An Empirical Study of Trade Cost And Foreign Direct Investment

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ABSTRACT

Contribution of Multinational Enterprises to the global economy is constantly rising from the 1980s onward. They invest in different countries using Foreign direct Investment.These FDI are either horizontal or vertical investment. Most of the literature suggests that HFDI is relatively more abundant in global economy than the VFDI. In this paper, the relative abundance of the two is compared by considering the impact of different factors like size of countries, dissimilarity in sizes, skill endowments, trade cost, investment cost etc. on the affiliate sales of the firm in host country. Based on this study, it is found that the size of the country, and the dissimilarity in size factor supports the dominance of Horizontal investment in the global market, rather than vertical investment. Other factors also support the HFDI but they are not significant in this study, so we cannot consider their impacts.

Keywords: FDI, Horizontal, Vertical FDI, ARDL

INTRODUCTION

With the rapid development in Globalization and technologies, firms/enterprises are also expanding and are investing in other countries. An enterprise that has its facilities and other assets in at least one country other than its home country is called a Multinational Enterprise (MNE). Such enterprises have offices and/or factories in different countries and usually have a centralized head office where they co-ordinate global management. The scale of investment in such MNEs is so large that some very large multinationals are having budgets that exceed those of many small countries. This expansion of firms are helping them to exploit the benefits of geographical locations of countries and help them attain proximity to larger markets for their products.

Investments made by these enterprises to expand globally is termed as Foreign direct investment. According to the United Nations Conference for Trade and Development (UNCTAD), FDI is defined as the investment made to acquire lasting interest in enterprises operating outside of the economy of the investor. FDI is different from the portfolio investment as the share of investment is more than 10% in FDI, unlike portfolio investment where it is less than 10%.

Multinational Enterprises (MNEs) have became a key players in globalized economies. They are a source of foreign wealth and technology. They supply global markets with FDI and helps to boost the economy. They also face some criticism as they also pose a competition and threat to the national firms because of their better and improved technologies. Even then, most countries welcome FDI as they help in their own infrastructural and technological development. As a result of this, there had been a rapid growth in FDI over the last few decades, from 5% of world GDP in 1980 to 10% in 1995 (World Investment Report, 1997),has led many people to examine the determinants and effects of FDI. According to the World Investment Report, FDI flows in 2013 increased to $1.45 trillion. This rapid increase in FDI has occurred in the context of reductions in barriers to investment throughout the world, and the empirical evidence shows that investment liberalization stimulates FDI.

These foreign direct investments by the firms can be categorized as -

- **Horizontal Foreign Direct Investment (HFDI)**
  A firm can split geographically by duplicating just a subset of its activities, for example, setting up a foreign plant in addition to a home plant for some part of the production process. This is referred to as 'horizontal' investment. FDI associated with cross-border mergers and acquisitions can be horizontal - where the firms are at the same stage of production. The decision of a firm to go for horizontal investment is motivated by the trade cost reductions and the proximity to the larger markets.

- **Vertical Foreign Direct Investment (VFDI)**
  A firm may exploit geographical benefits of production by splitting its activities and put all of its production of a particular component part in a separate foreign plant. In vertical FDI, firms setup their different stages of production to exploit the benefits of the cheap labor and raw materials availability. This choice is a based on a trade off between the increased cost of disintegration and the decreased cost of production due to lower factor prices/ These vertical FDI also includes the increasing service activities like outsourcing of customer support services, call centers and information technology support.

Since, we have discussed about the vertical and horizontal foreign direct investment, we need to analyze different factors which cause them and the decision process of the firm which motivates its investment strategy. The global markets is filled with FDI but which one is relatively more dominant, Horizontal FDI or the Vertical FDI.

OBJECTIVES

We discussed about the rising dominance of FDI in global marketplace. But, we need to know that which form of FDI, Horizontal or Vertical, is relatively more abundant. But, the problem with this analysis is that the data collected on FDI is usually in the form of the net inflows and the outflow from the economy. These data on FDI doesn't distinguish between the Horizontal and Vertical investment by the firm. This creates a problem as the most of the literature review suggest that the Horizontal FDI is relatively more

abundant and dominant than the Vertical FDI but, we need empirical proof to support this literature. So, motive of this empirical study is -

- **Horizontal FDI vs. Vertical FDI**
  Empirical Study of trade and exports to observe differences in HFDI and VFDI and try to separate the FDI in under two heads in order to find the relative importance of the two.

