IMPACT OF FDI AND FTA ON INDIAN INDUSTRIES

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INTRODUCTION

After the easing of the rules in sectors such as defence, Public Sector Unit (PSU) oil refineries, telecom, power exchange, and railways, foreign direct investment inflows in India have shown all-time hit of $60.1billion in 2016-17, according to Ministry of Commerce and Industry. In last three years, the government has eased 87 rules across 21 sectors to attract global investment and to accelerate economic growth of the economy. Foreign Direct Investment (FDI) rules were reformed across sectors such as broadcasting, retail trading and air transport. Foreign investment cap was hiked to 49% in insurance and pension from the earlier 26%. In addition, initiative such as introduction of composite caps in FDI policy and raising the approval limits of FIPB were also undertaken to promote ease of doing business in India. In retail trading of food products, the government permitted 100% FDI unconditionally.

The Indian government's favourable FDI policy regime is justified on the ground that foreign direct investment is not only a major source of non-debt financial access for the economic development of India, it also facilitate technology and productivity spillovers from the direct imitation of advanced production techniques. Rana Hasan (2001) examined the impact of foreign and domestic technologies on the productivity of Indian manufacturing firms using panel data. The result indicated a significant impact of foreign disembodied technologies on productivity. Domestic technologies also influenced domestic productivity positively.

However many studies give evidence that an increase in foreign presence failed to increase productivity growth Blomstrom (1986). In a meta-analysis of 32 empirical studies, Wooster and Diebel (2010) show "evidence of intra-sectoral spillovers from FDI in developing countries is weak at best." Keller also observed that there are no horizontal technology spillovers from FDI in less developed countries. The reason behind this would be there is a wide technology gap between multinationals and domestic firms. Hence the domestic firms lack the absorptive capacity of the production techniques (Haskel et.al. 2007; Blalock and Gertler, 2008). Blomstrom and Wolff (1989) found faster productivity growth and faster convergence of productivity levels in sectors with higher level of foreign ownership. In developed countries where the technology gap between the foreign and domestic firms is much less, there are evidences of positive spillovers (Haskel et. al. and Keller and Yeaple, 2009).

Many studies both theoretical and empirical have shown linkages between trade and foreign direct investment, i.e. how FDI is related to international trade. Trade and FDI can be related through policies such as preferential trade agreements and tariff reduction. Foreign investment can enhance technological capabilities. The countries, which are more open to trade, are more likely to attract inward investment (Narula and Wakelin). Foreign investors will face new incentives to penetrate these markets and take advantage of their expanded markets by exporting to the participating countries of the Free Trade Agreement (FTA) with lower or zero tariffs (Motta & Norman, 1996; Neary, 2002; Donnefeld, 2003).

At this background, the present paper tries to show the impact of both FDI and FTA on the different sectors of the economy in India. The paper is divided into two main sections. In the first part, this paper tries to explore whether there is a positive spillovers of FDI. It tries to analyze the holistic as well as detailed picture of the impact of FDI on R&D and Domestic Investment across different industries in India. In the second section, this paper tries to shed new lights on the importance of trade policies- specifically free trade agreements (FTA) on the changes of trade creation and trade diversion and social welfare of the economy. This paper assumes that in those industries where there is spillovers of R&D and domestic investment due to FDI there are chances of trade creation , trade diversion and welfare impact after the tariff reduction under the FTA.

The study would use industry-level panel data in India's manufacturing and service sectors to show evidences of positive spillovers due to foreign presence. It is assumed that impact of FDI on these dependent variables is different in each industry. This is more detailed study than assuming a common effect of FDI on these variables in India as a whole. For the impact of FTA between India and ASEAN, the study would use partial equilibrium model for the year 2016.

SOURCES AND TYPES OF DATA

In the present study the industry-wise data have been collected from Centre for Monitoring Indian Economy (CMIE), Prowess database. The firms in the data set account for approximately 80% of manufacturing output in India. Detailed product financial information according to two-digit ISIC codes are provided. The data set is an unbalanced panel of eight Indian industries over ten periods from 2007 to 2016. While simulating the impact of FTA between India and ASEAN, the tariff data of both the countries would be taken from the COMTRADE for the year 2016. Simple mean tariffs for all commodities, primary goods and manufactured goods are used rather than weighted mean tariff. Simulations are done for three major product groups/categories to estimate the likely impact of FTA on their trade.

