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Abstract

Developing and transition economies are an increasingly important source of outward foreign direct investment (OFDI). The objective of this paper is to fill the gap in the literature regarding outward foreign direct investment by adopting the well known gravity model to examine the relationship between trade (export and import), inward and outward FDI using Malaysia as a case. This contributes to the literature as previous studies on OFDI in Malaysia have focused primarily on the determinants of these outward flows, and there are no studies examining the impact of OFDI on trade. Our findings reveal that inward foreign direct investment (IFDI) conforms to the observed pattern of a complementary relationship between FDI and trade while OFDI and trade linkages are not significant. The empirical results also indicate that Malaysia has yet to follow the trajectory of developed economies in its shift from being a net capital importer to a capital exporter due to the lack of trade linkages between OFDI and trade. This further implies that the country may not be able to reap the potential benefits of OFDI that accrue through efficiency gains from specialization and scale advantages that are generated through trade channels.

JEL classification codes: F21
Keywords: Outward FDI, trade, multinationals, Malaysia

1. Introduction

1 Corresponding author’s e-mail: skgoh@usm.my. The authors would like to acknowledge the financial assistance from a research grant 304/CDASAR/6310074, Universiti Sains Malaysia. Helpful suggestions were received from Lui Haoming (National University Singapore). The usual disclaimer, however, applies.
In the literature, the trade effects of outward foreign direct investment (OFDI) are based primarily on the experiences of multinational enterprises (MNEs) from developed countries. However, there are some notable changes in the global OFDI landscape, namely, a shift towards services, with mergers and acquisitions (M&A) being the most common entry modes (UNCTAD 2004; 2008). This shift reflects the deregulation of services in many host countries as well as the proximity burden in services as producers and consumers generally have to be in the same locality, although there is increasing cross border tradability of some services with the use of information and communications technology (ICT). Another major change in the trend in global OFDI, as reported by UNCTAD (2011), is the increasing prominence of MNEs from developing and transition economies (DTEs) due to increasing globalization on the one hand, and falling barriers to trade and investment on the other. According to the World Investment Report 2011, outward investors from DTEs contributed 29 per cent to global FDI outflows in 2010. In particular, developing economies predominantly from Southeast Asia have become an emerging source of OFDI within and outside the region (UNCTAD, 2011). Malaysia’s OFDI, as in the case of some of these developing economies, is also increasing over time (Bank Negara Malaysia 2009; Ramasamy et al., 2012). According to UNCTAD statistics, Malaysia’s total approved nominal OFDI increased from US$115 million in 1992 to US$8,038 million in 2009, leading to a growth of 6,890 per cent over a span of 17 years. In fact, outflows of FDI have exceeded inflows since 2007 resulting in a shift in Malaysia’s position from a net capital importer to net exporter of capital.

The major impetus to the increasing outflows of capital from Malaysia can be attributed to progressive trade liberalization in the region, the search for new and expanding markets of major host countries (like the People’s Republic of China), the strengthening of the ringgit against the US dollar, and the Malaysian government’s liberal policy on capital outflows (Goh and Wong, 2011). However, at the same time, international trade is also an important component of Malaysia’s economic structure with trade constituting 176% of the country’s Gross Domestic Product (GDP) in 2010. A significant part of this trade is contributed by the multinationals operating in Malaysia and the region as Malaysia is also an important host

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2 It is obtained from UNCTAD’s statistical databases at: http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx?sRF_ActivePath=P.5,27&sRF_Expanded=P.5,27
economy, despite its declining attractiveness as a destination country for FDI since the Asian Financial Crisis (AFC). Consequently, the drastic increase in Malaysia’s OFDI has raised concerns about the impact of these cross border direct investment activities on the country’s trade, especially whether they promote or substitute trade since theoretically both impacts are possible (UNCTAD 2006).