LITERATURE REVIEW

With the rapid increase of FDI in share of global market, many researchers and academicians had shown their interest to study the FDI and the motivations of a firm to go for it. There are different factors which influences the decision of a firm whether to invest in foreign market or not. In 1993 and 1997, S. Lael Brainard published her paper on the study of the determinants of the foreign direct investment. She used the Proximity Concentration Trade-Off model to check the impact of different factors on the decision of a firm to go for FDI or exports. The main motive of the study was to find dependence of FDI n different factors. She took export shares of the firms as the dependent variable and factors like the firm-level economies of scale, plant-level economies of scale were the firm specific factors, corporate tax rate, freight cost, tariffs and per worker GDP difference were the country specific factors. This model showed the dependence of FDI on such factors and hence the firms decision for foreign direct investment. But this model was mostly focused on FDI as horizontal form. And there was not any method to distinguish between horizontal and vertical form of FDI there.

Later, to find the relative importance of HFDI vs VFDI, Carr, Markusen and Maskus (2002) used the knowledge capital model in their study. To conduct this study, they used a panel (1986-94) of cross-country data of the activities of US MNEs and of foreign subsidiaries based in the US to estimate models that integrate both HFDI and VFDI. They used the factor endowment differences as an important control not found in gravity based specifications.

In the knowledge capital model, they used the real affiliate sales by the firms in the host country as the dependent variable and the independent variables included in their study were sum of GDP of the two involved countries, square of difference of GDP, skill endowment difference, trade cost, investment cost etc. These are mostly the country characteristics and they influence HFDI and VFDI differently. Their impacts are as follows -

Size of Countries

Size of countries is an important factor in the decision of the firm, whether to go for FDI or not. Size is taken into consideration using the GDP of the two countries as we need the economic size and not the geographical one. Larger market size increases MNE affiliate production. As investment in a country involves large initial fixed cost, firms are willing to invest if they have higher changes to get it back and the larger the host market, the higher is the chances of MNE to get back its fixed cost of the foreign plant as it provides larger consumer base for its product. Theory also suggests that the relative size of home and host countries also matters for FDI. Model of HFDI predicts that the MNEs tend to replace national exporting firms with multinational firms when national markets are of similar size. The degree of similarity in home and host countries GDP's has a positive impact on the volume of multinational activity.

Skill Endowments of Labor

Skill endowments of labor of a country refers to the proportion of the workforce comprising of skilled labor like administrative worker, researchers, professionals, officers etc. to the total size of the employed labor force. This gives a relative measure of the labor quality in two countries. Carr (2001), suggests that affiliate sales are higher the larger the difference in the relative supply of skilled labor between the home and the host countries. But the theory of HFDI predicts that affiliate activity is promoted by similarity in relative skill endowments between home and host country. On the other hand, theory of VFDI predicts that it increases with the difference in relative skill endowments between the home and host countries. The firms tries to exploit the benefits of this relative skill endowment differences and cheap labor availability in host country and sets it stage of production at geographical location where the cost of production for that component can be minimized.

Trade Cost

Trade costs are very important determinant of FDI,and studies consider a variety of components of such costs including transport costs, distance and trade policy barriers.Impacts of trade cost on FDI can be positive or negative depending on the type of FDI. When looking at aggregate flows (dominated by HFDI), studies look at alternative modes of supplying a foreign market, exports and sales of a foreign subsidiaries. They find that sales of foreign subsidiaries become more important relative to trade the higher are trade costs. In contrast, VFDI is discouraged by higher trade costs. trade barriers, transport costs and distance discourage vertical investments as they increase the cost of trading components between production units.

