AN ANALYSIS OF INTRA-ASEAN FDI DETERMINANTS IN THE WAKE OF ASEAN ECONOMIC COMMUNITY

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ABSTRACT

This research intends to uncover the determinants of intra-ASEAN FDI, specifically to verify whether the establishment of ASEAN Economic Community has had any contribution to the raising intra-FDI inflow. Result from the fixed effect model with cross-section effects, which was employed to dataset of 10 ASEAN member states from 2000-2013, indicates that market size, quality of infrastructure, as well as labor productivity, were significant, and positively attracted intra-FDI inflow. Meanwhile, macroeconomic stability and degree of openness were insignificant. In addition, trade barrier was significantly proven to have negative effect on intra-FDI inflow. Unfortunately, the latest ASEAN's investment scheme was insignificant. Moreover, the country-specific effects were highly significant, proving that heterogeneity seems to have an important role in attracting intra-ASEAN FDI.

Keywords: intra-regional, foreign investment, economic integration, panel data.

ABSTRAK

Penelitian ini bermaksud untuk menyelidiki determinan dari intra-ASEAN FDI. Lebih spesifik lagi, untuk mengetahui apakah pembentukan ASEAN Economic Community memiliki kontribusi terhadap aliran masuk intra-ASEAN FDI. Hasil estimasi model fixed effect dengan cross-section effects terhadap data 10 negara anggota ASEAN dari tahun 2000-2013, mengindikasikan bahwa ukuran pasar, kualitas infrastruktur, serta produktivitas tenaga kerja terbukti signifikan dan secara positif menarik intra-ASEAN FDI. Sedangkan stabilitas makroekonomi dan keterbukaan terbukti tidak signifikan. Di sisi lain, trade barrier secara signifikan terbukti memiliki hubungan negatif dengan aliran intra-ASEAN FDI. Namun, skema investasi ASEAN terbaru terbukti bukan merupakan determinan penting. Selain itu, efek dari karakteristik negara terbukti signifikan, membuktikan bahwa heterogenitas memainkan peranan penting dalam menarik intra-ASEAN FDI.

Kata kunci: *intra-regional, investasi asing, integrasi ekonomi, panel data.*

1. INTRODUCTION

Foreign direct investment (FDI) has played an important role in promoting economic growth, especially in developing countries and transition economies as it can provide a mean to raise capital in a cost-effective manner (Changwatchai, 2010). Furthermore, it can bring both tangible and intangible assets such as advanced technology, better managerial skill, and innovative product design (Wang, 2009). This argument seems plausible since many developing countries, which relatively experience high economic growth rates, have been receiving the majority of World's FDI, including the Association of South East Asian Nations (ASEAN) members.

Total FDI inflow to ASEAN countries continued to increase over the years, from US$ 21.8 billion in 2000 to a whopping US$ 136.2 billion in 2014. Albeit it dropped a fair bit to US$ 47.9 billion in 2007-2009 due to US subprime mortgage crisis which literally shocked global economy as a whole. But the FDI inflow to ASEAN bounced back to its original course and continued to

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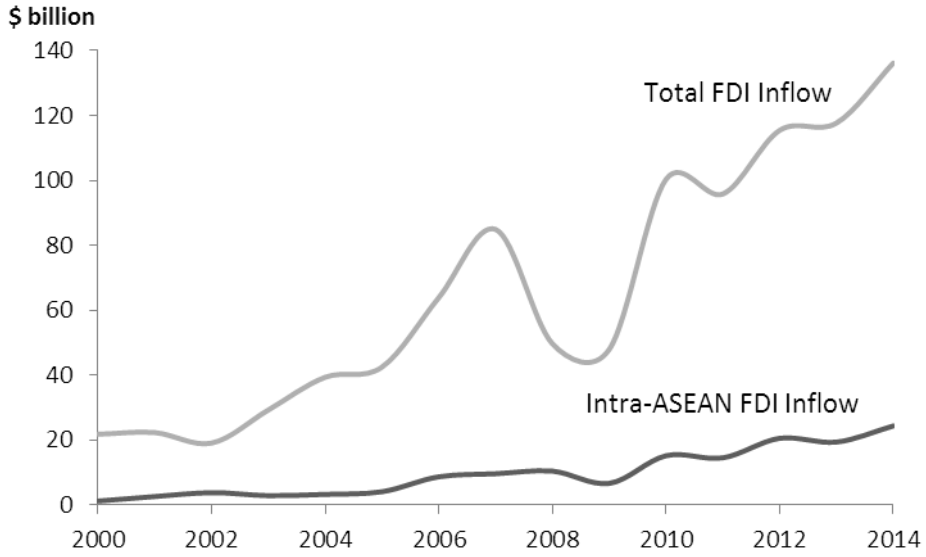
increase from then on. In 2013-2014 alone, total ASEAN FDI inflow rose from US$ 117.7 billion to US$ 136.2 billion, despite a 16% decline in global flow. This level exceeded inflow to China for the first time since 1993, making ASEAN the largest recipient of FDI in the developing world (ASEAN Secretariat, 2015).

