

Original Paper

doi [10.15826/recon.2022.8.4.026](https://doi.org/10.15826/recon.2022.8.4.026)

UDC 339.5

JEL F14, F21



FDI outflows and international trade nexus: Empirical evidence from country income groups

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Relevance. Outward foreign direct investment (OFDI) and international trade are traditionally viewed as key drive of economic integration and globalization. At the same time, the relationship between these phenomena is ambiguous both from theoretical and empirical points of view. This study contributes to the existing literature by analyzing the relationship between outward foreign direct investment and international trade for countries with different levels of income per capita.

Research objective. This study examines the dynamic interplay between OFDI and international trade in different income groups such as low-income (LIC), low-middle income (LMIC), upper-middle income (UMIC), and high-income (HIC) groups.

Data and methods. Based on World bank country income classifications, data from 161 countries are divided into LIC, LMIC, UMIC, and HIC for the period 1998–2019. The study employs the Difference (DFF-GMM) and two-step System Generalized Method of Moments (SYS-GMM) techniques to explore the OFDI-trade nexus.

Results. The results are mixed and significant providing support for both complementarity and substitutive FDI. Findings suggest that OFDI and trade nexus in LIC have negative impact indicating a substitutive effect, but in other economies, the impact is significantly positive and complementary.

Conclusions. Trade and OFDI nexus are substitutive in LIC, hence sound economic policy, aimed at increasing country's international competitiveness, should be adopted. However, trade and OFDI in LMIC, UMIC and HIC economies have mutually complementary relationship that facilitates the improvement of the domestic economy. Thus, government should promote policies that sustain the benefits of OFDI and trade interactions.

KEYWORDS

outward FDI, trade, exports, imports, system GMM, country income groups

ACKNOWLEDGMENTS

This research was supported by the Russian Science Foundation Grant No. 19-18-00262, “Modeling of Balanced Technological and Socio-Economic Development of Russian Regions”.

FOR CITATION

Osabuohien-Irabor, O., & Drapkin, I.M. (2022). FDI outflows and international trade nexus: Empirical evidence from country income groups. *R-economy*, 8(4), 340–355. doi: 10.15826/recon.2022.8.4.026

Взаимосвязь оттоков прямых иностранных инвестиций и международной торговли: эмпирический анализ для стран с разным уровнем дохода

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Актуальность. Прямые иностранные инвестиции (ПИИ) за рубежом и международная торговля традиционно рассматриваются как ключевой двигатель экономической интеграции и глобализации. В то же время взаимосвязь между данными явлениями неоднозначна, как с теоретической точки зрения, так и с точки зрения результатов известных эмпирических работ. Данное исследование вносит вклад в имеющуюся литературу, анализируя характер взаимозависимости между данными явлениями для стран с разными уровнем дохода на душу населения.

КЛЮЧЕВЫЕ СЛОВА

оттоки прямых иностранных инвестиций, международная торговля, экспорт, импорт, обобщенный метод моментов, взаимосвязь торговли и инвестиций

Цель исследования. В исследовании изучается динамическое взаимодействие между оттоками ПИИ и международной торговлей в группах стран с разным уровнем дохода: низким доходом, ниже среднего, выше среднего и высоким доходом.

Данные и методы. Используются данные по 161 стране за период 1998–2019 годы. Страны разделены по уровню дохода в соответствии с подходом Всемирного Банка. Для изучения динамической взаимосвязи ПИИ и торговли в исследовании используются разностный обобщенный метод моментов (DFF-GMM) и двухшаговый системный обобщенный метод моментов (SYS-GMM).

Результаты. Результаты статистически значимы, но неоднозначны, поскольку выявляют как эффекты замещения, так и эффекты дополнения между международной торговлей и исходящими прямыми иностранными инвестициями. Исходящие ПИИ и международная торговля замещают друг друга в странах с низким уровнем дохода, в то время как в других группах стран их взаимовлияние является взаимодополняющим.

Выводы. Связь между торговлей и исходящими ПИИ является замещающей в странах с низким доходом, поэтому для развития экономики им следует экономическую политику, направленную на повышение конкурентоспособности на мировом уровне. В то же время торговля и исходящие ПИИ в странах со средним и высоким доходом дополняют друг друга, что способствует росту национальной экономики. Таким образом, правительству следует продвигать политику, поддерживающую экспансию национальных компаний и развитие международных торговых связей.

БЛАГОДАРНОСТИ

Работа выполнена при поддержке гранта РФФИ № 19-18-00262 «Моделирование сбалансированного технологического и социально-экономического развития регионов России».

ДЛЯ ЦИТИРОВАНИЯ

Osabuohien-Irabor, O., & Drapkin, I.M. (2022). FDI outflows and international trade nexus: Empirical evidence from country income groups. *R-economy*, 8(4), 340–355. doi: 10.15826/recon.2022.8.4.026

外国直接投资流出与国际贸易的关系：对不同收入水平国家的实证分析

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摘要

现实性：外国直接投资（FDI）和国际贸易历来被视为经济一体化和全球化的主要推动力。同时，无论是从理论上还是从已知经验工作的结果来看，这些现象之间的关系都是模糊的。本研究通过分析不同人均收入水平国家这些现象之间的关系，并为现有文献做出贡献。

研究目标：该研究考察了不同收入水平国家（低收入、中下收入、中上收入和高收入）的外国直接投资流出和国际贸易之间的动态互动。

数据与方法：本文使用了161个国家在1998–2019年期间的数据，并按照世界银行国家收入水平来划分类别。本研究采用差分广义矩量法（DFF-GMM）和系统广义矩量法（SYS-GMM）来研究外国直接投资和贸易之间的动态关系。

研究结果：结果在统计学上是显著的，但也是混合的，因为它们显示了国际贸易和对外直接投资之间的替代和互补效应。在低收入国家，外向型外国直接投资和国际贸易相互替代，而在其他国家集团，它们是互补的。

结论：贸易与对外直接投资之间的联系在低收入国家是一种替代关系，所以他们应该采取经济政策，成为具有全球竞争力的国家，以发展其经济。同时，中高收入国家的贸易和对外直接投资相辅相成，促进了国民经济的增长。因此，政府应支持本国公司扩张和发展国际贸易联系。

关键词

外国直接投资流出、国际贸易、出口、进口、广义矩量法、贸易投资关系

致谢

這項研究得到了俄羅斯科學基金會第 19-18-00262 號資助，“俄羅斯地區平衡技術和社會經濟發展的建模”。

供引用

Osabuohien-Irabor, O., & Drapkin, I.M. (2022). FDI outflows and international trade nexus: Empirical evidence from country income groups. *R-economy*, 8(4), 340–355. doi: 10.15826/recon.2022.8.4.026

1. Introduction

Since the end of the 1980s, the patterns of trade have continued to change, reflecting the gradual integration of domestic economies into global production chains (Osabuohien-Irabor & Drapkin, 2021; Brana, 2016; Fontagné & Pajot, 1997). These advancements have been made pos-

sible by rapid development of information and communication technologies as well as the liberalization of trade and investments. Thus, trade and foreign direct investments (FDI) remain two key drivers of global economy, facilitating cross-border investment as well as goods and services around the world. According to the United

Nations Conference on Trade and Development (UNCTAD, 2020), global OFDI declined by 38.4 per cent from US\$ 1601 billion in 2017 to reached US\$966 billion in 2018 and rose by 33 per cent to US\$1314 billion in 2019. Compared to 2019, these flows declined by 49 per cent in 2020 due to economic crisis caused by COVID-19 global pandemic (UNCTAD, 2021). More so, international trade in goods and service reached US\$21 trillion in 2016 from US\$18 trillion in 2014. Then rose by 7 and 10 per cent in 2017 and 2018 to US\$22.5 trillion and US\$24.9 trillion respectively. However, to what extent are these increases and decreases in trade and OFDI linked in different income economies? To this end, this study seeks to empirically examine whether the relationship between home country international trade and OFDI are complementary or substitutive across different income economies groups.