Earlier, the physical land and sea distances between the two trading countries was taken as a proxy measure for this but, here the trade cost data is taken from world bank database where symmetric bilateral trade costs are computed using the Inverse Gravity Framework which estimates trade costs for each country pair using bilateral trade and gross national output.

Investment Cost

A firm incurs different kinds of cost to set up its affiliate in another country to expand its production. These costs include the cost of infrastructure development i.e. construction of offices, manufacturing units etc., cost on training of the workers. Firm incurs very high initial fixed cost to expand. Other than this there are other country specific costs like the corporate tax rate which influences the decisions of a firm. The policy makers reduce these taxes to encourage inward FDI in their countries as it helps in the economic and technological development of the country. Differences in tax influences the choice of where to locate the investment, once the decision to undertake an investment has already been taken. In case of HFDI, we expect it to be larger among the more similar home and host countries but VFDI increases with differences in factor endowments and factor costs, as this is what investors are looking for. In Brainard (1997), the difference in the per worker GDP of two countries, captures the factor endowments differences between two countries. The positive coefficient of this variable suggests that it is associated with high exports rather than affiliate sales and hence it promotes VFDI, not HFDI.

DATA SOURCES

Data are the backbone of any empirical study. Here, trade data is required to conduct the study and it is difficult to find a complete trade data set. So, different data sources are used to collect data on different indicators required in the study. Different data involved in this empirical study include data on real affiliate sales of multinational firms in the host country, Gross Domestic Product (GDP) of two countries (i.e. host and parent country), total employment, skilled labors employed, trade cost between the two countries and the corporate tax rate in the host country as a proxy for the investment cost incurred by the multinational firm in the host country to setup and run its affiliates there.

U. S. Bureau of Economic Analysis provides data on multinational enterprises and foreign direct investment inwards or outwards of the country, U.S. To exploit the benefits of the data set compiled by U.S. BEA, I have used U.S. as one of my two countries i.e. either as the parent country or as the host country. The data on the real affiliate sales by the affiliates of the firms, in host country, is obtained from this data set. When U.S. is taken as the parent country then data is compiled on 29 other countries and when U.S. is taken as host country then real affiliate sales from 15 other parent country is taken into consideration. All the data is collected for a period of 10 years i.e. from 1997 to 2006.

World Bank also compiles a good data set on different economic indicators of a country over the year. The data of the GDP of all the countries is taken from this data set. It has also compiled a new trade cost database which has data for International trade cost between two countries (as Reporting and Partner countries), so the data for trade cost is taken from this data set.

Data on labor employment, conditions, work categories and other factors can be found from the International Labor Organization website. It compiles a complete data set on labor conditions in different countries over the year. So, data on total employment is obtained from this data set. It also provided employment based on different work categories. From this data set, 0/1 Professional, technical and related workers , 2 Administrative and managerial workers and 3clerical and related workers are taken as skilled labor of the country for the given year. So, total skilled labor number is found by summing employment in these categories. Skill endowment term taken into the study is basically the ratio of skilled labor upon total employment in the country in the respective year. .

MODEL

To estimate relative importance of HFDI and VFDI, Carr, Markusen and Maskus used the Knowledge Capital Model in their paper. The model is given as -

$$AS_{ij} = \beta_0 + \beta_1(GDP_i + GDP_j) + \beta_2(GDP_i - GDP_j)^2 + \beta_3(SK_i - SK_j)$$

$$+\beta_4(GDP_i - GDP_j)(SK_i - SK_j) + \gamma X_{ij} + \varepsilon$$

where,

AS_{ij} = Real affiliate sales by firms, headquartered in country i, in country j.
GDP_i or GDP_j = GDP of country i or j respectively.
SK_i or SK_j = Skill endowments of country i or j respectively.
X_{ij} = vector of independent variables including investment barriers, geographical distance etc.
γ = Vector of regression coefficients.

In this model, they predicted that the horizontal FDI will be relatively important if -

$\beta_1 > 0$: Larger the economy size, larger is the HFDI.

$\beta_2 < 0$: Higher dissimilarity in two countries, reduces the likelihood of HFDI.