Interestingly, FDI inflow from within ASEAN, i.e. the intra-regional or intra-ASEAN FDI[2] is beginning to play a role in total FDI inflow to the region. Intra-ASEAN investment rose by 26%, from US$ 19.4 billion in 2013 to US$ 24.4 billion – accounting for 18% of total inflow into the region. In 2014, ASEAN firms were among the top 5 investors in the region, accounted for 65% of the total FDI flow into the region, along with firms from EU, Japan, US, and China (ASEAN Secretariat, 2015). As figure 1 suggests, the intra-regional FDI inflow had been steadily increasing and it seemed like it did not affected as much as the total FDI inflow did during the global crisis. It is obvious that there might be certain regional-specific factors that differentiate intra-regional FDI with its counterpart.

Figure 1. FDI Inflows to ASEAN (Current US$ billion)



Data source: World Investment Report & ASEAN Secretariat.

Many previous studies have confirmed the positive relationship between regional integration with regards to trade creation (Ismail, Smith, & Kugler, 2009). On the other hand, the studies of FDI have been primarily focusing on the general determinants of FDI as a whole, disregarding the presence of regional integration. Moreover, studies which differentiate intra-regional FDI with extra-regional FDI have been quite limited. Referring to the ASEAN's framework[3], promoting FDI, apart from trade creation, is one of the main pillars of regional integration. Hence, one would be tempted to argue that the regional integration, through the formation of ASEAN Free Trade Area (AFTA), which recently upgraded to ASEAN Economic Community (AEC), could potentially plays an important role to the raising trend of intra-ASEAN FDI.

This research aims to address previously mentioned issues by focusing primarily in intra-ASEAN FDI. The main objective is to uncover the determinants of intra-ASEAN FDI. Moreover, to verify whether measures and policies taken by ASEAN as an association to promote

[2] FDI from one member to the other members within ASEAN.
[3] The AFTA upgrade called the ASEAN Economic Community Blueprint (ASEAN Secretariat, 2008).

regional integration have had any contribution to the raising intra-FDI inflows. Through these objectives, this research hopes to identify the main differences of intra-ASEAN FDI determinants with total FDI inflows to this region, if any.

2. BRIEF THEORICAL FRAMEWORK & LITERATURE REVIEW

The most general framework regarding the determinants of FDI was proposed by Dunning, arguably the most referenced author in this particular area of study. The major contribution of Dunning's so called "eclectic paradigm" to the literature was to bring together several previous complementary theories, identifying a set of variables (ownership, location and internalization) that shape the activities of multinational firms (Dunning, 2000). Furthermore, Dunning divided FDI into three main types based on the motivations that firms have in making foreign investments, i.e. FDI. The first motivation is to seek larger market in a particular country or region, hence the name market-seeking FDI. Multinational Corporations (MNCs) can accommodate local markets in foreign countries much better and potentially further exploit these markets by setting up production facilities locally. Secondly, there is resource-seeking FDI. The main goal of this type of FDI is to acquire particular types of resources in FDI receiving countries, i.e. the host countries. The third type of FDI is efficiency-seeking FDI, where firms could potentially gain higher level of efficiency through the presence of economies of scale by better managing all of its geographically dispersed activities.