In the last four decades, there has been a substantial debate on whether the relationship between international trade and OFDI is complementary or substitutive. Many empirical studies have examined this relationship in different strand of literatures using single country analysis (Rehman & Noman, 2021; Greaney & Kiyota, 2020; Tham et al., 2018; Chiappini 2016), group analysis for developed and developing countries (Sabir et al., 2019), as well as literature examining FDI inflow in country income (Joshua et al., 2020; Araujo et al., 2017; Huang et al., 2016). This has led to inconclusive results in large numbers of empirical studies. However, analysis based on OFDI and trade relationship from developing economies have increased faster than those from developed countries (Herzer, 2011). Whilst considerable numbers of studies indicated that OFDI-trade nexus are positively related indicating a complementarity relationship which supports complementarity effects (Albulescu & Goyeau, 2019; Ahmad et al., 2016), other studies suggested negative relationship which may lead to substitutive effects underpinning the horizontal FDI theory (Anderson et al., 2019; Mitze et al., 2010). Many other studies such as Ahmad et al (2016); Goh et al. (2013) have also found evidence of mixed results for OFDI and international trade relationship.

However, the interactions of international trade and OFDI may reduce domestic production cost as well as raise return for domestic production (Ali et al., 2021; Liu et al., 2016). For this reason, MNEs may merge home country and foreign

productions to stimulate home country's output and facilitate investment inflows. Domestic productions are stimulated by allowing the domestic firm to start new international market using MNEs imported primary products from the host country to produce higher volume of goods at lower prices at home country or other affiliates. Overseas direct investment and international trade may also promote the transfer of technology from host or affiliates to home country and facilitates production process which improves the economy (Osabuohien-Irabor & Drapkin, 2022). Notwithstanding the spillover effects of OFDI and trade to home economies, policy makers are worried that outward-internationalization activities may lead to 'hollowing-out' effects giving rise to de-industrialization and jobs losses (Liu et al., 2015; Yamashita, & Fukao, 2010) as well as crowd out investment from domestic economy. Trade liberalization lowers the cost of transactions and allows FDI to 'sidestep' the tariff barriers. Most empirical studies of OFDI-trade in developing economies mainly comes from Brazil, India and China, where the results show complementarity effects (Gusarova, 2019; Knoerich, 2017).

The World Bank introduced the per capita income thresholds which examines the relationship between measures of well-being and GNI per capita for different income groups, and these include LIC, LMIC, UMIC, and HIC groups. Based on 2019 purchasing power parity (PPP), a country is LIC if its GNI per capita is below \$1,026; LMIC between \$1,026 and \$3,995; UMIC between \$3,995 and \$12,375; and HIC above \$12,375. Fig. 1 shows OFDI and trade series in different income groups, for instance, LIC shows upward trend which peaked in 2011, decreases and have moved upward since 2015. In plot (b), LMIC group show no trend between 1970 and 2003, as the values of OFDI and trade did not make much significant difference during this period. OFDI had sharp increase in 2005 and peaked in 2008 followed by a sharp downward trend till 2015 and then continued with a slow undulating upward trend, trade continue to maintain steady upward movement from the year 2003 and decrease in 2018. Similarly, plots (c) and (d) shows OFDI and trade relationships in UMIC and HIC economies. For the former, both series moved together without trend between 1970 to 2000, then had a sharp upward trend from 2003 to 2017, afterward both series decreased together. However, unlike the series in plots (a), (b) and (c), plots (d) in HIC

shows that since 1970 both the OFDI and trade series have continued to trend upward, peaked in 2007, then decreased. These plots suggest great differences in the macroeconomic factors among the different country income groups, which justifies the need to further examine the relationship empirically.

However, to the best of our knowledge, studies examining OFDI and international trade nexus in different income economies remain scanty and unexplored, as only few literatures concerning FDI inflow-trade relationship in developing economies exist. The dynamic feedback relationship between international trade and OFDI as well as the cross-country variation in investment and trade may lead to serious econometric problem such as simultaneity bias, serial correlation, reverse causality, endogeneity, heterogeneity, omitted variable bias, and bring about spurious regression with bias estimates. Thus, this study examines OFDI and trade relationship in different income economies classification such as HIC, UMIC, LMIC, and LIC using the two-step System Generalized Method of Moments techniques (SYS-GMM) developed by Arellano & Bover (1995) and Blundell & Bond (1998), and the Difference Generalized Method of Moments (DFG-GMM) estimator proposed

by Arellano & Bond, (1991) which accounts for numerous econometric issues. This brings new insights to extant literature.

This study contributes to the existing literature in twofold. Firstly, to examine the dynamic interplay between OFDI and trade based on world bank country's income groups and to ascertain whether the pattern of the interrelationship is complementarity or substitutive. Secondly, to examine the effects of the global financial crisis (GFC) on MNEs outward internationalization activities as well as international trade in different income groups using the two-step SYS-GMM and the DFF-GMM techniques to estimate the investment and trade models. Finding reveals that the dynamic impact of the nexus between OFDI and international trade from countries with low wage are negative, however positive and significant impact was found in other economy clusters.

The rest of the paper is structured as follows: Section 2 presents the theoretical framework of FDI and trade theory as well as empirical reviews of related literature. Section 3 describes the study methodology and data employed in the study. Section 4 discusses, analyses, and interprets the estimated results. Section 6 briefly discusses the conclusion as well as the practical implication the study.