METHODOLOGY

The study attempts to examine the impact of FDI on Indian industries. The study covers a time period of ten years from 2007 to 2016 for the eight industries. The three models selected in this context are pooled model with common intercept and slope, panel model with constant slope and heterogeneous intercept and seemingly unrelated regression (SUR) model with heterogeneous intercept and slope. Since international trade is a dynamic process, panel data is the most appropriate for systematic and efficient analysis (Dunning, 1993, Baltagi, 1995). Panel data allows us to study dynamic as well ross-sectional aspect of a problem. Panel data usually gives a large number of data points, increasing the degree of freedom, reducing the collinearity among the explanatory variables, hence improving the efficiency of econometrics estimates.

1 Specification of Model 1(FE or RE)

The model adopted for the *present study is* one where varying intercept terms are assumed to capture differences in behavior over individuals and where the slope coefficients are assumed to be constant.

This model in general can be written as:

$$Y_{it} = \alpha_i + \sum_{k=1}^{K} \beta_k X_{kit} + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

i = 1, 2 ...N

t = 1, 2 ...T

Thus Y_{it} is the value of dependent variable for the ith individual (industry) at time t.

$\boldsymbol{X_{kit}}$ is the value of the determinants for industry-wise analysis.

The appropriate estimation procedure for this model depends upon whether the $\boldsymbol{\alpha_i}$ are assumed to be random or fixed. If the $\boldsymbol{\alpha_i}$ are fixed it is fixed-effects model while if $\boldsymbol{\alpha_i}$ are random it is random-effects model.

Fixed effects model

The generalization of constant-intercept and slope model for panel data is to introduce dummy variable to allow for the effects of those omitted variables that are specific to industry cross-sectional units but stay constant over time and the effects that are specific to each time-period but are the same for all cross-sectional units. In the present study no time-specific effects are assumed and the focus is on only individual-specific effects. Thus, the values of dependent variable for the i^{th} units at time t, Y_{it} depend on K exogenous variables (X_{1it}, X_{2it},.........,X_{kit}) that differ across industries in a cross-section at a given point in time t, and shows variation through time; but the variables that are specific to the i^{th} units stay constant over time. In (FE) model, the α_i is assumed to be fixed (invariant over time).

Thus we can write the model as:

$$lnY_{it} = e_i\alpha_i + \underset{(1*k)}{\beta'} \underset{(k*1)}{\ln X_{it}} + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$i = 1, 2 ...N$

$t = 1, 2 ...T$

β' is a *1*K* vector of constants and α_i is *1*1* scalar constant representing the effects of those variables peculiar to the i^{th} industry cross-sectional units that stay constant over time. e_i is the dummy variable for the i^{th} industry, and u_{it} represents the effects of the omitted variables that are peculiar to both individual and time. We assume $\boldsymbol{u_{it}}$ to be uncorrelated with $\boldsymbol{x_{it}}$ and are independently and identically distributed random variable with mean zero and variance $\boldsymbol{\sigma^2 u}$.

Random effects model

In FE model, the effects of omitted variables (individual-specific) are considered as fixed constants over time, whereas in the RE model, the individual-specific effects are treated as random variables. Thus, the α_i is assumed random. So in this case, α_i is distributed independently and identically with mean zero and constant variance. Hence, the model is:

$$lnY_{it} = \mu + \beta' \ln X_{1it} + v_{it} \quad (3)$$

(1*k) (k*1)

$i = 1, 2 ...N$

$t = 1, 2 ...T$

$$\boldsymbol{v_{it} = \alpha_i + u_{it}}$$

where α_i is the individual-specific time invariant variable and u_{it} represents the effects of the omitted variables that are varying with both individual and time.

In the present study, two tests have been applied to identify the best statistical model. First, Hausman specification test has been used while comparing FE model with RE model.

Hausman Test: H_o: Random effects

H_a: Fixed effects

Testing for Fixed effects

We wish to test the joint significance of the intercepts capturing the unobserved individual effects of the fixed effects model. The pooled regression model has been used as the base line for our comparison. The joint significance test of these intercepts has been performed with an F-test

F - Test: $H_o: \alpha_1 = \alpha_2 = \alpha_3 = ... = \alpha_N$

H_a: *All possible alternatives*

$$F = \frac{(RRSS - URSS) / (N - 1)}{URSS / (NT - N - k)}$$

Where, RRSS = restricted residual sum of squares is the OLS on the pooled model.

