while, distance has a negative impact on trade between countries i and j.

Furthermore, the model presented by equation (1) is in multiplicative form, while standard gravity model is mostly estimated in additive form:

$$\ln T_{ij} = \beta_0 + \beta_1 (\ln y_i) + \beta_2 (\ln y_j) + \beta_3 (\ln d_{ij}) + u_{ij} \tag{2}$$

where ln represents natural logarithm, and u_{ij} is the random error term.

Ordinary least squares (OLS) regression analysis is mostly used when estimating gravity models and the empirical analysis generally includes various dummy variables to "capture the effects of some factors that can affect trade" (Marti et al., 2014b), such as a common language, sharing a common border, a colonial relationship, etc. The gravity model used in this research for each group of the analyzed countries, namely low-, middle- and high-GNI *per capita*, has the following structure:

$$\begin{aligned} tot\_trade_{ijt} &= \beta_0 + \beta_1 (\ln dist_{ij}) + \beta_2 (\ln LPI\_i_{it}) + \beta_3 (\ln LPI\_e_{jt}) + \\ &+ \beta_4 (gdp\_i_{it}) + \beta_5 (gdp\_e_{jt}) + \beta_6 (comcur_{ijt}) + \beta_7 (fta\_wto_{ijt}) + \\ &+ \beta_8 (colony_{ij}) + \beta_9 (comlang\_off_{ij}) + u_{ijt} \end{aligned} \tag{3}$$

where tot_trade_{ijt} is the volume of total trade between country i and country j in time t; $dist_{ij}$ is the distance between capital cities of country i and country j; LPI_i_{it} in time t is the LPI score for the importer country; LPI_ej_t in time t is the LPI score for the exporter country; gdp_i_{it} represents the gross domestic product of the importing country i while gdp_d_{jt} the gross domestic product of the exporting country j in time t; $comcur_{ijt}$ is a dummy variable for common currency in time t; fta_wto_{ijt} is a dummy variable for bilateral free trade agreement in time t; $colony_{ij}$ is a dummy for colonial relationship, and finally, $comlang\_off_{ij}$ is a dummy for common official

language. We emphasize that we conducted logarithmic transformation of the variables in order to interpret the coefficients as elasticities.

According to our gravity equation, total bilateral trade, *inter alia*, depends on several variables related to the economy, geography, demography, and the logistics performance. Theoretically, the majority of variables included in the gravity model are expected to have a significant positive impact on total bilateral trade flows except the distance variable, which should have a negative effect on trade flows, because proximity generally promotes trade. Since the focus of our paper is on trade facilitation, all variables except LPI scores have a role of control variables. Coefficients of LPI score variables for importing and exporting country are of main interest to us and they show how the improvement in their levels affects the bilateral trade flows between countries. Obviously, the estimated coefficients of LPI variables should have positive sign as well as estimated coefficients of the control variables (dummy variables that represent the actual social and cultural relationship between trading partners).

4. Empirical data and analysis

4.1. Empirical data

Since the LPI is published every two years, we used biannual data for the period from 2007 to 2016 for our analysis. We have drawn our trade flow data from the International Trade Centre (ITC) 2018 database while the list of dummy variables characterizing social and cultural features of trading countries are from CEPII 2018 database. The LPI and GDP data have been obtained from the World Bank 2018ab databases.

Our sample includes data for 150 countries whose LPI for 2007 and 2016 was published by the World Bank. The importing countries are grouped into three groups with respect to income level: low income, middle income and high income countries. To group the countries, we followed the World Bank's GNI *per capita* classification calculated using the World Bank Atlas Method. The countries are grouped as follows:

- Low income countries with the GNI/pc <= $1,006
- Middle income countries with the GNI/pc > $1,006 <= $12,235
- High income countries with the GNI/pc > $12,235

Table 1 contains descriptive statistics of all used variables in the model expressed in absolute values.

Table 1: Summary statistics for the key variables

Variable	Obs	Mean	Std. Dev.	Min	Max
tot trade	87,332	870148	7.54e+06	0.0010	4.82e+08
dist	107,090	7285	4307	8.45	19781
LPI_i	109,080	2.85	0.57	1.21	4.23
LPI_e	109,080	2.85	0.57	1.21	4.23
gdp_i	104,914	4.55e+11	1.59e+12	1.83e+08	1.86e+13
gdp_e	87,043	4.21e+11	1.47e+12	1.83e+08	1.74e+13
comcur	107,090	0.023	0.15	0	1
fta wto	106,758	0.15	0.35	0	1
colony	107,090	0.013	0.11	0	1
comlang off	107,090	0.12	0.33	0	1