Also this model

In this study, the model that is going to be used is very similar to the knowledge capital model given by Carr, Markusen and Maskus.

$$\ln(sales_{ij}) = \beta_0 + \beta_1 \ln(sumgdp) + \beta_2 \ln(squaregdp) + \beta_3 \ln(sk)$$

$$+\beta_4 \ln(tc) + \beta_5 \ln(corp) + \varepsilon$$

where,

$sales_{ij}$ = Log of Real affiliate sales by firms, headquartered in country i, in country j.
$sumgdp$ = Sum of GDP of two countries, i and j.
$squaregdp$= Square of difference of GDP of country i and country j.
sk = Ratio of skill endowments of country i and j.
tc = Trade costs between two countries.
$corp$ = Corporate tax rate between two countries.

Here, log of different values like real affiliate sales, sum of GDP, square of difference of GDP, skill endowments ratio, trade cost, and corporate rate is taken to scale down these terms and bring it to a common scale, but on applying log to different terms the product term of skill endowment difference and the GDP difference becomes highly correlated with the square of GDP difference and the skill endowment difference term. Many studies have suggested that HFDI is more prevalent and important than VFDI. But, this paper tries to test this result empirically. So, in the above regression equation, sum of GDP of home and host countries is expected to have positive effect on horizontal affiliate activity. Another variable is squared difference in home and host countries GDP's, it captures degree of dissimilarity in country size which is expected to have a negative effect on horizontal affiliate activity. While, vertical FDI is expected to occur when home and host countries have different relative endowments of skilled labor. So, another variable that is ratio of skilled labor endowments is used to consider the effects of VFDI over real affiliate sales. I will use different econometric models to test the results provided by this model and will try to find the relative importance of HFDI and VFDI.So, our hypothesis will remain same as for Carr, Markusen and Maskus (2002).

METHODOLOGY

Since the data set compiled to study the above mentioned model is a panel data of 44 country pairs over a time period of 10 yrs. (1997-2006), we need to first check the data for non-stationarity or unit root problem. We need to run Unit Root test to check for the Unit root problem on each variables. The unit root is checked using the Levin Lin Chu t stat, Im Pesharan and Shin W stat, Breitung t-stat, ADF and PP tests. The hypothesis of the tests is as follows -

$$H_0 : \text{Unit Root Problem.}$$
$$H_A : \text{No Unit Root Problem.}$$

If there is unit root problem at level, then we need to check for it after first difference and further at second difference if the problem persists at the first difference. On running unit root test, if the null hypothesis is rejected at level then we say, variable is stationary at level i.e. I(0). Similarly, if it's stationary at first difference then I(1) and at second difference I(2).

For the variables in our model, the unit root test results are -

Variables	Unit Root Test		Inference
	Level	First Difference	
LNSALES	Accept Null	Reject Null	Stationary at First Difference I(1)
LNSUMGDP	Reject Null	---	Stationary at Level I(0)
LNSQUAREGDP	Reject Null	---	Stationary at Level I(0)
LNSK	Accept Null	Reject Null	Stationary at First Difference I(1)
LNTC	Accept Null	Reject Null	Stationary at First Difference I(1)
LNCORP	Accept Null	Reject Null	Stationary at First Difference I(1)

Figure 1. Unit Root Test Result for all variables.

The results of the unit root test shows that all the variables in our model are either stationary at level or becomes stationary after first difference i.e. they are either I(0) or I(1). Therefore, we can use Panel Auto-Regressive Distributed Lag (ARDL) Model to study the impact of different factors and their lags on the dependent variable.

Auto Regressive Distributed Lag Model

We need to apply the ARDL method. This model is called so because auto regressive means that the dependent variable depends on its own past and distributed lag means that it also depends on the past of others i.e. independent variables. Therefore, the model is of the form -

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + ... + \alpha_p y_{t-p} + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + ... + \beta_q x_{t-q} + \varepsilon$$

where, y is dependent variable and x is a vector of independent variables. The obtained result suggests that the model has very high R-squared value which shows that model defines the equation very well. Here, the value of Durbin watson stat is also close to 2, which implies very small auto correlation in error terms.