URSS = unrestricted residual sum of squares being the least square dummy variable

F-test has been carried out on the residual sums of squares for FE and pooled data model to show that there are variations in the unobserved industry-specific effects. The basic idea behind the statistical test is as follows: if unobserved individual-specific effects do not exists, pooled (OLS) estimators are the best linear unbiased estimators and GLS estimators are inefficient and vice-versa. The procedure for restriction tests and model selection is discussed in Judge et al. (1980), Hsiao (1986) and Baltagi (1995).

Specification of Model 2 (SUR)

Any inference on the impact of FDI based on panel data model can be erroneous because of the simultaneity between the dependent and independent variables. There is reason to expect that r&d and domestic investment are simultaneously determined in a system of equation. In principle, the endogeneity problem can be tackled by applying instrumental variable techniques but the fundamental problem with this technique is that there is no ideal instrument available. A good instrument would be a variable which is highly correlated with FDI but not with the error term in these regressions. The results of these instrument variable estimation are reported in a similar analysis by E. Brensztein, j. De Gregoris and J.W. Lee (1998) where it is suggested that the instrumental variable estimation yields qualitatively similar result to those obtained by Seemingly Unrelated Regression (SUR) estimation. So I have used SUR model to estimate the effects of FDI on r&d and domestic investment across eight industries.

Panel estimator is a standard where slope coefficients are assumed constant, and the intercept varies over individual capturing the effects of those omitted variables that are specific to individual cross-sectional units but stay constant over time. However, it is quite possible that different attributes over the industries will be reflected in different slope coefficients (Judge, 1985). This may be due to the changing economic structures or due to different socioeconomic and demographic factors that allows the response parameters to vary over time and /or may be different for different cross-sectional units (Hsiao, 2003). In seemingly unrelated regression (SUR) model, the response parameter are allowed to vary from one unit to another invariant over time and the errors are allowed to be contemporaneously correlated and heteroscedastic between individuals. So SUR model approach has been used to examine the attributes of those sectors in which FDI has come in a larger amount in the Indian economy.

When regression coefficients are treated as invariant over time, but varying from one unit to another, we can write the model as:

$$Y_{it} = \sum_{K=1}^{K} \beta_{ki} x_{kit} + u_{it} \qquad (4)$$

$$= \sum_{K=1}^{K} (\bar{\beta}_k + \alpha_{ki}) x_{kit} + u_{it} \qquad (5)$$

$$i = 1, 2 \ldots N$$

$$t = 1, 2 \ldots T$$

Where, $\bar{\boldsymbol{\beta}} = (\bar{\beta}_1 \ldots \bar{\beta}_k)'$ is the common mean coefficient vector, and $\boldsymbol{\alpha}_i = (\alpha_{1i} \ldots \alpha_{ki})'$ the individual deviation from the common mean $\bar{\boldsymbol{\beta}}$. Here individual observations are heterogeneous, hence $\boldsymbol{\alpha}_i$ are treated as fixed constants. When $\boldsymbol{\beta}_i$ are treated as fixed and different constants, we can stack the N T observations in the form of Zellener (1962) seemingly unrelated regression (SUR) model.

3. The Software for Market Analysis and Restrictions on Trade (SMART) Model

For the second part, this study investigates the potential economic impacts of India-ASEAN FTA using SMART model. The SMART model is developed by UNCTAD and World Bank and is available in the World Bank's Integrated Trade Solution (WITS). The WITS brings together the various database on trade flows and trade policy instruments. It also integrates analytical tools that support simulation analysis.

The smart model is one of the analytical tools in the WITS used for simulation purposes. It contains in-built analytical modules that support trade policy analysis, covering the effects of multilateral tariff cuts and preferential trade liberalisation. It focuses on one importing market (in our case India) and its exporting partners (in our case ASEAN) and assessing the impact of a tariff changes. I tried to run the SMART model to quantify the trade impact of the proposed tariff reduction scenarios in each sectors. The SMART model focusses on the changes in imports in particular market when there is change in the trade policy (tariff reduction). One special advantage of the SMART model is that it allows quantifying impacts of tariff policy changes in a single market on trade flows, tariff revenue, trade creation effect, trade diversion effect, and social welfare of a nation detailed at HS 6-digit products(Cheong 2010; Ahmed 2010; Othieno and Shinyekwa 2011; Choudhry et al. 2013).