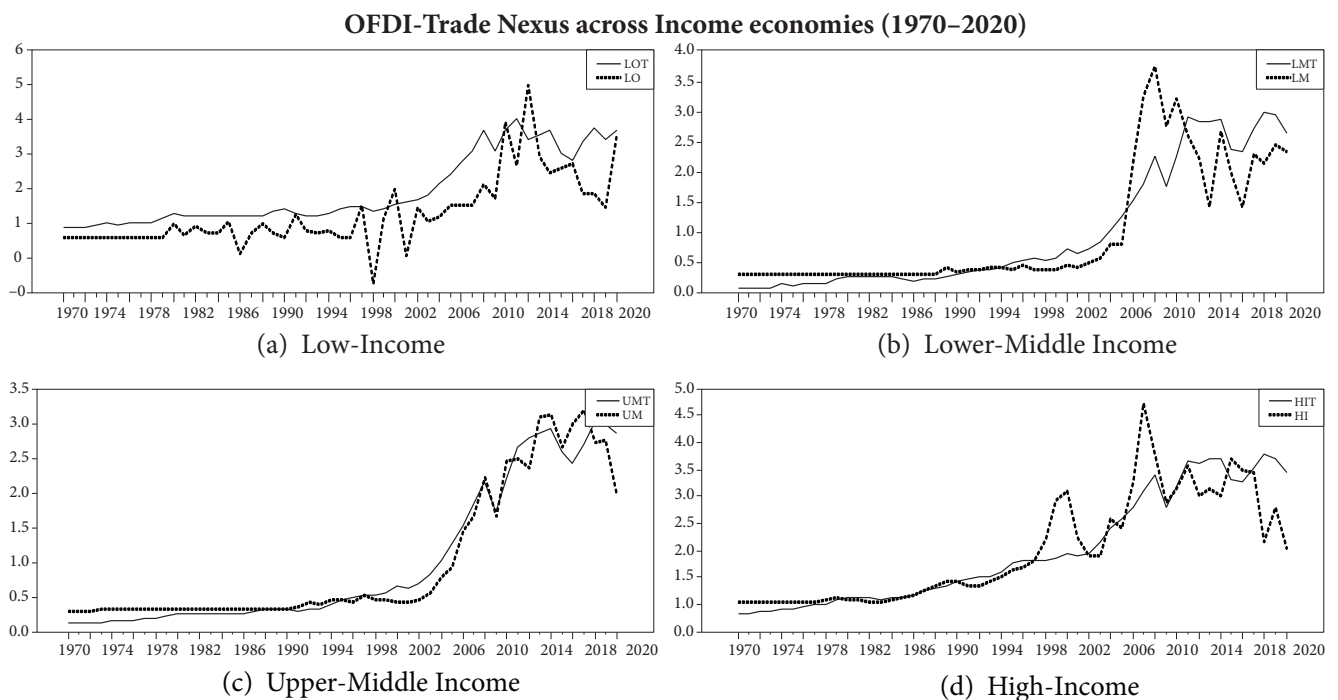


Figure 1. Plots showing OFDI and international trade relationships in different income classifications such as high-income, upper-middle income, lower-middle income, and low-income economies

Source: World Bank database (2020). <https://data.worldbank.org/>.

Author's evaluations (All plots are based on standardized values)

2. Theoretical background and empirical literatures

The key effect of FDI flows is the impact on global trade, where the standard trade theory asserts that the relationship is substitute rather than complement. Mundell (1957) first expressed the entrance of capital inflows in the Heckscher-Ohlin (H-O) model framework. The model predicts that for direct movement of factors of production, trading in commodities are perfect substitutes, especially capital. Their key assumptions explained that the balance of commodity prices can be obtained via international factor mobility in the absence of trade in goods, otherwise the balance of the price factor can be generated from the sale of goods without the mobility of capital if the obstacles in trade are abolished. This implies that increase in trade impediment stimulates factor movements and that an increase in restrictions to factor movements stimulates trade, thus the substitution of commodity for factor movements will be complete.

However, in the real world, these assumptions are not always satisfied, so a model employing them is somewhat limited. Thus, some advanced theory was formulated which challenged the substitution result that the models formed by modification of standard assumptions of H-O model is more likely to give complementary results rather than substitutions between the factors of trade and trade in goods. Hence, removing barriers to factor movement bring about a complementarity effects under free trade, change in assumptions underlying the Heckscher-Ohlin model as well as identical factor endowments. This shows a feedback relationship which indicates that analysis in international trade may not be separated from other economic factors such as investment, during empirical analysis.

After the work of Mundell (1957), this debate on substitutive and complementarity relationship has led to many scholarly research papers. For instance, Dunning (1980) OLI paradigm framework view oversea production and trade (exports) as two alternative modes to compete in international markets. The Internalization theory which explains that if OFDI production fixed cost is higher due to higher transportation cost, then per unit costs of exports is higher. In order word, firms will prefer export if the cost of oversea production is high (Buckley & Casson, 1981). However, owing to nature of investments, knowledge-based assets

transfer could give rise to substitutability between oversea production and exporting. This suggests that firms engage in the production of goods abroad to circumvent trade cost, thus a substitutive relationship with market-seeking motive (Markusen, 1984).

Some other literatures postulated the proximity-concentration models where firms could either choose to produce abroad using an affiliate or export directly to host countries. But if they choose the latter rather than the former, they are bound to provide transport costs and tariffs. Therefore, if cost of transport and tariffs are high, firms will most likely prefer oversea production of goods ahead of direct exportation to compete in foreign market, leading to FDI-Trade (exports) substitutive relationship (Brainard, 1997). To this end, Markusen (1984) and Brainard (1997) horizontal models, suggests that FDI-Trade (export) relationship may be substitutes if size, technological and factor endowments are similar between trading countries.

To get the best cost advantage from the most favorable locations, firms could engage in fragmentation of different stages of production at different location of resources endowments, leading to a complementarity relationship (Helpman & Krugman, 1985). This is also referred to as the factor proportion model, where the motives behind MNEs vertical FDI is the differences in factor cost. The vertical FDI framework will more likely happen between developing and developed countries. This suggests that whilst investment in developed (high industrialized) countries are merely to serve growing markets demands, investments in developing countries seek cheap and abundant resources, expectedly of vertical FDI. Even so, the sector (manufacturing, service, etc.) of oversea operation, the economy (developed or developing) as well as the type of industries (firm or plant level economies of scale) needs to be considered (Lipsey, 2002). Firm's expansion in international market can create increase in the demand for other product, as indication that at least two factors can explain the complementary (positive) relationship of vertical FDI theory (Head & Ries, 2004).

Few empirical studies have examined the nexus between OFDI and trade, and these literatures are taken at two different levels via; country levels (Anderson et al., 2019; Albulescu & Goyeau, 2019) and industry level (Borghesi et al., 2020; Chen & Fang, 2016). So far, not too few empirical stu-

dies have examined the relationship between OFDI and exports (Li et al., 2020; Li, 2019; Bhasin & Paul, 2016), compares to handful studies on OFDI and imports relationship (Wu & Chen, 2021; Fan & Wang, 2020). The central focus of these studies is to examine whether the relationships are complementary or substitutive.

For studies examining OFDI and exports, finding shows that the effects of OFDI on China's export sophistication are strongly positive, varies across quantiles and region, and a significant driver of exports promotion (Li et al., 2020). For Chinese manufacturing firms' productivity, a complementarity effects between OFDI and export was found (Zhou, 2020). More so, investment abroad from BRICS countries for the period 1993–2015 showed to substitute exports, indicating that MNEs in these countries do not connect with their countries' firms (Bhasin & Kapoor, 2020). However, OFDI flows complements export sophistication (EXPY), as one per cent increase in OFDI leads to 0.1 per cent increase in EXPY (Li, 2019). Empirical analysis of the impact of OFDI flows on exports from Association of Southeast Asian Nations (ASEAN) found both complementarity and substitutive effects, but further results showed that the complementarity effects outweigh the substitution effects in four countries (Ahmad et al., 2016).

Similarly, MNEs in ten major emerging countries in Asia were found supporting home country firms, when a panel data for the period 1991–2012 were analyzed (Bhasin & Paul, 2016), but the results for sectoral level analysis of the impact of Italian stocks OFDI on trade (exports) suggests not to support a substitutionary relationship (Ferragina & Colacurcio, 2015). Regarding OFDI and imports nexus, empirical literatures have showed that OFDI via backward vertical integration, may give rise to imports and in turn boost the economic activities of home country. Wu & Chen (2021) study employed the SYS-GMM estimator to investigate the impact of the Chinese OFDI flows on trade (imports) intensity. Results revealed positive significant impacts which indicates complementary effects. Empirical research also showed that home country's imports, may promote the flow of investment abroad (Fan & Wang, 2020).