Based on the investment development path (IDP) theory, the OFDI and inward FDI (IFDI) position of a country is correlated with its stage of economic development. A country thus moves from stage 1, or the “least developed stage” where the country is a net IFDI receiver to stage five, or the “developed” stage where both inward and outward stocks of capital are about the same (Dunning and Narula 1996). Since Malaysia’s inward stock of FDI in 2010 is USD101 billion while its outward stock is USD97 billion (UNCTAD 2011), it is expected that Malaysia is close to stage 4, based on this theory. This evolution is supposed to occur when local firms have acquired firm-specific advantages that allow them to engage in OFDI. But it is unclear whether the parent companies of Malaysia’s OFDI will maintain linkages with their foreign affiliates through intra-firm trade as experienced by the OFDI of the developed countries.

The literature indicates that much of this depends on the motivation of the MNEs for entering a foreign market as well as industry characteristics and the tradability of the goods and services produced in that industry (UNCTAD 2006; Agarwal undated). In general, both market-seeking and efficiency-seeking OFDI may affect trade positively as affiliates may rely on the parent company for the import of capital and intermediate goods. Non-tradable services are expected to have limited trade effects. A closer examination of the sectoral distribution of OFDI in Malaysia reveals that the largest sector of OFDI is the services sector, with government-linked companies (GLCs) leading these outward flows, followed by oil and gas while the manufacturing sector takes a third place (BNM, 2009). Nevertheless, as more services are traded, process fragmentation is also emerging, with low-wage activities being sliced away and outsourced (Christen and Francois 2009), thereby raising the possibility of intra-firm trade in services.

Given the above, this paper adopts the well known gravity model to examine the relationship between trade (export and import), inward and outward FDI. This adds on to the literature on
OFDI as past studies on OFDI in Malaysia have focused primarily on the determinants of these outward flows while there are no studies examining the impact of OFDI on trade (see for example Ragayah, 1999; Sim, 2005; Globerman and Shapiro 2006; Tham, 2007; Ariff and Lopez, 2008; Kueh et al., 2008; Wong 2010; and Goh and Wong, 2011). Moreover, the literature on the impact of OFDI focuses more on the developed world rather than DTEs even though the latter economies are increasingly investing outside their home countries at an earlier stage of their development (UNCTAD 2006; Globerman and Shapiro 2006). This study aims to fill this gap.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 specifies the model for the panel data analysis. It also describes the data and discusses the appropriate methodology to undertake this empirical study. The estimation results are reported and analyzed in Section 4 followed by conclusions and policy implications in Section 5.

2. Review of the Literature

Historically, industrialized countries are the main sources of global FDI outflows. One of the major effects of FDI is its impact on international trade. In theory, FDI may substitute or complement trade. In the early literature, Mundell (1957) used a theoretical model to demonstrate that FDI and exports are substitutes for each other. However, subsequent theoretical developments have shown that it is possible to have either a substitutionary or complementary relationship between FDI and trade, depending on the nature of the investment. Thus, for example, Markusen (1984) and Markusen and Venables (1995) showed that horizontal FDI are market-seeking or these firms expand overseas to avoid trade costs, leading to a substitutionary relationship with trade. On the other hand, Helpman (1984) and Helpman and Krugman (1985) showed the possibility of a complementary relationship when vertical FDIs are involved due to the fragmentation of the production process geographically. This results in the location of different stages of production in host economies that offer the best cost advantages for a particular stage of production.