HYPOTHESES FORMULATION

The literature on FDI and its impact tend to suggest a host of factors responsible for FDI flows at industry level. Based on the theoretical approaches and the findings of the previous studies, the present study examined various combinations of industry specific variables over a number of alternative models. Final selection of model was done taking into consideration pair-wise simple correlation coefficients for the pooled data, unadjusted and adjusted coefficients of multiple correlation, number of significant elasticity coefficients, and meaningfulness of the signs of coefficients for the model tested by Chow-test and Hausman test. The explanatory variables along with FDI chosen for impact study are tax - intensity, import - intensity, gross fixed asset -intensity and domestic investment - intensity. Given below are the rationale for inclusion of these specific variables and the possible relationships before the empirical model is specified and tested.

R&D –Intensity spillovers

Technological and productivity spillovers are central to the study of the impact of FDI. The major findings from Asian countries suggest that these spillovers are positive, both economy wide as well as for specific industries. The present study tries to examine the spillovers of R&D

in diversified industries from very high- tech to low- tech industries such as hotel & tourism, transportation, textile, industrial machinery, machine tools, trading, electronics and electricals and chemicals.

Given the above explanations, the specific hypotheses to capture the overall effects at the industry level are formulated as follows:

Hypothesis1: There would be influences of FDI on R&D in Indian industries

Hypothesis 2: The spillovers of R&D due to FDI would change across industries.

Accordingly, the following panel data model is specified:

$$LnR\&D_{it} = \alpha_i + \beta 1 lnX1_{it} + \beta 2 lnX2_{it} + \beta 3\ lnX3_{it} + uit \qquad \ldots\ldots\ldots\ldots(1)$$

$$i = 1, 2 \ldots.8$$

$$t = 1, 2 \ldots.10$$

Where X1, X2 and X3 taken for the final model are Foreign Direct Investment (FDI), Gross Fixed Assets (GFA) and Import (IMP), all taken as percentage of sales. R&D intensity is measured as the ratio of R&D expenditure to sales.

The SUR model postulated for the impact study is as follows:

$$lnRD_{it} = \alpha_i + \beta_{1i} \ln FDI_{it} + \beta_{2i} \ln GFA_{it} + \beta_{3i} \ln IMP_{it} + u_{it} \ \ldots\ldots\ldots\ldots\ldots (6.1)$$

$$i = 1, 2 \ldots..8$$

$$t = 1, 2 \ldots 10$$

Where RD is R&D - intensity; GFA and IMP are gross fixed asset and import.

Domestic Investment Intensity Spillovers

FDI exerts a positive impact on domestic investment via productivity and knowledge spillovers. FDI brings complementary products at cheaper cost that dominates the displacement of domestic competitors. Foreign investors would bring faster economic growth through advance technology in the host country which would attract higher degree of domestic investment to exploit these competitive advantages Hence higher foreign investment would lead to higher domestic investment.

The present study tries to examine the spillovers of domestic Investment in diversified industries from very high- tech to low- tech industries such as hotel & tourism, transportation, textile, industrial machinery, machine tools, trading, electronics and electricals and chemicals.

Given the above explanations, the specific hypotheses to capture the overall effects at the industry level are formulated as follows:

Hypothesis3: There would be influences of FDI on Domestic Investment in Indian industries

Hypothesis 4: The spillovers of Domestic Investment due to FDI would change across industries.

The following panel data model is specified:

$$LnIDit = \alpha i + \beta 1lnX1it + \beta 2lnX2it + \beta 3\ lnX3it + uit \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$i = 1, 2 \ldots.8$$

$$t = 1, 2 \ldots.10$$

Where X1, X2 and X3 taken for the final model are Foreign Direct Investment (FDI), Export (Exp) and Tax (T), all taken as percentage of sales. Domestic Investment intensity is measured as the ration of domestic Investment to sales.