Based on the theoretical framework and literatures regarding international trade and OFDI relationship, potential feedback relationship between the two macroeconomic factors may lead to problem of reverse causality and simultaneity

which occur when two variables affect each other simultaneously with a reciprocal feedback loop. Other problems such as endogeneity and heterogeneity due to cross country variation effects of trade and OFDI may yield inconsistent and biased estimates. These problems may be addressed using econometric models that accounts for these issues. To this end, this study employs the two-step SYS-GMM and DFF-GMM techniques to estimate the relationship between international trade and OFDI in 161 countries based on world bank income classification such as LIC, LMIC, UMIC, and HIC for the period 1998–2019 to determine whether the macroeconomic factors exhibit complementarity or substitution effects. In addition, this study examines the effects of the 2007–2008 global financial crisis on OFDI and trade in different income groups.

3. Methodology and Data

3.1. Data description

This study uses the yearly panel dataset of 161 countries grouped according to the world bank country income classification which includes, the LIC (22 countries), LMIC (41 countries), UMIC (47 countries), and HIC (51 countries), over the period of 1998–2019. The study variables and data sources are presented in Table 1. Whilst the choice of country selection was based on the availability of dataset, variable selection was informed by the theory and analysis of previous studies (Ito et al., 2020; Kamal et al., 2019). The variables of interest are the aggregated international trade (total trade) and OFDI flows which alternate as dependent and independent variables in the model so as to capture the bidirectional causal effects in country's income clusters. However, the study controlled for certain factors that may affects the relationship between OFDI and international trade, as failure to do so, might compromise the internal validity of results, thus numerous economic factors such as GDP, INFR, and INST, were controlled for in the experimenting investment and trade models.

Figure 2 shows the cross-country correlation of different income groups on the relationship between OFDI and international trade for the period 1998–2019. OFDI and trade for LMIC, UMIC and HIC is set in-between two boundaries for vast majority of countries within the range of a minimum close to zero and a maximum close to 4 and suggests a positive contemporaneous link between OFDI and international trade. Neverthe-

less, OFDI and trade partly lies between positive and negative axis in LIC group, and the correlation trend suggests negative relationship between OFDI and international trade. This observation gives initial possible evidence of a contemporaneous relationship that does not account for observable explanatory variables including controls for time and country dimensions. In addition, it does not adjust for endogeneity and heterogeneity concerns, however these issues are tackled in our empirical analysis.

3.2. Econometric technique & model specifications

Based on theoretical background, and the empirical literatures in the relationship between OFDI and international trade as discussed in section 2, this study examines the interactions between OFDI and trade using the SYS-GMM and DFF-GMM techniques. The use of the first-difference transformation (one-step GMM) may cause internal transformation problem leading to loss of many observations (Roodman, 2009; Arella-

Table 1

Definitions of variables and data sources

Variable	Definition	Unit	Sign	Source
OFDI	The natural logarithm of foreign direct investment net outflows as a % of GDP	Constant 2010 US\$	+/-	UNCTAD (2020)
TRD	Total trade measured in natural logarithm	Constant 2010 US\$	+/-	World Bank (2020)
GDP	The real Gross Domestic product per capital (market size) in logarithm	Constant 2010 US\$	+/-	World Bank (2020)
INST	Institution composite index	Composite index	+	WGI (2020)
INFR	Overall Quality of infrastructure	Composite index	+	WEF (2019)
POP	Size of home country (total population) measured in natural logarithm	Annual	+	World Bank (2020)
GFC	Dummy 1 for year of crisis, 0 otherwise	Scale	-	Author's construction

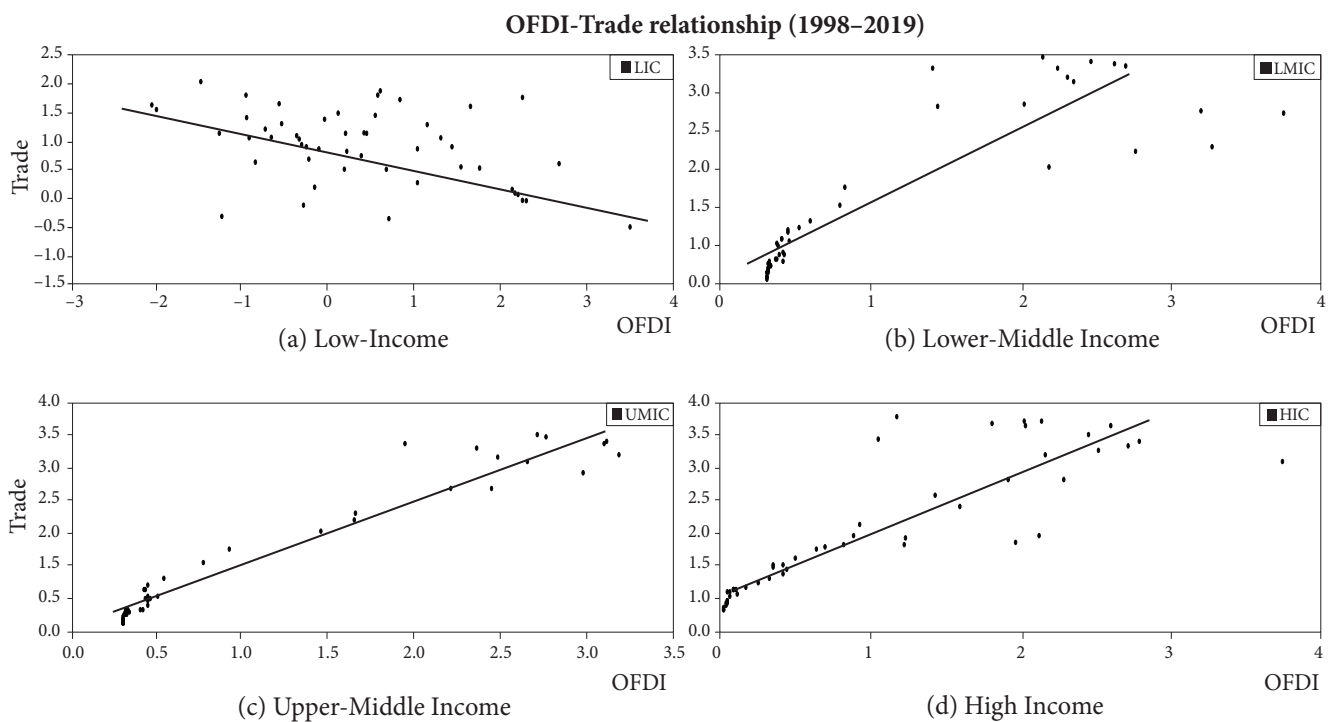


Figure 2. Shows a positive relationship between FDI outflows and total trade based on country economic income. The Horizontal line indicates natural log of FDI outflows, and the vertical line represents the natural log of Total trade

Source: Authors' calculations using data from <https://data.worldbank.org/>

no & Bover, 1995). However, this can be avoided using the second order transformation (two-step GMM), and on this account, this study employs the two-step GMM estimators to investigate the OFDI-trade relationship. We estimate the trade and investments models in logarithmic forms, except the crisis dummy (GFC) variables. Equation (1) and (2) shows the trade and investment models respectively.