Most of the theoretical framework essentially expands Dunning's line of thinking, adding other motives that might entice MNCs to undergo FDI. Moreover, UNCTAD[4] classified the majority of the economic determinants of inward FDI similarly; which are market-related, resource-related, and efficiency-related economic determinants, as well as other non-economic determinants such as policy and business environment (UNCTAD, 2009). But the general nature of the theoretical framework has led researchers to rely on empirical evidences.

2.1 Determinants of FDI Empirically

The main motivation of FDI known up to this day is probably market size. As mentioned by Dunning (2000), market-seeking FDI was designed to satisfy a particular foreign market or set of foreign markets. The greater the local market is, the bigger the attraction of this market for the firms to engage in FDI. This positive relationship between market size and FDI has been widely confirmed by many researchers (Nonnenberg & Mendonça, 2004; Çeviş & Çamurdan, 2007). The most common measures of market size are GDP and its other variations, such as GDP per capita, GDP growth, etc.

MNCs' decision in engaging into foreign investment could also be motivated by the need of some particular types of resources that are limited (or unavailable) in their home countries, or available at lower costs (or higher productivities) in the recipient countries. For examples, the abundance of natural resources, lower labor cost, higher labor productivity, or the existence of some particular technologies/assets/infrastructures needed in the production processes. Unfortunately, which resources that each firm prioritized depends heavily on the goods the firm produces. In other words, these resources would vary for each firm, the industries they operate in, etc. Consequently, measuring resource-seeking FDI has been proven to be quite complicated. Some studies used wage rate to highlight the relatively lower cost of labor in the host-countries (Çeviş & Çamurdan, 2007; Demirhan & Masca, 2008), level of education to measure labor's productivity (Nonnenberg & Mendonça, 2004), other complementary assets that are required for efficient processes of production such as the quality of infrastructure or electricity/energy

[4] United Nations Conference on Trade and Development.

availability (Nonnenberg & Mendonça, 2004; Demirhan & Masca, 2008) as proxies of this type of FDI. Based on previously mentioned studies, the availability of these resources seem to positively affected FDI inflow, although the levels of significance of these proxies were mixed.

Other determinants that potentially influenced FDI inflow besides the two formerly mentioned, are more complex to be specified since they vary depending on the characteristics or circumstances of each country. Franco, Rentocchini & Marzetti (2010) categorized these motivations as residual motives, which are literally motives other than the previously mentioned determinants. This is where researchers have to rely heavily on previous empirical findings to determine other determinants that might influence FDI in certain situations or certain economies that they are dealing with. It should be noted that, the third type of FDI proposed previously (Dunning's classification), which is efficiency seeking FDI, is sometimes identified under the label of market or resource seeking FDI, especially when carrying out empirical application. This logic seems acceptable since efficiency is obtained through the better use of resources or higher level of production in larger market.

One of the widely used residual motives is the degree of macroeconomic stability that the host-country has, usually measured by the level of inflation or interest rate. Low level inflation or interest rate can indicate the economic stability of a country. A stable economy is considered favorable fo MNCs since it will offer firms the ideal condition to have long run return on their investment abroad. The literature mostly found that high volatility of host countries' currencies and high inflation rates tend to discourage foreign investors to engage in the activities of FDI (Nonnenberg & Mendonça, 2004; Çeviş & Çamurdan, 2007; Xaypanya, Rangkakulnuwat, & Paweenawat, 2015).

MNCs will also choose to invest in an export-oriented country rather than invest in a country with closed economy (or low level of openness), as referred by Xaypanya, Rangkakulnuwat & Paweenawat (2015). The degree of openness of an economy can reflects the willingness of certain country to accept foreign investment, and it is generally measured by the ratio of international trade (export + import) to GDP (Nonnenberg & Mendonça, 2004; Çeviş & Çamurdan, 2007; Demirhan & Masca, 2008).

The existence of trade barriers may also hinder FDI inflow into some countries (Franco, Rentocchini, & Marzetti, 2010). Both tariff and non-tariff trade barriers have been proven to be one of the important factors in trade creation (Okabe & Urata, 2013) as well as FDI. Some studies found that in the case of market-seeking FDI, MNCs would engage into FDI to avoid high tariff that a particular country imposed, i.e. tariff jumping. In this case, the higher level of tariff could actually increase market-seeking FDI since MNCs would prefer investing in new production facilitates in the host country rather than paying the tariff on their exported products (Changwatchai, 2010).