The SUR model postulated would be as follows:

$lnID_{it} = \alpha_i + \quad + u_{it}$ …………………….…....... (6.2)

i = 1, 2 8

t = 1, 2 ...10

Where ID is domestic investment; EXP and T are export and tax respectively.

All the variables - dependent, independent and the normalizing one (sales) - have been deflated by the appropriate price indices (wholesale price index, export and import indices) with 1985 as the base, to abstract from the influence of price changes. All the independent variables are expressed as percentages of sales and they represent their respective intensities. The dependent variable (Y) is FDI as a percentage of sales deflated by wholesale price index. Then entire values are transformed into log-linear functional form. β_i in the log-linear models as shown in equation (1) directly measures FDI elasticities with respect to explanatory variables.

Impact of FTA on Trade Flows

Under India- ASEAN FTA they have to open their economies to each other, and will induce domestic structural reforms and create competitive market environment in both countries particularly India. In this context it is important to analyse and quantify the potential trade between India and ASEAN under an FTA and identify the specific areas wherein a reduction of trade barriers could result in mutual benefit.

At this backdrop the study proposes to examine the costs and benefits in those sectors which are having advantages of spillovers from FDI. Was the FTA likely to create impact on trade, social welfare and consumer surplus in those industries which enjoy competitive advantage from FDI

Hypothesis 5: An FTA between India and ASEAN increases the economic activities (in terms of welfare, trade flows – trade creation and trade diversion) of different sectors in India.

RESULTS and DISCUSSIONS

R&D Spillovers

Overall Impact

The panel data model industry wise impact is shown in the table (1) . The dependent variable is r&d-intensity which is measured as the ratio of r&d expenditure to sales. The Hausman test shows RE model superior to FE model. RE model reveals that overall impact of FDI on r&d-intensity in the above industries is positive and significant at 1%.

Industry-Specific Impact

The SUR model result shows that except for textile and hotel and tourism, the impact of FDI on r&d –intensity in the above industries is highly positive (table 2). This shows that technology spillovers through FDI are easy to absorb in the high-tech and high-skill industries. In contrast the medium r&d intensive industries viz. hotel and tourism etc. seem to be not so fit for such spillovers. The estimated spillovers differ sharply in the high-tech and low-tech industries. As expected spillovers are larger in magnitude and exhibit a high degree of statistical significance, in technological intensive sectors.

Domestic Investment spillovers

Overall Impact

The Hausman test shows that FE model is superior to RE model. FE model suggests that FDI has positive and significant impact on domestic investment for the industry as a whole (Table 3).

Industry-specific Impact

The result from SUR model indicates that FDI has positive impact on domestic investment, as the estimated coefficient is positive and statistically significant in almost all the industries as shown in table (4). The positive relationship implies that FDI stimulates or crowd-in domestic investment. This findings is consistent with Borensztein, Gregoria and Lee (1998). The result show that 1% increase in FDI is associated with an increase of more than 1% in domestic investment in hotel & tourism, transportation, industrial machinery, electronics & electricals and chemicals. Higher FDI inflows in particular industry mean a higher level of competiveness among the domestic producers, which attracts domestic investors to capture those competitive advantages.

Results for the Impact of India-ASEAN FTA

India Opens Market to ASEAN countries: The present study examines the impact of zero tariffs by India on the above sectors such as transport sector, electronics & electricals and organic chemicals, which are showing a positive impact of FDI.

SMART simulation was run for **Transport sector** for the year 2016. When India reduces tariff for ASEAN countries, its import from ASEAN could be decomposed into two parts namely trade creation and trade diversion. Under the tariff reduction, the ASEAN products would be cheaper than before and the ASEAN imports would replace high cost domestic production. This is called the trade creation which improves welfare as domestic resources are allocated more efficiently but creates competition from the domestic producers. In addition, it would lower the price of ASEAN products relative to products from other parts of the world. The increase in India's import from ASEAN due to reduction of the ASEAN's relative price is called trade diversion, which lowers welfare because the low cost production from the rest of the world is replaced by less efficient FTA member and production is forced to shift away from the comparative advantage. The results from all the tables reveal that trade creation dominates over trade diversion in all the products under zero tariff scenario. Thus it is clear that trade creation improves welfare as the new imports replace the high cost of domestic production. The value of the net welfare gains for India in these group is $117.6 million and the consumer surplus is $54.41 million. Before the scenario the imports were $4.70 billion but after the tariff was reduced to zero the change in imports was $219.26 million.