Model I

$$TRD_{i,t} = \gamma TRD_{i,t-1} + \delta OFDI_{i,t} + \beta_1 GDP_{i,t} + \beta_2 INST_{i,t} + \beta_3 INFR_{i,t} + POP_{i,t} + GFC_{2007} + GFC_{2008} + \epsilon_{i,t} \quad (1)$$

$$\epsilon_{i,t} = \eta_i + u_i.$$

Model II

$$OFDI_{i,t} = \gamma OFDI_{i,t-1} + \delta TRD_{i,t} + \beta_1 GDP_{i,t} + \beta_2 INST_{i,t} + \beta_3 INFR_{i,t} + POP_{i,t} + GFC_{2007} + GFC_{2008} + \epsilon_{i,t} \quad (2)$$

$$\epsilon_{i,t} = \eta_i + u_i,$$

where $i = 1, \dots, N$ and $t = 1, \dots, T$, γ , δ , and β are parameters to be estimated. The subscript i and t denotes country and year respectively. $TRD_{i,t-1}$ and $OFDI_{i,t-1}$ is the one-period lagged country's trade and investment respectively. Model I is the Trade model applied to home country the aggregated trade for the period 1998–2019. Model II is the investment model applied to home country direct investment abroad. The term ϵ_{it} , u_i and η_i are the disturbance, the unobserved country-specific effects and unobserved time specific effects respectively.

4. Results & discussion

4.1. Description statistic

Table 2 summarizes the variables statistics applied in the study. Its shows the main variables – OFDI and TRD and other set of controlled micro-economic factors that can affect OFDI and trade relationship of home country for different income economies groups. This includes GDP, INST, INFR and POP institution and economic growth relationship. The average flow of OFDI reduces moving from HIC (1.917) to LIC (1.007), this indicates that there is higher investment outflow from high wage countries compared to poor income countries. However, standard deviation appears to be higher in LIC (0.989) compared to the other income growth. This show that volatilities is much higher in LIC than the other group of income economies. International trade volume seems to be higher in UMIC (0.737), followed by trade activities in HI (0.613), while combine volume of export and import is smallest in LIC (0.318). Expected the mean GDP is large and less volatile in HIC and least in LIC with higher volatility for the period 1998–2019. However, the mean values of the descriptive statistics for INST and INFR shows to reduce moving from HIC to LIC.

4.2. Impact of OFDI on trade across income groups

Table 3 presents the empirical results of the trade model shown in equation (1), impact of OFDI on trade across income groups such as LIC, LMIC, UMIC and HIC using the two-step SYS-GMM. The lagged trade term for all specification for income groups are positive and statistically significant, but their values are less than one. This

Table 2

Summary statistics for world bank income economies cluster 1998–2019

	High-Income			Upper-M. Income			Lower-M. Income			Low-Income		
	Obs.	Mean	St. d.	Obs.	Mean	St. d.	Obs.	Mean	St. d.	Obs.	Mean	St. d.
TRD	1122	0.613	0.372	1034	0.737	0.235	902	0.411	0.334	484	0.318	0.333
OFDI	1122	1.917	0.827	1034	1.796	0.774	902	1.499	0.892	484	1.007	0.986
GDP	1122	1.119	0.121	1034	1.176	0.521	902	0.301	0.863	484	0.297	0.767
INST	1122	0.672	0.109	1034	0.538	0.112	902	0.331	0.102	484	0.160	0.084
INFR	1122	8.911	3.400	1034	6.042	8.590	902	3.091	7.814	484	0.253	10.09
POP	1122	1.532	3.706	1034	2.314	8.573	902	3.794	11.04	484	5.334	13.66

Note:

1. Sources: Data sources is from <https://data.worldbank.org/>
2. Author's calculations

indicates that changes in the explanatory variables at a specific point in time influence the current period. According to Table 3, it can be noted that except for LIC, there is a significant positive relationship between OFDI and Trade in LMIC, UMIC and HIC. This implies that a 1% expansion of overseas production (OFDI) may increase trade by 0.093%, 0.197%, 0.200% for LMIC, UMIC and HIC respectively and indicate a complementary relationship. However, negative relationship of OFDI-trade in LIC suggests a substitutional relationship. This suggests “OFDI-supporting trade” that cause import for home country via backward vertical integration or spillover effects and stimulates export due to enhanced competitiveness with the local firms. OFDI spillover may encourage monetary development of economies through

repatriation of investment returns and facilitates technical know-how and skills to home country which improve the economy.

However, in LIC (see Table 3), the “OFDI-supporting trade” concept do not hold implying that home trade does benefit from OFDI – do not cause imports and stimulates export. In addition, the 2007 GFC is insignificant in LIC and LMIC and negatively significant in UMIC and HIC, but in 2008, results indicates that GFC affected all income groups in world economy. Model diagnostic checks of override identification (Hansen test specification) and autocorrelation tests for AR (2) do not rejects the null hypotheses and indicates that the overall performance of the trade model is satisfactory. Thus, the results in Table 3 correctly describe the relationship between OFDI-trade.

Table 3

SYS-GMM estimates of the effects of OFDI on home country’s trade

Dependent Variable: TRD	World Bank Country Income Classifications				
	Low-Income	Low-Middle	Upper-Middle	High-Income	All sample
	(1)	(2)	(3)	(4)	(5)
Lagged TRD	0.361*** (7.340)	0.286*** (11.803)	0.405*** (9.643)	0.397*** (10.747)	0.210*** (6.730)
OFDI	-0.046* (-1.670)	0.093* (1.910)	0.197** (2.396)	0.200** (1.994)	0.211*** (2.731)
GDP	0.006*** (2.830)	0.178 (1.490)	0.220* (1.680)	0.397** (2.371)	0.579*** (2.750)
INST	0.018* (2.406)	0.127*** (5.390)	0.279** (2.090)	0.313* (1.694)	0.401 (1.350)
INFR	0.009 (1.410)	0.174*** (2.584)	0.243*** (4.845.)	0.502*** (7.215)	0.585* (1.872)
POP	0.123* (1.660)	0.351** (2.130)	0.132* (1.819)	0.332 (1.450)	0.607** (2.260)
2007 (Global Fin. Crisis)	0.014 (1.000)	0.019 (1.641)	-0.093*** (-2.610)	-0.061*** (-11.080)	-0.174*** (-2.890)
2008 (Global Fin. Crisis)	-0.007* (-1.700)	-0.002** (2.065)	-0.138*** (-4.864)	-0.111*** (-9.002)	-0.103*** (-8.543)
Constant	2.005* (1.676)	1.856*** (4.563)	-2.343*** (-6.238)	-1.116*** (-3.223)	0.793* (1.948)
Year effect	Yes	Yes	Yes	Yes	Yes
Home country effect	Yes	Yes	Yes	Yes	Yes
Regional effect	Not included	Not included	Not included	Not included	Not included
Total Observation	484	902	1034	1122	3542
Instruments/Groups	21/22	27/41	26/47	33/51	67/161
Instrument ratios	1.047	1.518	1.807	1.545	2.402
Arellano-Bond (1) <i>p</i> -value	0.001	0.003	0.000	0.002	0.000
Arellano-Bond (2) <i>p</i> -value	0.183	0.347	0.298	0.643	0.353
Hansen test <i>p</i> -value	0.201	0.836	0.233	0.427	0.197

Note:

1. TRD is lagged one year, t-statistics are in parentheses.

2. Significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

3. Author’s calculation: Sources: Data sources is from <https://data.worldbank.org/> Access date (13.09.2021)

To further examine the consistency of the estimated results shown in Table 3, this study re-estimates the trade regressions model using DFF-GMM technique. The estimated coefficients are informative given that DFF-GMM estimates of lagged dependent variable is downward biased to the SYS-GMM and the technique magnifies gaps in unbalanced panels, hence it may not be consistent. Table 4 presents the estimated results of the impact OFDI on trade using the DFF-GMM estimator. The lagged trade variable is positive and statistically significant across the different income group and implies that the trade model is dynamical stable. The results suggests that OFDI provides a substitutive effect to trade in countries with low wages, but complement trade in LMIC, UMIC and HIC. This finding is consistent with the estimated results using the two-steps SYS-GMM.