2.2. ASEAN Regional Integration Milestones

ASEAN was established in 1967 by five member countries, namely Indonesia, Singapore, Malaysia, Philippines, and Thailand. Currently ASEAN has ten member countries with the joining of Brunei, Cambodia, Laos, Burma, and Vietnam. The ASEAN declaration sets out the objectives of ASEAN, which includes the acceleration of economic growth. There are large number of treaties, agreements, and initiatives throughout the years. The ASEAN Free Trade Area (AFTA) was implemented in 1992, subsequently the establishment of the ASEAN Industrial Cooperation (AICO) in 1996 and the ASEAN Investment Area (AIA) in 1998, are some of the milestones in promoting industrial production, FDI, as well as trade.

In the case of investment, AIA scheme aims to provide an environment that facilitates free flow of direct investment, technology, and skilled professionals (ASEAN Secretariat, 2008).

The AIA has recently been deepened and upgraded to the ASEAN Comprehensive Investment Agreement (ACIA) in 2007. ACIA agreement aims to enhance existing AIA agreement with regard to investment liberalization (restrictions reduction), facilitation (improving procedures in doing businesses, licensing, and other incentives schemes), protection (fair & equitable treatment, full protection & security, compensation of losses, etc.), as well as transparency and predictability (improved investment law, regulations & guidelines). The deadline to achieve a free and open investment environment, which was originally expected to be reached by 2020, was accelerated by five years in advance to 2015.

Unfortunately, this scheme focuses mainly in institutional upgrades, reforming policies, and further liberating many institutional barriers in each member country. Not to mention, it is still at its early stage of implementation. These issues would mean that measuring any sort of progression or gain in FDI inflow to be quite difficult. The only definitive variable currently available that is measurable is tariff. The overall lower tariff in the region is a result of continues efforts and combinations of ASEAN schemes throughout the years, including policies that were issued during the periods of AFTA implementation. Other effects are either unmeasurable, or the data regarding these effects are still unavailable at this point of time. Apart from identifying tariff as one of the explanatory variables, the effects of AIA and ACIA that might influence intra-ASEAN FDI, as well as any country-specific characteristics, are mixed together as one unmeasurable effect. Future availability of data measures should allow further studies to slowly decompose this mixed influence.

3. DATA & METHODOLOGY

The dataset used in this research was a panel data with the cross-sections comprised of all 10 ASEAN member countries from 2000 to 2014. The data on intra-FDI inflows and average tariff rates were derived from the ASEAN Secretariat Statistics, whilst the education indices were obtained from the Human Development Reports (United Nations Development Programme, 2000-2015). The rest of the variables are acquired and calculated from the World Development Indicators (The World Bank, 2000-2015). Each cross-section was then identified by each country's 3-letter-international code[5]; IDN, BRN, KHM, LAO, MYS, MMR, PHL, SGP, THA, and VNM for Indonesia, Brunei Darussalam, Cambodia, Lao PDR[6], Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, respectively. Overall, the whole sample consisted of 10 cross-sections over the span of 15 years, although the electricity data only available up to 2013. Therefore, effectively only 140 observation were obtained (10 cross-sections × 14 years).

To identify the specific characteristics of each cross-section, the panel ordinary least squares (POLS) was used to calculate the estimation. Moreover, the fixed effect model with cross-section effects was employed to account for the heterogeneity, i.e. the unknown country-specific characteristic differences, that could lead to the variation of each ASEAN member states' ability in attracting intra-FDI inflow. To account for any changes that could have occurred to these country-specific characteristics over time, a dummy variable (DACIA) was included to indicate whether the signing of ACIA in 2007 bring about any changes or gains in intra-FDI inflow. The model specification can be represented by:

$$INTRAFDI_{it} = \hat{\alpha}_0 + \hat{\alpha}_{i-1}D_{i-1} + \hat{\beta}_1 GDP_{it} + \hat{\beta}_2 ELECTRIC_{it} + \hat{\beta}_3 EDU_{it} + \hat{\beta}_4 INFL_{it} + \hat{\beta}_5 OPEN_{it} + \hat{\beta}_6 AVTAR_{it} + \hat{\beta}_7 DACIA_{it} + \hat{\varepsilon}_{it} \quad (1)$$

[5] ISO Alpha-3 Country code as published by the United Nation.
[6] Lao People's Democratic Republic.