Tariff reduction by India leads to significant tariff loss to the Indian government. The gain in consumer surplus due to the fall in the domestic price outweighs the loss in tariff revenue leading to net welfare gain due to gain in consumer's surplus. The assumption of infinite export supply elasticity implies that tariff reduction by ASEAN will not affect the prices in India- that means the price effects are zero.

Trade Creation and Trade Diversion is highest for Thailand and Indonesia, because the tariff rate is very high for Thailand and Indonesia. So when the tariff is reduced the Chinese exporters take the advantage of free market access in India. However, tariff is very high for Philippines but the trade creation and trade diversion is less even when India reduces its tariff.

Similarly, the simulation results for **Electronics and Electricals** (HS Code 85) show that India is gaining more in welfare terms. The value of the welfare gain for India after the scenario is $5.66 million. The simulation results show that Imports before the tariff reduction was $ 37 billion and after the scenario the import change was $70.99 million. Trade creation and trade diversion are not very high for all the countries as the tariff isunexpectedlylow before the scenario.Trade creation is higher than the trade diversion and the trade creation improves the welfare as domestic resources are allocated more efficiently but creates competition from the domestic producers.

For **Organic Chemicals** the simulation result shows that India is in the advantageous position after the FTA, however the tariff is very low in India. The value of import before the tariff reduction by India was $40.76 billion and the import change after the scenario is $93.19 million. The increase in India's import due to reduction of the ASEAN's organic chemical relative price is the trade diversion, which may lower the welfare because the low cost production from the rest of the world is replaced by less efficient FTA member. The tariff change is $-11.6 million and the trade creation is greater than trade diversion in all the countries except Thailand. This trade creation increases the welfare to $4.16 million as the domestic resources are allocated more efficiently and creates competition in the domestic market.

CONCLUSIONS and RECOMMENDATIONS

This paper examined the impact of FDI and FTA on Indian industries using panel data model and SMART model. The panel data set consists of eight industries over ten periods from 2007-20016. The SMART model is run for India –ASEAN FTA for the year 2016. The study found out those industries which showed positive spillovers due to FDI also have a welfare gain and increase in the trade flows disintegrated into trade creation and trade diversion effect. The country would benefit from the free trade by opening itself further to international competition. The success of FDI and FTA is linked to each other. The present study found that there is spillovers of R&D in sectors such as, trading, transport, industrial machinery, machine tools and electronics and electricals and chemicals and positive impact of FDI on domestic investment in sectors such as hotel & tourism, transport, electronics and electricals and chemicals. To see the impact of FTA between India and ASEAN countries simulation was carried out for these sectors such as transport, electronics and electricals and chemicals. It was found that where there are spillovers due to FDI, a reduction in tariff under the FTA would improve the social welfare and also increase the trade flows in terms of trade creation and trade diversion.

While negotiating with other FTA partners, the government should take a broader view of spillovers of FDI. India has very high tariff than its FTA partners, hence in view of more unexploited potentials, a tariff reduction in those sectors should be applied where there is significant impact of FDI. India had pursued the route of high protection for long time but the scope for expansion of the industry is many times if we open our economy to the world markets. However, to protect the interest of farmers and labour-intensive sectors good institutions and efficient regulatory environment is needed to act as a catalyst to flow through the economy.

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Table 1.PANEL DATA MODEL (INDUSTRY-WISE IMPACT ON R&D SPILLOVER)

Variables	pooled	Fixed effects	Random effects
$\ln(X_1)$ ln(fdi)	0.735(5.624)***	0.384(4.665)***	0.464(4.560)***
$\ln(X_2)$ ln(gfa)	-1.183(-2.366)**	4.175(4.628)***	1.725(2.375)**
$\ln(X_3)$ ln(imp)	-0.075(-0.398)	0.113(0.313)	0.391(1.372)
Constant	2.841(1.296)	-	-10.700(-3.568)***
R^2	0.31	0.54	0.36
adj R^2	0.28	0.53	0.33
Nobs,Nvar	80,4	80,4	80,4

Note: Against each variable, the first row represents the coefficient and t-statistics

in the parentheses and the second row gives the standard error in parentheses.