Source: Authors'calculation

4.2. Empirical analysis

In our paper, we have originally estimated a gravity model to discover whether trade facilitation proxied by LPI affects international trade and obtained the following results presented in Table 2. The table is divided into four columns; the first column presents the results of all the observed countries, while the second, third, and fourth column present the results of the observed trade when importing countries are low, middle, and high income. The estimated coefficients are in line with our expectations. Firstly, more distant countries tend to trade less, indicating that geographical proximity enhances trade between countries. Secondly, economic size (measured by the size of their GDP) shows a positive impact on bilateral trade, which implies that, the "larger" the two economies, the more trade takes place between them. The results show that the sign on LPI coefficient for both importing and exporting country is as expected, positive and statistically significant. The signs of coefficients of dummy variables are in line with the gravity model theory, indicating that if trading partners have a common currency, free trade agreement, common colonial history or a common language, it is more likely that they will do more trading. Moreover, when comparing our results to the results of the meta-analysis conducted by Head and Mayer (2014), we can conclude that our results are empirically-consistent, i.e. one standard deviation away from the mean of meta-analysis results. Although in general all the predicted variables except distance show positive effects on international trade, the results are quite interesting when we observe the results separately per each group of importing countries.

Table 2: Gravity model results

	(1)	(2)	(3)	(4)
	gen	low	middle	high
VARIABLES	lntot trade	lntot trade	lntot trade	lntot trade
lndist	-1.201***	-1.584***	-1.337***	-0.932***
	(0.0146)	(0.0478)	(0.0209)	(0.0221)
lnLPI_i	1.260***	1.484***	2.807***	1.189***
	(0.0734)	(0.217)	(0.132)	(0.147)
lnLPI_e	3.728***	3.580***	3.815***	4.215***
	(0.0759)	(0.195)	(0.108)	(0.126)
lngdp_i	0.929***	0.781***	0.928***	1.000***
	(0.00663)	(0.0213)	(0.00944)	(0.0114)
lngdp_e	1.095***	1.065***	1.126***	1.081***
	(0.00696)	(0.0190)	(0.0101)	(0.0111)
comcur	-0.0194	1.104***	0.517**	-0.204***
	(0.0650)	(0.188)	(0.209)	(0.0485)
fta_wto	0.654***	1.444***	0.892***	0.409***
	(0.0279)	(0.112)	(0.0394)	(0.0410)
colony	0.547***	0.916***	0.155*	0.845***
	(0.0556)	(0.169)	(0.0899)	(0.0774)
comlang_off	1.055***	0.523***	1.147***	0.742***
	(0.0288)	(0.0689)	(0.0399)	(0.0520)
Constant	-37.31***	-29.68***	-38.51***	-41.59***
	(0.211)	(0.678)	(0.311)	(0.351)
Observations	65,253	10,353	31,596	22,982
R-squared	0.668	0.521	0.657	0.701

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculation

As mentioned before, the variable distance is negative and significant in all cases, which is in line with the premise that the larger the distance between trading country, the higher the costs and lesser the trade. However, it seems that distance has a higher negative effect on trade in case of a low income importing country. This is because low income importing countries demand less expensive products from distant countries and consume cheaper goods. The LPI coefficient is positive indicating that the LPI score has the highest impact when the importing country is a middle income country while the LPI score of the exporting country has the highest impact when the importing country is a high income country. This result is expected given that the highest LPI-ranked countries are the ones with the best quality of

logistics service, most advanced infrastructure, the usage of digital technology, good regulatory environment, and trade facilitation has the highest impact on trade in these countries. Furthermore, countries with higher GDP growth also tend to have higher rates of growth in trade as an output share. The GDP variable is significant in all cases, presenting a positive sign, but the coefficients indicate that GDP has the highest impact on trade in case importing countries are middle- or high-income.

Variables, common currencies, free trade agreements, colonial history, and common language are also significant and positive; yet, it seems that common currency has negative effects when the importing country is a high income country, while in other cases it shows positive sign. The rest of the dummy variables seem to have the strongest impact when the importing country is a low level one, which is not that suprising considering that developed countries trade with their former colonies and with countries with which they have a free trade agreement. Finally, these findings are in line with our hypothesis, that trade facilitation indicator together with a standard set of gravity model variables has a positive impact on bilateral trade although exporter logistics performance seems to be more important than importer logistics performance.

5. Results and discussion

Overall, our results indicate that trade facilitation and international trade are strongly linked. Our empirical model includes a series of variables which, according to the gravity theory of international trade, have an impact on bilateral trade between countries. We tested the theory and the results show that economic strength of the trading partners measured by the GDP and social and cultural indicators (common currency, free trade agreement, colonial history, and common language) have a significant positive impact on bilateral trade flow while the distance has a significantly negative impact on trade between countries. Furthermore, our initial hypothesis was that trade facilitation measured by the logistic performance index has a positive impact on international trade, and the higher logistics performance score of the country has a significantly positive effect on bilateral trade flows. The contribution of our paper is in the differentiation of three income levels: low-, middle- and high with respect to the importing country. Hence, we have estimated the model separately when the importing country is either a low-, middle- or high-income country, and our results show that the logistics performance index has a greater impact in the case of middle- and high-income countries than in the case of low income countries. These results are in accordance with the LPI score of each group of countries; namely, in all publications of the World Bank LPI, the best-ranked countries are those with the highest GDP. Developed countries are those that trade the most; however, according to our results, the emerging economies