The result shows that the dependent variable depends significantly on its own lagged value (-1) and lnsumgdp, lnsumgdp(-1), lncorp(-2) etc. Though not all results are significant but the association of

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNSALES(-1)	0.980838	0.006187	158.5202	0.0000
LNSUMGDP	7.758073	2.265482	3.424468	0.0007
LNSUMGDP(-1)	-7.393249	2.237563	-3.304152	0.0011
LNSQUAREGDP	-1.405295	1.074735	-1.307573	0.1920
LNSQUAREGDP(-1)	1.660842	1.108885	1.497759	0.1353
LNSQUAREGDP(-2)	-0.374124	0.480621	-0.778417	0.4370
LNSQUAREGDP(-3)	0.179014	0.267228	0.669892	0.5035
LNSKRATIO	0.001376	0.005414	0.254162	0.7995
LNTC	-0.006285	0.017771	-0.353641	0.7239
LNCORP	-0.097079	0.076546	-1.268247	0.2057
LNCORP(-1)	-0.171058	0.115143	-1.485614	0.1385
LNCORP(-2)	0.228190	0.081359	2.804741	0.0054
C	-14.06058	3.696544	-3.803709	0.0002

R-squared	0.995543	Mean dependent var	24.52807
Adjusted R-squared	0.995360	S.D. dependent var	1.515262
S.E. of regression	0.103211	Akaike info criterion	-1.662525
Sum squared resid	3.121193	Schwarz criterion	-1.504334
Log likelihood	267.3664	Hannan-Quinn criter.	-1.599259
F-statistic	5453.823	Durbin-Watson stat	1.871483
Prob(F-statistic)	0.000000		

Figure 2. ARDL Model Results

lnsumgdp, lnsquaregdp, lntc and lncorp all are in accordance with theory to support the dominance of HFDI. lnskratio is not supporting HFDI, but its highly insignificant.

Based on the results of the ARDL method, we can write our short run equation as

$$ln(sales_t) = C_0 + C_1 ln(sales_{t-1}) + C_2 ln(sumgdp_t) + C_3 ln(sumgdp_{t-1}) + C_4 ln(squaregdp_t) +$$

$$C_5 ln(squaregdp_{t-1}) + C_6 ln(squaregdp_{t-2}) + C_7 ln(squaregdp_{t-3}) + C_8 ln(skratio_t) + C_9 ln(tc_t) +$$

$$C_{10} ln(corp_t) + C_{11} ln(corp_{t-1}) + c_{12} ln(corp_{t-2})$$

This gives the association of dependent variable with its lagged, independent variables and their lagged values in short run.We will also check the long run relationship among these factors. First, we will show how the lagged values are selected and will check the existence of any long run relationship.

Model Selection : Akaike Information Criterion (AIC)

The Panel ARDL method selects for different lags for the regressors and the dependent variable. In the above regression, the selected lag model is ARDL(1, 1, 3, 0, 0, 2). It is selected on the basis of Akaike Info Criterion (AIC). AIC measures the relative quality of statistical models for a given set of data. It provides the relative estimate of the information lost when a given model is used to represent the process that generated the data. Though it can't say anything about the absolute quality of the model, it helps selecting the relatively best model.

$$AIC = 2k - 2\ln(L)$$

where,

k = number of estimated parameters in the model

L = maximum value of likelihood function for the model.

This helps minimizing the information lost in different models. So, the model with lowest AIC gets selected as the preferred model. Fig. 3 shows different AIC values and hence, ARDL(1, 1, 3, 0, 0, 2) gets selected.

Also, we need to check whether there is a long run relationship in our model or not. We can do this using Bounds Test.