* significant at 10percent, ** significant at 5percent, *** significant at 1percent

Haussman Test: Ho: Random Effects; Ha: Fixed Effects

Table 2. SUR MODEL (INDUSTRY-WISE IMPACT ON R&D SPILLOVER)

Variable	Hotel &tourism	Transport	Textile	Ind Mach	Mach tool	Trading	Electronics & electrical	Chemical
ln(fdi)	-0.034 (-0.222)	0.525 (8.029)***	0.032 (1.130)	0.314 (8.765)***	1.060 (4.417)***	0.731 (14.401)***	0.839 (5.631)***	0.203 (3.323)**
ln(gfa)	6.876 (5.896)***	-1.323 (-4.430)***	1.252 (3.110)**	1.179 (3.399)**	6.051 (1.907)*	-1.137 (-1.403)	7.192 (3.437)**	0.612 (2.185)*
ln(imp)	-0.692 (-1.449)	0.316 (1.565)	0.005 (0.042)	-0.036 (-0.547)	4.037 (2.222)*	-0.970 (-1.703)	-2.159 (-1.794)	0.576 (3.023)**
constant		4.826 (3.440)**	-8.809 (-5.276)***	-6.436 (-4.535)***	-38.173 (-3.252)***	4.152 (1.019)	-22.828 (-4.206)***	-5.979 (-5.135)***
R^2	0.83	0.66	0.43	0.84	0.54	0.89	0.74	0.68

adj R^2	0.75	0.48	0.45	0.77	0.30	0.83	0.61	0.53
Durbin-Watson	0.421	0.135	0.000	0.114	0.186	0.114	0.234	0.008

Note: Against each variable, the first row represents the coefficient and the second row gives the t-statistics in parentheses.

*significant at 10percent, ** significant at 5percent, *** significant at 1percent

Table 3. PANEL DATA MODEL (INDUSTRY-WISEIMPACT ON DOMESTIC INVESTMENT)

Variables	pooled	Fixed effects	Random effects
$\ln(X_1)$ ln(fdi)	0.036(1.284)	0.073(3.252)***	0.066(2.642)***
$\ln(X_2)$ ln(exp)	0.032(1.102)	0.210(2.212)**	0.049(1.295)
$\ln(X_3)$ ln(tax)	-0.235(-1.432)	0.226(1.277)	-0.005(0.029)
Constant	2.030(14.194)***	-	1.862(11.240)***
R^2	0.06	0.23	0.10
adj R^2	0.03	0.21	0.07
Nobs,Nvar	80,4	80,4	80,4

Note: Against each variable, the first row represents the coefficient and t-statistics in the parentheses and the second row gives the standard error in parentheses.

* significant at 10percent, ** significant at 5percent, *** significant at 1percent

Haussman Test: Ho: Random Effects; Ha: Fixed Effects
Statistic = 32.949; Probability = 0.000

Table 4. SUR MODEL (INDUSTRY-WISEIMPACT ON DOMESTIC INVESTMENT)

variable	Hotel&tourism	transport	textile	Indus mach	Mach tool	trading	Electronics & Elect	chemical
ln(fdi)	0.125 (5.328)***	0.111 (5.711)***	-0.076 (-1.777)	0.084 (2.661)**	-0.096 (-2.069)*	-0.002(-0.248)	0.093 (4.416)***	0.111 (5.548)***
ln(exp)	0.407(3.296)**	0.114 (3.270)***	-0.045(-0.775)	0.304 (7.734)***	1.915 (5.965)***	0.851(6.709)***	0.667 (16.633)***	1.238 (33.574)***
ln(tax)	4.722(10.709)***	1.036 (17.395)***	-0.135(-0.228)	-1.604 (-7.374)***	-1.831 (-2.439)**	-0.217 (-3.391)**	-0.365 (-6.343)***	-0.184 (-1.799)
constant	-1.103(-	1.729	2.364(4.725)***	3.507	-1.039	0.027(0.104)	0.718	-0.362

	1.995)*	(13.287)***		(13.912)***	(-1.012)		(8.486)***	(-3.276)**
R^2	0.83	0.75	-0.04	0.71	0.14	0.22	0.88	0.90
adj R^2	0.75	0.63	-0.56	0.57	-0.27	-0.17	0.83	0.86
Durbin-watson	0.034	0.021	0.005	0.018	0.0483	0.002	0.008	0.009

Note: Against each variable, the first row represents the coefficient and the second row gives the t-statistics in parentheses.