Where:

$INTRAFDI_{it}$ = intra-ASEAN FDI inflows to country *i* time *t* (constant US$ million).
GDP_{it} = GDP of country *i* time *t* (constant US$ million).
$ELECTRIC_{it}$ = electricity net production - electricity final consumption of country *i* time *t* (kilowatt-hours million).
EDU_{it} = education component in the human development index of country *i* time *t*.
$INFL_{it}$ = inflation, consumer prices, of country *i* time *t* (%).
$OPEN_{it}$ = (exports + imports)/GDP of country *i* time *t*.
$AVTAR_{it}$ = average tariff rate of country *i* time *t* (%).
$DACIA_{it}$ = dummy for periods that ACIA was launched in 2007.
D_{i-1} = cross-section dummies with one country as a benchmark (cross-section fixed effect).

The vector of explanatory variables was comprised of different motives of FDI mentioned in previous section; GDP (proxy for market size), ELECTRIC (proxy for infrastructure quality), EDU (proxy for labor productivity), INFL (proxy for macroeconomic stability), OPEN (proxy of the degree of trade openness), AVTAR (proxy for trade barrier), and DACIA (dummy ACIA launch).

It should be noted that the decision to use the fixed effect model was based on the logic that the individual-specific effects, i.e. the country-specific characteristics, should have some sort of correlation with the explanatory variables (Wooldridge, 2005). In the case of random effect model, these individual-specific effects are assumed to come about from certain random processes, which make these effects to be uncorrelated with the explanatory variables. Secondly, including both the cross-section and time effects would have been ideal since the implementation of ASEAN policies throughout the years should have some impact on the county-specific characteristics. But doing so would mean including too many dummy variables for every country and every year, this could impact the efficiency of the estimators. For this reason, the decision was made against incorporating both effects. Instead the model was estimated using only the cross-section effects to control the heterogeneity of each country and adding the dummy for the year ACIA was implemented as a compromise to try capturing any changes in these country-specific characteristic that might occur as a result of ASEAN's policy implementations, if any.

4. EMPIRICAL RESULT AND DISCUSSION

As mentioned before, the model was estimated by employing the fixed effect model with the cross-section effects. The estimation had been tested to satisfy the standard classical assumptions, ensuring best, linear, and unbiased estimators (BLUE)[7]. Table 1 represents the estimation output of the model with the level of significance for each coefficient.

The result shows that market size of each ASEAN members have a positive effect on intra-ASEAN FDI and it is highly significant. This result confirmed previous findings that, similar to extra-ASEAN FDI, ASEAN firms engaged in cross-border investment also motivated by market. The interesting part is that this result indicates that ASEAN firms are starting to expand their target markets to the neighboring countries, competing head to head with other major foreign firms (from outside ASEAN which many of them have been established for many of years) and

[7] The classical assumption tests, i.e. the autocorrelation, heteroscedasticity, & multicollinearity can be referred in the appendix.

local firms. The willingness of ASEAN based firms to expand their markets might reflect the raising level of competitiveness they have achieved thus far. Only a decade ago, MNCs that participated in foreign markets were dominated by large and technologically advanced corporations usually originated from developed countries, which gave these firms the upper hand in terms of competitiveness over the local firms.