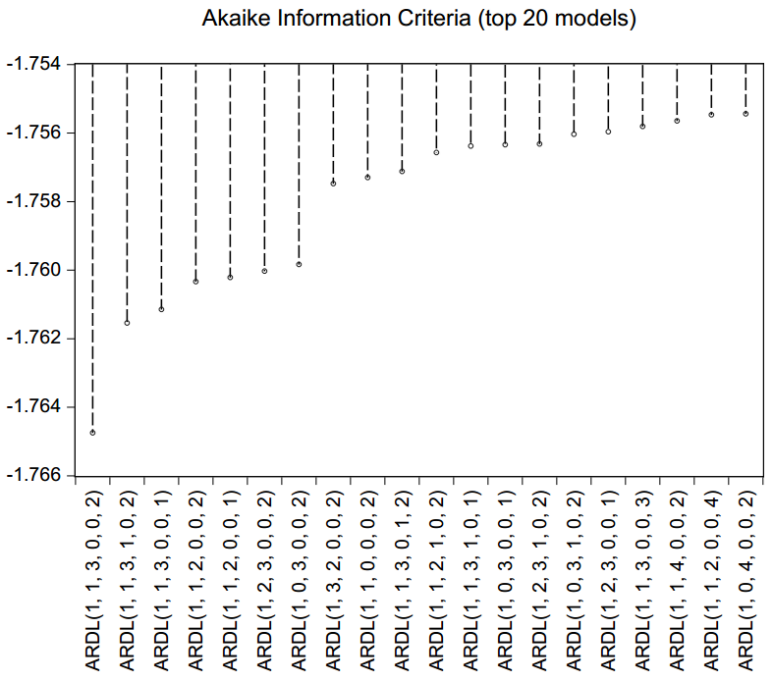

Figure 3. Model Selection : Akaike Info Criterion Graph (AIC)

Long Run Relationship Test : Bounds Test

The null hypothesis in bounds test says that there is no long-run relationship but the output of the Bounds test shows that the F-statistic value is greater than the critical values given at the 10%, 5% and 2.5% significance level, but is smaller than the critical value at 1% significance level. So, we can reject the null hypothesis here, and can say that there is a long run relationship existing in the model at 10%, 5% and 2.5% but not at 1% significance level.

ARDL Bounds Test
Date: 04/14/16 Time: 01:53
Sample: 2000 2006
Included observations: 306
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	3.875882	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73
1%	3.06	4.15

Figure 4. Bounds Test Output

The coefficients for the long run equation is given in Fig. 5. Fig 5. also shows the long run co-integration equation coefficients with the error correction term given as *Cointeq* .

Based on these long run coefficients, we can write the long run equation as

$$ln(sales_t) = \alpha_0 + \alpha_1 ln(sumgdp_t) + \alpha_2 ln(squaregdp_t) + \alpha_3 ln(skratio_t) + \alpha_4 ln(tc_t) + \alpha_5 ln(corp_t)$$

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNSUMGDP)	7.767674	1.602294	4.847845	0.0000
D(LNSQUAREGDP)	-1.397897	0.777474	-1.797998	0.0732
D(LNSQUAREGDP(-1))	0.164886	0.270222	0.610187	0.5422
D(LNSQUAREGDP(-2))	-0.168533	0.208810	-0.807115	0.4203
D(LNSK)	-0.051513	0.054037	-0.953291	0.3412
D(LNTC)	-0.024399	0.064064	-0.380857	0.7036
D(LNCORP)	-0.096233	0.074749	-1.287403	0.1990
D(LNCORP(-1))	-0.231689	0.076306	-3.036331	0.0026
CointEq(-1)	-0.019050	0.003649	-5.219910	0.0000

Cointeq = LNSALES - (19.0388*LNSUMGDP + 3.1540*LNSQUAREGDP + 0.0718*LNSK -0.3280*LNTC -2.0847*LNCORP -733.7692)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNSUMGDP	19.038820	5.568942	3.418750	0.0007
LNSQUAREGDP	3.154030	2.588598	1.218432	0.2240
LNSK	0.071804	0.278121	0.258175	0.7965
LNTC	-0.327975	0.877252	-0.373866	0.7088
LNCORP	-2.084677	1.261969	-1.651924	0.0996
C	-733.769150	288.694791	-2.541678	0.0115

Figure 5. Co-integrating Form and Long Run Coefficients

CONCLUSION

Most of the literature suggest that the size of the gdp of the countries involved in FDI matters for the promotion of HFDI and the results obtained by our study also suggested the same. The positive dependence of affiliate sales of a firm in host country on the lnsumgdp (which is a proxy for the size of the two economies involved) supports the theory of HFDI. Also, the theory of HFDI shows that it is more likely to have HFDI in two similar size of markets, so the term lnsquaregdp which captures the dissimilarity in market sizes has a negative coefficient which implies that decrease in dissimilarity of market sizes (or increase in similarity in market sizes) promotes the affiliate sales or say the horizontal activity of the firms.