Empirical studies on the relationship between OFDI and trade have been undertaken at different levels, viz. country level (i.e., based on bilateral trade data e.g. Grubert and Mutti
(1991); Clausing, (2000)), industry level (i.e., based on cross-section data by industry e.g., Lipsey and Weiss (1981); Brainard (1997); Kawai and Urata (1998)), firm level (i.e., based on U.S. MNEs e.g., Lipsey and Weiss (1984)) as well as product level (i.e., based on disaggregated export data e.g., Blonigen (2001)). In general, there is no consensus on the trade effects of OFDI based on the empirical literature as positive and negative relationships have been found in different studies. For example, some studies supporting the proposition that OFDI is a substitute for trade are by Horst (1972), Svensson (1996), Bayoumi and Lipworth (1997) and Ma et al. (2000), to name a few. The findings by Horst (1972) confirmed that OFDI is often viewed as a replacement for home exports for U.S. manufacturing firms if they were to produce for the Canadian markets. Grubert and Mutti (1991), who used bilateral trade data, however, found that OFDI from the U.S. promoted home exports and imports. Amiti et al. (2000) pointed out that the relationship between trade and FDI is not a straightforward one as a substitutionary relationship tends to take place if a horizontal OFDI occurs between countries that are similar in terms of relative endowments and size, and when trade costs are moderate to high. Otherwise, vertical OFDI is likely to dominate arising from intra-firm trade within the MNEs. Findings that advocate the complementary relationship between OFDI and trade are by Lipsey and Weiss (1981; 1984), Helpman (1984), Blomström et al. (1988), Grossman and Helpman (1989), Brainard (1993; 1997), Lin (1995), Graham (1996), Pfaffermayr (1996), Clausing (2000), Head and Ries (2001) and Hejazi and Safarian (2001). Moreover, Lim and Moon (2001) asserted that OFDI would have a positive effect on home country exports if the foreign subsidiaries were located in less developed countries, or if they were relatively new, and in a declining home industry. Furthermore, Goldberg and Klein (1999) and Bronigen (2001) showed mixed evidence in that OFDI had both the substitution and complementary effects on trade.

A common model used to test the relationship is an FDI-augmented gravity model\(^3\), where inward and outward FDI are added as an additional determinant of trade (Ahn et al. undated). For example, the standard gravity model\(^4\) postulates that trade between two countries are determined positively by each country’s GDP, and negatively by the distance between them. Following this study, other researchers augmented the gravity model by including population,

\(^3\) Bayoumi and Eichengreen (1997) note that “the gravity equation has long been the workhorse for empirical studies on the pattern of trade”

\(^4\) The gravity model was developed by Tinbergen (1962) and Poyhonen (1963) and has become an essential tool in the simulations if international trade flows.
per capital income, trade arrangement, common language, and historical and cultural ties between countries, which could potentially influence the intensity of trade between countries. The analysis is then extended to take OFDI and IFDI into account as additional determinants of trade. This will indicate whether trade and FDI are substitutes or complements after controlling for comparative advantage (Hejazi and Safarian, 2001; Ellingsens et al., 2006). The gravity model has also been extensively used in the trade literature to examine several trade issues such as ascertaining, for example, the impact of trade liberalization, a currency union and FDI on trade flows (Frankel, 1997; Rose, 2000).

Based on the above review, we have found that the economic relationship between OFDI and trade falls into three main categories: substitution, complementary and mixed. The type of economic relationship between OFDI and trade is dependent on the domestic firms’ strategies to invest abroad e.g., horizontal investment (i.e., seeking to get better access to foreign market by relocating home production to foreign production), vertical (i.e., seeking to take advantage of cheap factors of production abroad by establishing a subsidiary in the host economy) or both. However, in the case of OFDI in the services sector, which is generally market-seeking FDI, there may be limited impact on exports although it is now possible to increase efficiency by relocating certain segments of production of services.

3. Model Specification, Data and Methodology

3.1 Model Specification

The gravity model for the current empirical analysis can be written as:

$$\ln X_{ij} = \beta_0 + \beta_1 \ln [Y_i Y_j] + \beta_2 \ln [P_i P_j] + \beta_3 \ln D_{ij} + \beta_4 \ln O_{ij} + \beta_5 \ln I_{ij} + \beta_6 \ln L_{ij} + \epsilon_{ij} \quad (1)$$

$$\ln M_{ij} = \alpha_0 + \alpha_1 \ln [Y_i Y_j] + \alpha_2 \ln [P_i P_j] + \alpha_3 \ln D_{ij} + \alpha_4 \ln O_{ij} + \alpha_5 \ln I_{ij} + \alpha_6 \ln L_{ij} + \epsilon_{ij} \quad (2)$$