Table 1. Estimation Output

Pooled Least Squares with Cross-Section Fixed (Dummy Variables)
Dependent Variable: INTRAFDI

Independent Variable	Coefficient		Standard of Error
C	-10238.27	***	2664.881
GDP	0.010610	***	0.001042
ELECTRIC	0.096545	***	0.032583
EDU	16793.09	***	4827.520
INFL	-0.452589		13.11463
OPEN	-275.8444		546.9385
AVTAR	217.0900	***	79.96519
DACIA	-431.6247		292.0195
R-squared	0.734872	F-statistic	21.30790
Adjusted R-squared	0.700384	Prob. (F-statistics)	0.000000
S.E. of regression	914.4078	Durbin-Watson stat	1.991818

Significant at α = 10% (*), α = 5% (**) & α = 1% (***)

The quality of infrastructure and the labor productivity also have been found positively and significantly affected intra-FDI inflow. This implies that intra-FDI inflows are also motivated by the availability of resources (or efficiency). In this particular case the net surplus of electricity, which is essential in any production processes even in the service industries, and the level of education of the labor are essential in attracting intra-ASEAN FDI. Notice that, like market size, intra-ASEAN FDI also has the same motivation as the extra-ASEAN FDI in terms of resource-seeking (or efficiency). Again this can be interpreted as ASEAN firms' willingness to compete head to head against the already established MNCs from outside ASEAN as well as against the local firms in search of particular resources (or lower cost of these particular resources).

Interestingly, the macroeconomic stability (measured by inflation) and degree of trade openness were not significant in attracting regional FDI. This might be the result of economic integration that allows higher cross-border investment to still occur within ASEAN despite high inflations or low degrees of openness in the member countries. It seems like ASEAN policy regime has made firms to be less worried about the macroeconomic stability and the degree of openness. This result also confirmed the findings of previous study carried out by Nwosu, Orji, Urama, & Amuka (2013). Arguably, the ASEAN credibility as the main engine of regional integration has compelled optimism with regard to stability in the region.

Tariff reduction is probably the most definitive measure of ASEAN's policies effectiveness, at least at this point of time. As the significant coefficient indicates, the trade barriers reduction (measured by the average tariff rates) was positively influencing intra-ASEAN FDI. This implies that the agreements, initiatives, and policies that have been implemented under ASEAN's framework, seem to be performing as they were intended, promoting regional investment. It should be noted though, that many of ASEAN's strategies and schemes involving

institutional or regulation reforms are unfortunately difficult to measure. Reduction in tariff is only one aspect of the broader picture. Nevertheless, the result can be viewed as partial improvements that had resulted from the implementation of ASEAN schemes.

The ACIA implementation in 2007, shown by the ACIA dummy variable, appears to be insignificant. This result is not surprising as the signing of ACIA in 2007 would still needed time to be fully effective. During the period of the signing until the predetermined deadline, many countries would have still in the processes of implementing their individual targets. Now that it has just passed the deadline in 2015, the ACIA would starts to take effect, if any. The availability of data in the future should provide a better picture of any gain or progress that might have occurred due to ACIA.

The intercept, which takes all the unobservable characteristics of each member country, also was found significant. Although we could not interpret this result any further, but at the very least it can be concluded that country-specific characteristics do impact FDI inflow. From this finding, along with the significance of tariff previously mentioned, it can be argued that ASEAN's policies do contribute to the raising intra-ASEAN FDI, to some extent.

5. CONCLUSION

This research intends to uncover the determinants of intra-ASEAN FDI inflow. Specifically, the main interest is to verify whether the latest measures and policies taken by ASEAN as an association to promote regional integration, have had any contribution to the raising intra-FDI inflows. Result from the fixed effect model with cross-section effects, which were employed to dataset consisting of 10 ASEAN member states from 2000 to 2014, indicates that market size, quality of infrastructure, and labor productivity were significant and positively attracted intra-FDI inflow. Meanwhile, macroeconomic stability and the degree of openness were proven to be insignificant. The only definitive measures of ASEAN's policies effectiveness so far, tariff, was significantly proven to have negative effect on intra-FDI inflows. Unfortunately, the ACIA launch in 2007 as the ASEAN's most recent initiative in improving FDI inflow to the region was not one of the main determinants of intra-ASEAN inflow. This is possibly due to the time needed for each country to fully implement ACIA's targets. Moreover, the country-specific effects were highly significant, proving that heterogeneity in each of ASEAN countries, i.e. the country-specific characteristics, seems to have an important role in attracting intra-ASEAN FDI.