The per capital GDP level across income, home country institutional framework, infrastructure development as well as population of home country shows to provide positive effects to trade across income groups which help to improve domestic economy. However, the impact of GFC dummy only shows to affect UMIC and HIC during the year 2007, but in 2008, all income groups were affected. These findings also corroborate the results of SYS-GMM estimates. Table 4 also report the diagnostic test statistics which shows that the Hansen test statistics do not reject the null hypothesis of valid over-identifying restrictions and the p-value of AR(2) test suggests that the trade regression model do not exhibit second-order serial correlation. This implies that trade model as well as the estimated results are robust and correctly describe the impact of OFDI on trade across income group.

Table 4

DFF-GMM estimates of the effects of OFDI on home country's trade

Dependent Variable: TRD	World Bank Country Income Classifications				
	Low-Income	Low-Middle	Upper-Middle	High-Income	All sample
	(1)	(2)	(3)	(4)	(5)
Lagged TRD	0.278*** (4.534)	0.213*** (5.827)	0.368*** (7.532)	0.304*** (9.561)	0.167*** (5.267)
OFDI	-0.036*** (-2.870)	0.97*** (1.731)	0.199** (2.030)	0.198*** (2.187)	0.233** (1.865)
GDP	0.015 (1.360)	0.198*** (4.050)	0.249* (1.720)	0.403 (1.237)	0.593 (0.131)
INST	0.026** (2.370)	0.138** (1.760)	0.288*** (3.531)	0.347*** (2.930)	0.418* (1.671)
INFR	0.028* (1.673)	0.187 (1.540)	0.265* (1.831)	0.519** (2.633)	0.597** (2.131)
POP	0.137 (1.334)	0.370* (1.840)	0.146** (2.330)	0.348* (1.917)	0.625* (2.190)
2007 (Global Fin. Crisis)	0.069* (2.170)	0.012 (0.860)	-0.067* (-1.880)	-0.146* (-1.870)	-0.258* (-1.930)
2008 (Global Fin. Crisis)	-0.002** (3.873)	-0.004** (-5.039)	-0.151* (-1.962)	-0.193*** (-7.116)	-0.111* (-1.873)
Constant	2.232 (1.550)	1.867*** (4.190)	-2.271* (-1.832)	1.018*** (2.920)	0.841** (2.073)
Year effect	Yes	Yes	Yes	Yes	Yes
Home country effect	Yes	Yes	Yes	Yes	Yes
Regional effect	Not included	Not included	Not included	Not included	Not included
Total Observation/Grand	484	902	1034	1122	3542
Instruments/Groups	18/22	23/41	20/47	29/51	62/161
Instrument ratios	1.222	1.782	2.350	1.758	2.596
Arellano-Bond (1) p-value	0.003	0.000	0.000	0.001	0.002
Arellano-Bond (2) p-value	0.169	0.204	0.236	0.441	0.192
Hansen test overid p-value	0.342	0.571	0.186	0.202	0.564

Note:

1. TRD is lagged one year, t-statistics are in parentheses.

2. Significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

3. Author's calculation: Sources: Data sources is from <https://data.worldbank.org/> Access date (13.09.2021)

4.3. The impact of trade on outward FDI across in income groups

Table 5 shows the results from the estimation of the investment model which examines the impact of trade on OFDI across income economic using the two-steps SYS-GMM. The impact of trade on OFDI in LIC is negative and insignificant, implying that a 1% increase in international trade will decrease OFDI flow to foreign countries by 0.103% but the effect is insignificant. Regarding other income groups such as LIMC, UMIC and HIC, findings shows that the coefficient of the relationship is positive which suggests the existence of “trade supporting OFDI” effects which stimulates domestic investment to increase scale of production and upgrade technologies for home countries. The evidence shows that a 1% in-

crease in home trade leads to overseas production expansion (OFDI) by 0.162%, 0.340%, and 0.544% respectively for LIMC, UMIC and HIC. Trade facilitate OFDI to exploit relative factor costs difference in abroad to improve produce and raise capital back home and improve the economy. Finding shows that trade complements OFDI more in the countries with high income compared to other income group, and closely followed by UMIC.

Other remaining variables in the investment model are quite satisfactory. For instance, the GDP, institutions, infrastructure development and population are positive and significant in all income economic groups. This implies that these variables provide supports for domestic trade impact on OFDI. In addition, the statistically significant coefficients of GFC dummy, shows that the

Table 5

SYS-GMM estimates of the effects of home country trade on OFDI

Dependent Variable: OFDI	World Bank Country Income Classifications				
	Low-Income	Low-Middle	Upper-Middle	High-Income	All sample
	(1)	(2)	(3)	(4)	(5)
Lagged OFDI	0.164** (2.130)	0.183*** (2.642)	0.201*** (7.921)	0.147* (1.694)	0.105*** (6.610)
TRD	-0.103 (-1.660)	0.162*** (3.512)	0.340*** (11.453)	0.544*** (2.410)	0.493*** (8.947)
GDP	0.026* (1.790)	0.181** (2.503)	0.320* (1.860)	0.413* (1.670)	0.602** (2.207)
INST	0.008 (1.497)	0.274* (1.657)	0.316* (1.940)	0.507*** (3.335)	0.516 (1.430)
INFR	0.113** (2.010)	0.240* (1.900)	0.456*** (2.550)	0.553 (1.380)	0.376* (1.704)
POP	0.143** (2.370)	0.270* (1.782)	0.335 (1.340)	0.281* (1.687)	0.432 (0.430)
2007 (Global Fin. Crisis)	-0.058* (1.850)	-0.021 (-1.062)	-0.097* (-1.750)	-0.088** (-2.141)	-0.125* (-1.801)
2008 (Global Fin. Crisis)	-0.078 (-0.200)	-0.188*** (-2.590)	-0.115 (-0.120)	-0.156* (-1.740)	-0.107** (-2.400)
Constant	-3.200*** (-4.271)	-3.174 (-1.160)	-1.638* (1.670)	2.301*** (3.744)	2.743* (1.889)
Year effect	Yes	Yes	Yes	Yes	Yes
Home country effect	Yes	Yes	Yes	Yes	Yes
Regional effect	Not included	Not included	Not included	Not included	Not included
Total Observation/Grand	484	902	1034	1122	3542
Instruments/Groups	20/22	29/41	24/47	30/51	53/161
Instrument ratios	1.000	1.413	1.958	1.700	3.037
Arellano-Bond (1) <i>p</i> -value	0.000	0.000	0.000	0.001	0.000
Arellano-Bond (2) <i>p</i> -value	0.372	0.288	0.197	0.402	0.253
Hansen test overid <i>p</i> -value	0.444	0.176	0.252	0.387	0.504

Note:

1. TRD is lagged one year, t-statistics are in parentheses.

2. Significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

3. Author's calculation: Sources: Data sources is from <https://data.worldbank.org/> Access date (13.09.2021)

2007 and 2008 global financial crisis affects OFDI internationalization activities in all economic group, but the crisis appears to deteriorate in 2008 compared to the year 2007. The p values of Hansen tests of over identification and AR (2) autocorrelation tests showed insignificant and do not reject the null hypothesis (see Table 5).