Equations (1) and (2) state that the volume of exports ($X$) and imports ($M$) between pairs of countries $i$ and $j$ are a function of their income or GDP ($Y$), population ($P$), distance ($D$), outward FDI ($O$) and inward FDI ($I$), and language ($L$). It is expected that income is one of
the major determinants of bilateral trade because it is treated as the country’s potential trade. For instance, it is considered as productive capacity for the exporting country (refer to Equation 1) and as absorptive capacity for the importing country (refer to Equation 2) (Sohn, 2005). Hence, exports and imports are positive functions of income. Similarly, exports and imports are also positive functions of population. For instance, if the population of a trading partner country \( j \) increases, it has a tendency to increase the exports of the trading partner country \( i \) (and likewise for import) because a larger population of an exporting country can also be interpreted as a bigger market for imported goods as well. However, distance, which is a proxy for transaction costs (e.g. transport costs), is negatively related to both exports and imports. For instance, other things being equal, the longer the distance between two countries, the higher is the transport costs, which could in turn be an impediment to trade. In this study, we can use the absolute geographical distance variable (i.e. the distance between capitals of countries) as a proxy for the economic center for a country to measure distance. With reference to the likely effects of the OFDI (or IFDI) variable on bilateral trade, it can either be complementary or substitutionary. For instance, if the foreign affiliates of domestic (or foreign) firms use home inputs (e.g. intermediate exports or intermediate imports) for production in host (or home) economies, then export (or import) is a positive function of OFDI (or IFDI). On the other hand, if domestic production e.g. exports of final goods and services (or imports of final goods and services) have been entirely relocated abroad (or home economy), then export (or import) is a negative function of OFDI (or IFDI). However, OFDI (or IFDI) will tend to increase import (or export) if foreign affiliates of domestic (or foreign) firms provide backward (or forward) linkages when inputs are being imported from abroad (or exported back to the home countries of foreign firms). Concerning variables such as language, this can be handled by a dummy variable, which assumes the value of one if both countries speak the same language (i.e. Malay, English and Chinese); otherwise, they take the value of zero. According to Bussiers (2006), countries sharing the same language not only tend to have lower transaction cost to trade but are also instrumental in establishing trade ties between them.

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5 Bergstrand (1989), who derived the gravity equation, showed that the exports of a bilateral trade depend not only on income but also on per capita income. Per capita income represents the income level or purchasing power of exporting and importing countries. However, in view of the fact that per capita income may strongly correlate with the income variable, the population is used as an explanatory variable instead of per capita income.
3.2 Data

The data consist of 59 countries from 1991 to 2009 and the selection of these countries is based on the availability of the OFDI and IFDI data. The aggregate data for OFDI and IFDI are retrieved from the Monthly Statistical Bulletin, Bank Negara Malaysia (BNM). The bilateral trade data are provided by the International Monetary Fund’s Direction of Trade Statistics (IMF DOTs). GDP as well as population are taken from the World Bank, while the distance variable data comes from CEPII database. All the raw data are converted into real terms before they are transformed into natural logarithms.

This study makes use of panel data by pooling the time series (1991 to 2009) with cross-sectional (59 countries) data. The use of panel data is appropriate here since we can increase the data point and the degree of freedom, thereby providing a more robust estimate. The panel data is unbalanced due to some missing bilateral investment data in BNM Monthly Statistical Bulletin.