*significant at 10percent, ** significant at 5percent, *** significant at 1percent

Table 5: Smart Model for India-ASEAN FTA (Simulation Results for Transport Vehicles HS code 87)

Reporter Name	Product Code	Welfare in 1000 USD	Imports Before in 1000 USD	Import Change	Old Tariff Revenue in 1000 USD	Tariff Change In Revenue in 1000 USD	Consumer Surplus in 1000 USD
India	87	117765.1	4762581	219334.1	1284333	-155881	54414.75

Source: UN COMTRADE Data base (India is assumed to reduce its tariff to zero)

Table 6:Country-Wise Trade Total Effect Under India-ASEAN FTA (Simulation for Transport Vehicle)

Reporter Name	Partner Name	Product Code	Trade Total Effect in 1000 USD	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate
India	Cambodia	87	-16.668	0	-16.668	0	0
India	Indonesia	87	10381.05	7220.97	3160.076	11.04	0
India	Malaysia	87	2216.004	1690.887	525.117	7.58	0
India	Myanmar	87	-7.443	0	-7.443	0	0
India	Philippines	87	980.06	349.108	630.952	12.14	0
India	Singapore	87	2807.481	2669.012	138.469	9.03	0
India	Thailand	87	233083.7	206401.5	26682.15	17.38	0
India	Vietnam	87	2377.344	1002.641	1374.703	7.44	0

Table 7: Smart Model for India-ASEAN FTA (Simulation Results for Electronics and Electricals HS code 85)

Reporter Name	Product Code	Welfare in 1000 USD	Imports Before in 1000 USD	Import Change	Tariff Revenue in 1000 USD	Tariff Change In Revenue in 1000 USD	Consumer Surplus in 1000 USD
India	85	5066.878	37005268	70995.48	2479987	-37534.2	4717.423

Source: UN COMTRADE Data base (India is assumed to reduce its tariff to zero)

Table 8:Country-Wise Trade Total Effect Under India-ASEAN FTA (Simulation for Electronics and Electricals)

Reporter Name	Partner Name	Product Code	Trade Total Effect in 1000 USD	Price Effect	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate
India	Brunei	85	0	0	0	0	0	0
India	Cambodia	85	-0.021	0	0	-0.021	0	0
India	Indonesia	85	4414.302	0	2703.307	1710.995	1.3	0
India	Singapore	85	10375.3	0	6294.981	4080.32	0.9	0
India	Philippines	85	2086.153	0	1018.388	1067.766	1.06	0
India	Thailand	85	44293.48	0	35130.42	9163.063	1.18	0
India	Vietnam	85	18663.42	0	13481.24	5182.184	1.1	0

India	Malaysia	85	16646.73	0	12366.95	4279.783	1.21	0

Table 9: Smart Model for India-ASEAN FTA (Simulation Results for Organic Chemicals HS code 29)

Reporter Name	Product Code	Welfare in 1000 USD	Tariff Revenue in 1000 USD	Tariff Change In Revenue in 1000 USD	Consumer Surplus in 1000 USD	Imports Before in 1000 USD	Import Change
India	29	4169.888	944555.8	-11331.2	5902.116	14767091	93119.9

Source: UN COMTRADE Data base (India is assumed to reduce its tariff to zero)

Table 10:Country-Wise Trade Total Effect Under India-ASEAN FTA (Simulation for Organic Chemicals)

Reporter Name	Partner Name	Product Code	Trade Total Effect in 1000 USD	Price Effect	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate
India	Cambodia	29	0	0	0	0	0	0
India	Thailand	29	19865.88	0	8956.499	10909.38	1.78	0
India	Indonesia	29	6658.813	0	3556.249	3102.564	1.9	0
India	Malaysia	29	50665.46	0	42484.74	8180.72	1.51	0
India	Philippines	29	19.954	0	10.491	9.463	1.79	0
India	Singapore	29	43907.7	0	38096.13	5811.569	0.81	0
India	Vietnam	29	39.022	0	15.791	23.231	0.71	0