Table 6 shows the results from the investment model using the DFF-GMM estimator. Trade shows to substitutes investment in LIC and LMIC but complements UMIC and HIC groups. Substitutive effects of trade could be due to large national disadvantage which may temporary affect MNCs investments. Thus, domestic firm may export goods and services along investment to foreign country. This can also occur when MNCs

relocates abroad due to numerous reasons such as political instability, etc. Except population in LIC which is negative, the results of the other controlled variables are positive and significant which help in stimulating home country trade and OFDI activities. The coefficients of GFC dummy indicates that the financial crisis affected OFDI internationalization activities at different level of income economies in the 2007 and 2008. This results also validate the SYS-GMM estimation on the effect of GFC on OFDI shown in Table 5. However, the overall performance of the investment model based on the diagnostic test statistics (Hansen and AR (1) and (2) tests) is satisfactory which indicates robustness of the estimated coefficients.

Table 6

DFF-GMM estimates of the effects of home country trade on OFDI

Dependent Variable: OFDI	World Bank Country Income Classifications				
	Low-Income	Low-Middle	Upper-Middle	High-Income	All sample
	(1)	(2)	(3)	(4)	(5)
Lagged OFDI	0.105* (1.670)	0.168*** (7.390)	0.188** (2.430)	0.129*** (3.203)	0.101** (2.250)
TRD	-0.100** (-2.230)	-0.171*** (-2.790)	0.387*** (5.000)	0.567*** (4.980)	0.465*** (6.610)
GDP	0.058** (2.770)	0.194* (1.680)	0.333*** (4.360)	0.441* (1.673)	0.621 (0.870)
INST	0.011* (1.652)	0.283 (1.510)	0.323** (2.460)	0.513 (0.410)	0.527** (2.170)
INFR	0.121** (2.690)	0.252*** (2.810)	0.418 (0.870)	0.556*** (3.050)	0.395* (1.910)
POP	-0.145 (-0.110)	0.273 (0.680)	0.347* (1.658)	0.293** (2.570)	0.439*** (2.960)
2007 (Global Fin. Crisis)	-0.036* (1.790)	-0.019*** (4.010)	-0.103** (2.160)	-0.074*** (4.510)	-0.108** (2.105)
2008 (Global Fin. Crisis)	-0.081** (1.982)	-0.169* (-1.890)	-0.122* (-1.970)	-0.147** (2.130)	-0.090* (-1.920)
Constant	1.375 (1.130)	4.128* (1.930)	3.235* (1.690)	-1.621** (-2.061)	2.550* (1.760)
Year effects	Yes	Yes	Yes	Yes	Yes
Home country effects	Yes	Yes	Yes	Yes	Yes
Regional effects	Not included	Not included	Not included	Not included	Not included
Total Observation/Grand	484	902	1034	1122	3542
Instruments/Groups	20/22	28/41	22/47	26/51	49/161
Instrument ratios	1.100	1.464	2.136	1.961	3.285
Arellano-Bond (1) p-value	0.001	0.000	0.000	0.000	0.002
Arellano-Bond (2) p-value	0.189	0.373	0.329	0.504	0.293
Hansen test overid p-value	0.211	0.521	0.173	0.284	0.447

Note:

1. TRD is lagged one year, t-statistics are in parentheses.

2. Significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

3. Author's calculation: Sources: Data sources is from <https://data.worldbank.org/> Access date (13.09.2021)

5. Conclusions

This study examined the linkages between direct investments abroad and home country's trade based on the world bank income clusters (the low-income, lower-middle income, upper-middle income, and high-income) over the period 1998–2019. To account for numerous econometric issues, the SYS-GMM and DFF-GMM techniques are utilized. Empirical results provide new insight which are highly significant but sensitive to different economic income category.

Finding reveals that the impact of OFDI from countries with low wage is negative and significant to the home country's trade, but the reverse effect is insignificant. This indicates that OFDI from these countries substitute domestic trade, and this can be due to many reasons, for instance: Local firms may lack the necessary financial strength for business competitiveness, hence MNCs internationalization activities (OFDI) may substitute trade. MNCs diversify investment in low-income countries due to poor business performance as low-income economies are associated with poor economic indicators. However, in other income groups such as low-middle, upper-middle and high-income countries, OFDI and international trade are mutually complementary which improve home country economy. This suggests that MNCs could be resources-seeking vertical FDI, driven with the desire to exploit factor price differences

or market-seeking FDI which tend to repatriate investment returns to improve domestic production. Regarding the impact of 2007–2008 global financial crisis on trade and OFDI across different income groups, findings show that contrary to other income group with negative impact, international trade in low-income and low-middle income countries were not affected by GFC in 2007. Nevertheless, trade and investments in all income categories were affected negatively in 2008.

The study provides several policy implications. In low-income countries where OFDI substitute trade, policymakers should synergize with the relevant government agencies to enact appropriate trade-investment policies as well as provide incentives to support and encourage domestic firm to adequately compete with foreign companies. More funds should be injected into the domestic economy to revamp infrastructure development, institutions, technological upgrading, etc. to facilitate OFDI and trade. In addition, relevant government agencies should monitor firm's internationalization activities to comply with the trade-investment policies of home countries, to ensure that “going abroad” do hollow-out the economy, as this will strengthen and protect the local industries. However, in other income groups, government must sustain policies that provides mutually complementary relationship that stimulates the domestic economy.

References

- Ahmad, F., Draz, M.U., & Yang, S.-C. (2016). A novel study on OFDII and home country exports: implications for the ASEAN region. *Journal of Chinese Economic and Foreign Trade Studies*, 9(2), 131–145.
- Anderson, J.E., Larch, M., & Yotov, Y.V. (2019) Trade and investment in the global economy: A multi-country dynamic analysis. *European Economic Review*, 120, 103311.
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error components models. *Journal of Econometrics*, 68(1), 29–51. [https://doi.org/10.1016/0304-4076\(94\)01642-Ds](https://doi.org/10.1016/0304-4076(94)01642-Ds)
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and application to employment equations. *The Review of Economic Studies*, 58(2), 277–297. <https://doi.org/10.2307/2297968>
- Albulescu, C.T., & Goyeau, D. (2019). The interaction between trade and FDI: The CEECs experience. *Inter. Econ and Econ Policy*, 16(3), 489–509.
- Ali, U., Li, Y., Wang, J.-J., Yue, X., & Chang, A.-C.J. (2021). Dynamics of outward FDI and productivity spillovers in logistics services industry: Evidence from China, *Transportation Research Part E: Logistics and Transportation Review*, 148, 102258
- Araujo, J.D., David, A.C., Van Hombeeck, C., & Papageorgiou, C. (2017). Non-FDI Capital Inflows in Low-Income Countries: Catching the Wave? *IMF Economic Review*, 65(2), 426–465.
- Breitung, J. (2000). The local power of some unit root tests for panel data. *Advances in Econometrics*, Volume 15: Nonstationary Panels, Panel Cointegration, and Dynamic Panels, ed. B.H. Baltagi, pp. 161–178. Amsterdam: JAY Press.

Buckley, P.J., & Casson, M. (1981). The optimal timing of a foreign direct investment. *Economic Journal*, 91(361), 75–87.