3.3 Methodology

Based on the panel data, the gravity model can be estimated by pooled ordinary least square (POLS), fixed-effects (FE), random-effects (RE), and the Hausman-Taylor (HT) methods. One caveat of the pooled regression is that it assumes homogeneity for all countries which does not permit control of the effects of the specific country. This may lead to bias estimates due to a correlation between the explanatory variables and unobservable effects (see Cheng and Wall, 2005). In contrast, the FE method introduces the country specific effect by estimating different intercepts for each pool member country. Its major benefit is that it always provides consistent estimates regardless of correlation between the specific effects and the explanatory variables. As for the RE method, which is based on Generalized Least Squares (GLS) estimator that takes time series as well as the cross-sectional dimension of the data into account, it treats intercepts as random variables across the pooled member countries. As a result, it can provide efficient estimates especially when there is little time-series

\[^6\text{It is noted that using aggregate data is prone to aggregation bias in the regression estimates as the impact of OFDI and IFDI on trade may vary at the sector level. However, the actual data is not available at the sectoral level. As a result, the present study is based on aggregated bilateral investment and trade data.}\]
variation. However, biased and inconsistent estimates are likely to occur if the specific effect is correlated to some of the explanatory variables. Hence, it is necessary to test the presence of this bias by using the Hausman test, which has a $\chi^2$ distribution under the null hypothesis of no correlation between the individual effects and the regressors. If the calculated test statistic rejects the null hypothesis, this suggests that the FE method is more efficient than the RE method. Even so, the common language dummy variable and the distance variable (that do not vary over time) as shown in Equations (1) and (2) cannot be estimated by the FE method because they will be crossed out by the fixed effect transformation.

As an alternative to both the FE and RE, Egger (2002 and 2005) proposes using the Hausman and Taylor (1981) estimator (hereafter, HT), which uses instrumental variables in lieu of the time invariant variables, and the instruments can include some of the explanatory variables in the model.\(^7\) Egger (2005) asserts that the HT method can produce consistent and efficient estimates for the time-invariant variables if the fixed effects are not correlated with a subset of the explanatory variables.

Hausman and Taylor (1981) categorized the explanatory variables into four categories: $X^{1}_{it}$ are the variables that are time varying and uncorrelated with $\alpha_{i}$ and $\eta_{it}$; $X^{2}_{it}$ are time varying and correlated with $\alpha_{i}$ but not $\eta_{it}$, $Z^{1}_{i}$ are time variant and uncorrelated and $Z^{2}_{i}$ are time invariant and correlated with $\alpha_{i}$. The specification of the model is as follows:

$$Y_{it} = \beta_0 + \beta_1 X^{1}_{it} + \beta_2 X^{2}_{it} + \gamma Z^{1}_{i} + \gamma Z^{2}_{i} + \alpha_{i} + \eta_{it}$$

where $\alpha_{i}$ is the country specific component and $\eta_{it}$ is the idiosyncratic error.

The correlation of $X^{2}_{it}$ and $Z^{2}_{i}$ with $\alpha_{i}$ is the cause of the bias in the RE estimator. The strategy proposed by HT is to use information already contained in the model to instrument for these two variables, $X^{2}_{it}$ and $Z^{2}_{i}$. The $X^{2}_{it}$ regressors are instrumented by the deviation from individual means (as in the Fixed Effect approach) and the $Z^{2}_{i}$ regressors are

\(^7\) As pointed out by Rault et al. (2009), the HT estimator does not require the use of external instruments (i.e. not from the original specification of the model). Hence, the difficulties in suitable external instrumental variables can be avoided.
instrumented by the individual average of $X^i_n$ regressors. The model is identified when the number of $X^i$ is greater than the number in $Z^2$. In addition, there must be sufficient correlation between the instruments variables ($X^i$ and $Z^i$) and $Z^2$ in order to avoid a weak instrument problem. The selection of the variables that should be included in $X^2$ and $Z^2$ is not obvious. Since our objective is to address the endogeneity of inward and outward FDI with trade, we consider these two variables to be correlated with $\alpha_i$. However, the product of GDP and product of population are considered to be exogenous.\footnote{The other reason that we incorporate the product of GDP as $X^i$, the exogenous time varying variable, is we found from the correlation matrix, that the product of GDP is the most correlated variable with distance, hence, provides a good instrumental variable for $Z^2$.} The time-invariant endogenous variable $Z^2_i$ is the distance between the countries.