So, the empirical study supported the literature and suggested that the global market is largely dominated by the Horizontal form of foreign investment rather than vertical investment.

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APPENDIX

Country Pairs

When U.S. is parent country, Host country included -

Argentina, Australia, Belgium, Brazil , Canada, Chile, Germany, Hong Kong, Ireland, Indonesia, Italy, , Israel Japan, Korea, Malaysia, Mexico , Netherlands, New Zealand, Norway, Peru, Phillipines, Singapore, South Africa, Spain, Switzerland, Thailand, Turkey, United Kingdom and Venezuela

When U.S. is host country, Parent country included -

Australia, Canada, Denmark, Germany, Hong Kong, Iceland, Israel, Italy, Japan, Korea, Netherlands, Singapore, Spain, Switzerland, and United Kingdom

90% and 95% Confidence Intervals for variables

Coefficient Confidence Intervals
Date: 04/15/16 Time: 11:16
Sample: 1997 2006
Included observations: 306

		90% CI		95% CI	
Variable	Coefficient	Low	High	Low	High
LNSALES(-1)	0.980838	0.970628	0.991048	0.968660	0.993015
LNSUMGDP	7.758073	4.019866	11.49628	3.299392	12.21675
LNSUMGDP(-1)	-7.393249	-11.08539	-3.701111	-11.79698	-2.989515
LNSQUAREGDP	-1.405295	-3.178684	0.368094	-3.520474	0.709885
LNSQUAREGDP(-1)	1.660842	-0.168896	3.490581	-0.521547	3.843232
LNSQUAREGDP(-2)	-0.374124	-1.167183	0.418935	-1.320031	0.571784
LNSQUAREGDP(-3)	0.179014	-0.261931	0.619959	-0.346916	0.704944
LNSK	0.001376	-0.007557	0.010309	-0.009278	0.012030
LNTC	-0.006285	-0.035609	0.023039	-0.041260	0.028691
LNCORP	-0.097079	-0.223384	0.029227	-0.247728	0.053570
LNCORP(-1)	-0.171058	-0.361053	0.018936	-0.397671	0.055554
LNCORP(-2)	0.228190	0.093943	0.362438	0.068069	0.388312
C	-14.06058	-20.16013	-7.961017	-21.33572	-6.785432

Figure 6. 90% and 95% Confidence Intervals

Actual, Fitted and Residual Graph

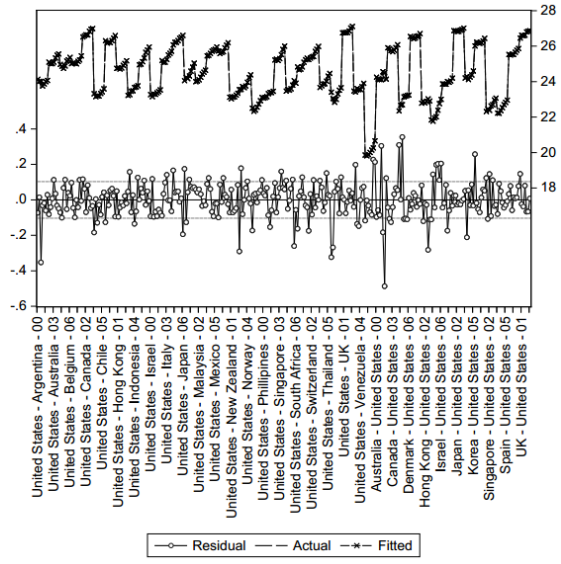

Figure 7. Actual, Fitted and Residual Graph

It shows the curve fitting, and the actual and fitted curves are overlapping. This can be verified from the very high R-squared value of approx. 99% obtained in our test.