Bhasin, N., & Paul, J. (2016). Exports and outward FDI: are they complements or substitutes? Evidence from Asia. *Multinational Business Review*, 24(1), 62–78.

Borghesi, S., Franco, C., & Marin, G. (2020). Outward Foreign Direct Investment Patterns of Italian Firms in the European Union's Emission Trading Scheme. *Scandinavian Journal of Economics*, 122(1), 219–256.

Brainard, S. (1997). An empirical assessment of the proximity-concentration trade-off between multinational sales and trade. *American Economic Review*, 87.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)

Brana, S. (2016). International trade, FDI and growth: some Interactions Introduction to the special issue, *International Economics*, 145, 1–6.

Chen, Z., & Fang, T. (2016). Chinese Returnees and High-Tech Sector Outward FDI: The Case of Changzhou. *Asian Economic Papers*, 15(3), 195–215.

Chiappini, R. (2016). Do overseas investments create or replace trade? New insights from a macro-sectoral study on Japan. *Journal of International Trade and Economic Development*, 25(3), 403–425.

Dunning, J. (1980). Towards an eclectic theory of international production: some empirical tests. *Journal of International Business Studies*, 11(1), 9–31. <https://doi.org/10.1057/palgrave.jibs.8490593>

Ferragina, A., & Colacurcio, C. (2015). Italian FDI and exports at sectoral level: Substitutes or complements? *Global Economy Journal*, 15(2), 277–310.

Fan, X., & Wang, L. (2020). The influence of China's import on its OFDII location. *Transformations in Business and Economics*, 19(3), 418–430.

Fontagné, L., & Pajot, M. (1997). How Foreign Direct Investment Affects International Trade and Competitiveness: an Empirical Assessment, CEPII, document de travail n° 97-17

Gusarova, S. (2019). Role of China in the development of trade and FDI cooperation with BRICS countries. *China Economic Review*, 57, 101271.

Greaney, T., & Kiyota, K. (2020). Japan's outward FDI potential. *Journal of the Japanese and International Economies*, 57, 101073.

Goh, S.K., Wong, K.N., & Tham, S.Y. (2013). Trade linkages of inward and outward FDI: Evidence from Malaysia. *Economic Modelling*, 35, 224–230. <https://doi.org/10.1016/j.econmod.2013.06.035>

Herzer, D. (2011). The long-run relationship between outward foreign direct investment and total factor productivity: Evidence for developing countries. *Journal of Development Studies*, 47(5), 767–785.

Head, K., & Ries, J. (2004). Exporting and FDI as alternatives strategies, *Oxford Review of Economic Policy*, 20(3), 409–423. <https://doi.org/10.1093/oxrep/grh024>

Helpman, E., & Krugman, P. (1985). Market structure and foreign trade. MIT Press, Cambridge.

Huang, C.-H., Teng, K.-F., & Tsai, P.-L. (2016) Inward and Outward Foreign Direct Investment and Inequality: Evidence from a Group of Middle-Income Countries. *Global Economy Journal*, 16(3), 511–538.

Ito, M., Matsuura, T., & Yang, C.H. (2020). Revisiting Complementarity between Japanese FDI and the Import of Intermediate Goods: Agglomeration Effects and Parent-firm Heterogeneity. *Asian Economic Papers*, 19(3), 90–106. https://doi.org/10.1162/asep_a_00789

Joshua, U., Rotimi, M.E., & Sarkodie, S. A., (2020). Global FDI Inflow and Its Implication across Economic Income Groups, *Journal of Risk Financial Management*, 13(11), 291. <https://doi.org/10.3390/jrfm13110291>

Knoerich, J. (2017). How does outward foreign direct investment contribute to economic development in less advanced home countries? *Oxford Development Studies*, 45(4), 443–459. <https://doi.org/10.1080/13600818.2017.1283009>

Lipse, R.E. (2002). Home and host country effects of FDI. *NBER Working Paper No. 9293*.

Liu, W.-H., Tsai, P.-L., & Tsay, C.-L. (2015). Domestic impacts of outward FDI in Taiwan: Evidence from panel data of manufacturing firms. *International Review of Economics & Finance*, 39, 469–484. <https://doi.org/10.1016/j.iref.2015.07.011>

Liu, Z., Xu, Y., Wang, P., & Akamavi, R. (2016). A pendulum gravity model of outward FDI and export. *International Business Review*, 25(6), 1356–1371.

Li, Q., Lee, S., & Park, S.W. (2020). The effect of inward and outward foreign direct investment on regional innovation performance: Evidence from China. *Global Business and Finance Review*, 25(1), 65–88.

Li, C., Liu, C., & Zhao, J. (2020). The effects of inward and outward foreign direct investment on manufacturing export sophistication in China. *Applied Economics Letters*.

Li, J. (2019). Export Sophistication and Outward FDI in Developing Countries, *Journal of International Commerce, Economics and Policy*, 10(3).

Levin, A., Lin, C., & Chu, C. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108, 1–24.

Mitze, T., Alecke, B., & Untiedt, G. (2010). Trade-FDI linkages in a simultaneous equations system of gravity models for German regional data. *International Economics*, 122(2), 121–162.

Markusen, J.R. (1984). Multinationals, multi-plant economics, and the gains from trade. *Journal of International Economics*, 16, 205–226.

Mundell, R.A., (1957). International trade and the factor mobility. *American Economic Review*, 47, 321–335.

Osabuohien-Irabor, O., & Drapkin, I. M. (2021). Outward FDI & International Trade: The study of causal effects. 15th Economics & Finance Virtual Conference, Prague. <https://doi.org/10.20472/EFC.2021.015.012>

Osabuohien-Irabor, O., & Drapkin, I.M. (2022). The Impact of Technological Innovation on Energy Consumption in OECD Economies: The Role of Outward Foreign Direct Investment and International Trade Openness. *International Journal of Energy Economics and Policy*, 12(4), 317–333.

Rehman, F.U., & Noman, A.A. (2021). China's outward foreign direct investment and bilateral export sophistication: a cross countries panel data analysis. *China Finance Review International*.

Tham, S.Y., Khoon Goh, S., Wong, K.N., Fadhli, A. (2018). Bilateral Export Trade, Outward and Inward FDI: A Dynamic Gravity Model Approach Using Sectoral Data from Malaysia. *Emerging Markets Finance and Trade*, 54(12), 27.

Wu, Y., & Chen, C. (2021). The Impact of China's Outward Foreign Direct Investment on Trade Intensity with Belt and Road Countries. *Emerging Markets Finance and Trade*, 57(6), 1773–1792. <https://doi.org/10.1080/1540496X.2019.1646124>

Wang, F., Liu, J., & Su, C. (2017). Outward foreign direct investment and export performance in China. *Canadian Public Policy*, 43, 572–587.

Yang, C.-H., Cheng, M.-C., & Lin, C.-H. (2015). What drives China's outward direct investment? *Acta Oeconomica*, 65(3), 431–453.

Yamashita, N., & Fukao, K. (2010). Expansion abroad and jobs at home: Evidence from Japanese multinational enterprises. *Japan and the World Economy*, 22(2), 88–97.

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ARTICLE INFO: received May 28, 2022; accepted September 7, 2022

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ИНФОРМАЦИЯ О СТАТЬЕ: дата поступления 28 мая 2022 г.; дата принятия к печати 7 сентября 2022 г.

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