must take a step forward in investing in logistic infrastructure and performance to become more competitive and integrate themselves into international trade flows. It is already well-known that low income countries such as African countries are at a disadvantage because of their outdated transport and logistics infrastructure together with other institutional barriers. For those countries, it is easier to trade with third countries than among themselves. Low income countries have the potential to improve their trade performance, which might lead to economic growth and development; however, there is much to be done in all trade facilitation areas (customs efficiency, hard and soft infrastructure quality, shipment reliability, etc.).

Although our results are empirically-consistent, one of the limitations of our research is that our model only includes aggregated logistics performance index as a proxy variable of trade facilitation without considering the inclusion of other trade facilitation indicators which might give us a deeper understanding of the problem. The inclusion of different measures from a variety of sources and the comparison of the results might give us even more comprehensive picture. Furthermore, each of the LPI components should be analysed separately as this level of aggregation might lead us to a wrong conclusion. In that regard, our analysis can be considered as a basis for further research in the field of trade facilitation.

6. Conclusion

Trade liberalization and trade tariff reduction together with the complex supply chain network has resulted in an increase in importance of other factors in international trade. Recently, scientists have made a mutual attempt to find the indicators that best reflect trade facilitation and its role in international trade and the economy in general. The aim of our research was to empirically investigate the impact of trade facilitation on international trade distinguishing between low-, middle- and high-income importing countries. In order to estimate the impact of trade facilitation on international trade, we used the augmented gravity model on the sample of 150 countries around the world in the period from 2007 to 2016. According to our gravity equation, total bilateral trade depends on economic, geographic, and demographic variables together with logistics variables. The estimation results show that all the used variables are significant and show the expected signs correspondingly to the initial hypotheses. The economic size indicators (measured by the size of their GDP) show a positive impact, which implies that the bigger the two economies, the more trade takes place between them. The trade facilitation indicator, LPI, shows significantly positive coefficients, which pinpoints (ili highlights) the importance of logistics performance in the countries' international trade. However, the results seem to be different when estimating the gravity model separately for each group of importing countries. The trade facilitation indicator together with a standard set of gravity model variables

shows a significant and positive impact on bilateral trade. Furthermore, the results imply that exporter logistics performance seems to be more important than importer logistics performance. Future research should be more focused on factors contributing the most to trade facilitation, meaning that each of the LPI components should be studied separately. Although trade facilitation is increasingly recognized by governments as well as academia, there is much more to be done. The main policy implication is that continuous investment in trade facilitation measures may have a positive impact on international trade.

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Trgovinska logistika – primjena gravitacijskog modela

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Sažetak

Tijekom proteklog desetljeća, brojni su radovi pokušali istražiti odlučujući utjecaj olakšavanja trgovine, tzv. "trade facilitation", na međunarodnu trgovinu. Od liberalizacije trgovine i smanjenja carina, drugi faktori koji olakšavaju trgovinu stavljeni su u prvi plan. Pod olakšavanjem trgovine smatraju se sve mjere koje smanjuju trgovinske troškove, a koji ne obuhvaćaju snižavanje carina. Stoga je cilj ovog istraživanja empirijski istražiti utjecaj faktora olakšavanja trgovine na međunarodnu trgovinu s aspekta logistike, uzimajući pritom u obzir scenarij u kojem su zemlje uvoznice zemlje niskog, srednjeg ili visokog dohotka. Kako bismo procijenili učinke faktora olakšavanja trgovine, u radu koristimo prošireni gravitacijski model na podacima za 150 zemalja svijeta u razdoblju od 2007. do 2016. godine. Indeks logističkih performansi (LPI) koji izdaje Svjetska banka koristi se kao "proxy" varijabla za olakšavanje trgovine. Rezultati procjene pokazuju da su sve korištene varijable značajne i rezultati su u skladu s inicijalnom hipotezom, što upućuje na to da će se s olakšavanjem trgovine povećavati i međunarodna trgovina. Rezultati nas također dovode do zaključka da su logističke performanse izvoznika važnije od logističkih performansi uvoznika. Ovo istraživanje podupire smjernice Svjetske banke vezane uz potrebu ulaganja u olakšavanje trgovine kako bi se osigurali niži trgovinski troškovi koji predstavljaju prepreku povećanju međunarodne trgovine.

Ključne riječi: *trgovinska logistika, olakšavanje trgovine, međunarodna trgovina, gravitacijski model, LPI*

JEL klasifikacija: *F10, F11, F13, F14*

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