4. Empirical Results

The estimated results are reported in Table 1. The second and sixth columns in the table show the coefficients of the gravity model (real bilateral exports and imports) estimated by POLS. Income and distance variables are significant with the expected sign. Inward FDI is also significant but with a negative sign. Outward FDI is significant in the export equation but insignificant in the import equation. Past research has shown that if individual effects are present, then the OLS estimates could be biased. Therefore, the $F$-test is used to diagnose if all the country specific effects are equal across countries. However, the calculated $F$-statistic rejects the null hypothesis of jointly equal country specific effects and suggests the pooled regression method is inappropriate. As a result, alternative estimators such as RE, FE and HT methods, which allow for country specific effects in regression model, are considered.

The next step is to use the Breusch and Pagan Lagrange Multiplier (LM) test statistic to test if there are random effects in the FE model. The LM test statistic has a $\chi^2$ distribution under the null hypothesis of no random effects against the alternative of random effects. The test result shows that the null hypothesis is rejected in favor of the RE model. The main drawback of the RE model is that it can result in biased and inconsistent estimates if some of the explanatory variables are correlated with the specific effect or the error term. Therefore, the Hausman test is performed to detect the presence of this bias. The calculated Hausman test statistic rejects the null hypothesis of no correlation between the individual effects and the
regressors, suggesting the FE model is more efficient than the RE model. But, as discussed earlier on, the FE model fails to estimate time-invariant variables such as the distance variable and the dummy variable for common language. For this reason, the gravity model is estimated by using the HT method. The fifth and ninth columns of Table 1 present the estimation results for real bilateral exports and imports based on the HT method. Both the estimated regressions show that inward FDI, the product of GDP and distance, are key determinants of bilateral exports and imports.

<Insert Table 1 here>

The estimated coefficients of IFDI for bilateral exports as well as imports are positive and significantly different from zero, which suggests that IFDI is instrumental in providing both backward and forward linkages for Malaysia’s trade i.e., the former is achieved when inputs are being imported from abroad or the home country of MNEs for value added in Malaysia, while the latter occurs when intermediate or final outputs are being produced and exported back to their home countries or affiliates elsewhere for assembly and distribution (see Sieh-Lee, 2000). This result is supported by the fact that IFDI was concentrated in manufacturing for half of the period of this study (63% from 1990-99 before falling to 41% in 2000-2009 (Bank Negara 2009)) and the importance of component trade in Malaysia as part of the regional production networks of the MNEs producing in the region. In contrast, OFDI has no significant impact on Malaysia’s bilateral exports and imports. This relationship is also observed in Globerman and Shapiro’s (2006) study on emerging economies. The evidence is also consistent with the fact that 70% of accumulative net OFDI from Malaysia is services based (see BNM, 2009) and this implies that these OFDI services are primarily driven by market seeking objectives. The product of GDP for bilateral exports and also imports has the largest estimated coefficient magnitude, which implies that a rapid growth of the Malaysian economy can facilitate higher export and import trade. The estimated coefficients of the distance variable, which is significantly different from zero with a negative sign, indicate that geographical distance is an important resistance factor for Malaysia’s bilateral export and import trade. This suggests that trading partners located in proximity can forge higher bilateral trade for Malaysia.

5. Conclusions
This study has been motivated by the increasing importance of OFDI from DTEs, including Malaysia and the lack of studies investigating the impact of OFDI on home country trade for these countries. Malaysia represents an interesting country case study as it is a middle income economy that is relatively an important destination and source of FDI in the region. Since 2007, the economy has turned into a net capital exporter from a net capital importer. Given the importance of trade in the country, this shift warrants investigating the impact of OFDI on the home country’s international trade.

Our results reveal that IFDI conforms to the observed pattern of a complementary relationship between FDI and trade while OFDI and trade linkages are not significant. We attribute this result to the fact that 70% of accumulative net OFDI from Malaysia is services based and non-tradable services are expected to have limited trade effects. In addition, it is important to note that the balance of payments data on services underestimates trade in services, especially in terms of the delivery of services in the form of natural persons, while the heterogeneous nature of services implies that a disaggregated form of analysis may be more suitable. Unfortunately, this is not permitted in terms of the availability of data for Malaysia. It is therefore critical to improve data collection of services to deepen the understanding of policy makers on the relationship between OFDI and trade and to provide better research support for policy formulation in the country.