Overall, the intra-ASEAN FDI share the same determinants as extra-ASEAN FDI, although country-specific characteristics can further increase each country member's ability to attract more intra-FDI inflow. In conclusion, the ASEAN's policies thus far seem to provide contribution to the raising intra-ASEAN FDI, to some extent. Future availability of data and measures should allow further studies to decompose the unknown country-specific characteristics even more, thus providing the more complete analysis of the effectiveness of ASEAN's policies in promoting intra-ASEAN FDI.

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Appendix

Estimation Output

Dependent Variable: INTRAFDI?
Method: Pooled Least Squares
Sample (adjusted): 2000 2013
Included observations: 14 after adjustments
Cross-sections included: 10
Total pool (balanced) observations: 140

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10238.27	2664.881	-3.841922	0.0002
GDP?	0.010610	0.001042	10.18129	0.0000
ELECTRIC?	0.096545	0.032583	2.963086	0.0037
EDU?	16793.09	4827.520	3.478616	0.0007
INFL?	-0.452589	13.11463	-0.034510	0.9725
OPEN?	-275.8444	546.9385	-0.504343	0.6149
AVTAR?	217.0900	79.96519	2.714807	0.0076
DACIA?	-431.6247	292.0195	-1.478068	0.1419
Fixed Effects (Cross)				
_IDN--C	-2853.311			
_BRN--C	-958.4097			
_KHM--C	2552.612			
_LAO--C	2858.767			
_MYS--C	-1913.326			
_MMR--C	3676.355			
_PHL--C	-1765.067			
_SGP--C	-459.0784			
_THA--C	-1381.219			
_VNM--C	242.6778			

Effects Specification

Cross-section fixed (dummy variables)

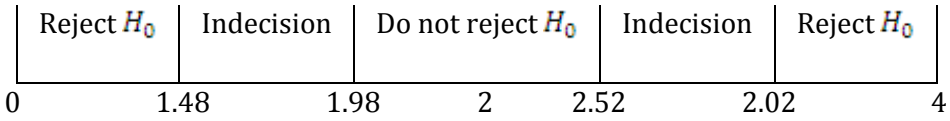
R-squared	0.734872	Mean dependent var	878.8000
Adjusted R-squared	0.700384	S.D. dependent var	1670.541
S.E. of regression	914.4078	Akaike info criterion	16.58783
Sum squared resid	1.03E+08	Schwarz criterion	16.94503
Log likelihood	-1144.148	Hannan-Quinn criter.	16.73298
F-statistic	21.30790	Durbin-Watson stat	1.991818
Prob(F-statistic)	0.000000		

Autocorrelation Test (DW Test)

$H_0 : \rho = 0$ no autocorrelation

$H_1 : \rho \neq 0$ autocorrelation

$DW\ stat = 1.991818$ $k' = 16$ $n = 140$



$1.98 \leq DW\ stat = 1.99 \leq 2.52$

Do not reject H_0: no autocorrelation

Heteroscedasticity Test (White Test)

H_0: Homoscedastic

H_1: Heteroscedastic

Heteroskedasticity Test: White

F-statistic	1.096848	Prob. F(88,51)	0.3645
Obs*R-squared	91.60064	Prob. Chi-Square(88)	0.3753
Scaled explained SS	275.4342	Prob. Chi-Square(88)	0.0000

$n.R_2 = 91.60064 < \chi^2_{(88,\ 0.01)} = 121.767$

Do not reject H_0: homoscedastic

Multicollinearity Test

Correlation Matrix

	GDP	ELECTRIC	EDU	INFL	OPEN	AVTAR
GDP	1.000000	0.571273	0.416182	-0.095329	0.023812	-0.442388
ELECTRIC	0.571273	1.000000	0.213114	-0.008149	-0.092488	-0.129546
EDU	0.416182	0.213114	1.000000	-0.432848	0.572118	-0.687357
INFL	-0.095329	-0.008149	-0.432848	1.000000	-0.249960	0.230500
OPEN	0.023812	-0.092488	0.572118	-0.249960	1.000000	-0.264612
AVTAR	-0.442388	-0.129546	-0.687357	0.230500	-0.264612	1.000000

No high correlation among explanatory variables: no multicollinearity