The limited impact of Malaysian OFDI on trade indicates that this pattern differs from the experience of developed countries that are located in stages 4 and 5 of the IDP theory whereby it is the firm specific assets of private local firms that drive them to invest abroad in search of efficiency, or new markets or for strategic reasons. In turn, these firm specific assets create trade linkages with the home economy, thereby enabling them to benefit from outbound investment (Globerman and Shapiro 2006). Our results indicate that Malaysia has yet to follow the trajectory of developed economies in its shift from being a net capital importer to a capital exporter due to the lack of trade linkages between OFDI and trade. It further implies that the country may not be able to reap the potential productivity benefits of OFDI that accrue through efficiency gains from specialization and scale advantages that are garnered through the trade channels.
While the precise reasons for the lack of any significant ties between OFDI and trade are beyond the scope of this present study, the results imply a serious disjuncture between policy focus and reality. A reassessment of the policies for promoting OFDI and services is necessary to ascertain policy coherence, in particular the current policy focus on the importance of services export. At the same time, more studies are needed on the rationale motivating Malaysian firms to invest abroad and the capabilities of local firms to benefit from these outward flows.

References


Table 1: The results of OLS, FEM and HTM estimation for Bilateral Export and Import of Malaysia

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Real Bilateral Export</th>
<th>Real Bilateral Import</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>REM</td>
</tr>
<tr>
<td>Inward FDI</td>
<td>-0.0486</td>
<td>0.0569</td>
</tr>
<tr>
<td></td>
<td>(0.0244)**</td>
<td>(0.0113)**</td>
</tr>
<tr>
<td>Outward FDI</td>
<td>0.0972</td>
<td>0.0027</td>
</tr>
<tr>
<td></td>
<td>(0.0239)**</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Product of GDP</td>
<td>1.0238</td>
<td>0.6042</td>
</tr>
<tr>
<td></td>
<td>(0.0443)**</td>
<td>(0.048)**</td>
</tr>
<tr>
<td>Product of population</td>
<td>-0.0129</td>
<td>0.1428</td>
</tr>
<tr>
<td></td>
<td>(0.0355)</td>
<td>(0.0882)</td>
</tr>
<tr>
<td>Distance</td>
<td>-1.3490</td>
<td>-0.9963</td>
</tr>
<tr>
<td></td>
<td>(0.0562)**</td>
<td>(0.1856)**</td>
</tr>
<tr>
<td>Language</td>
<td>0.2352</td>
<td>0.2894</td>
</tr>
<tr>
<td></td>
<td>(0.0848)**</td>
<td>(0.3097)</td>
</tr>
<tr>
<td></td>
<td>(0.7096)**</td>
<td>(1.6680)</td>
</tr>
<tr>
<td>No of Observation</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>R²</td>
<td>0.8</td>
<td>0.76</td>
</tr>
<tr>
<td>F-statistics</td>
<td>435.66 (0.00)</td>
<td>435.66 (0.00)</td>
</tr>
</tbody>
</table>

Breusch-Pagan LM test 2737(0.00) 1751.7 (0.00)
Hausman test
FEM vs REM 17.97(0.00) 51.83 (0.00)
FEM vs HTM 4.2290.58) 3.11(0.538)

Note: The dependent variable is a logarithm of real export. OLS stands for the pooled OLS estimator, FEM fixed effect model and REM random effect model, respectively. Countries dummies not reported here in order to save space. Figures in ( ) indicate the standard error. * denotes coefficient significant at the 10% level of significance, ** denotes coefficient significant at 5% level of significance, *** denotes coefficient significant at 1% level of significance. Hausman statistic rejects the null hypothesis of correlation between explanatory variables and unobserved individual effects in all cases considered.