# Employment Effect of Foreign Direct Investment in Indian Manufacturing Industries

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# Employment Effect of Foreign Direct Investment in Indian Manufacturing Industries

*Sanjaya Kumar Malik**

[***Abstract***: *This paper examines the employment effect of foreign direct investment (FDI) in India's manufacturing industries. It also examines whether the nature of employees mediates the employment effect of FDI in the manufacturing industries. The paper employs a balanced panel data of 54 three-digit industries from the Annual Survey of Industries for the period from 2008-09 to 2015-16. Estimating a dynamic labour demand model through the System-Generalised Method of Moment estimator, it does not underscore any considerable effect of FDI on employment in India's manufacturing industries. Even after controlling for the nature of employees, FDI is not found to have any significant impact on domestic demand for labour in Indian manufacturing industries. This study thus does not consider FDI as an important channel for employment generation in the manufacturing industries in India.*]

***Keywords*:** FDI; Employment effect; Labour demand; Dynamic panel; System GMM; Manufacturing industries

## 1. Introduction

The policymakers, particularly in developing countries, are competing to attract foreign direct investment (FDI) by luring multinational enterprises (MNEs) with various investment incentives (i.e. fiscal and monetary incentives) and relaxation in trade regulations (Blomstrom and Kokko, 2003). An important reason, *inter alia*, for attracting FDI is the presumption that foreign firms generate employment, either directly through their own employment growth or through a spillover effect (Girma, 2005). Besides, the labour markets in developing countries are highly concentrated around agriculture and informal sector, the assumption is therefore that employment generation due to FDI could shift people from agriculture or informal sector to the modern sectors (i.e. industry and services) (Lipsey, Sjoholm and Sun, 2010).

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In developed countries the contribution of FDI to employment generation has been a much debated area, while in developing countries there are very few studies on the relationship between FDI inflows and employment creation. Though small in number, the studies in developing countries show a rise in employment due to the presence of foreign firms or foreign affiliates in these countries (Coniglio *et al.*, 2015; Peluffo, 2015; Karlsson *et al.*, 2009; Waldkirch and Nunnenkamp, 2009).[1] However, the employment effect of FDI is not distributed evenly across different types of employees in host developing countries. Since the technologies of MNEs are highly skill-complementary in nature, they tend to influence the generation of high-skilled employees, not the generation of low-skilled or un-skilled one (Peluffo, 2015). The employment effect of FDI may thus condition upon the nature of employees in host developing countries.

In this paper, we examine the employment effect of FDI in the local manufacturing industries in India. Since 1991 India has been undertaking numerous internal as well as external reforms to deregulate its economy and thus to make it an investor friendly environment. These reforms have brought about substantial FDI inflows from US$ 97 million in 1990-91 to US$ 39 billion in 2017-18 (Reserve Bank of India, 2018). The FDI stock in India has increased dramatically from US$ 97 million to US$ 464 billion between 1990-91 and 2017-18; and its share in national income (GDP) has increased phenomenally to 14 percent from a meagre 0.03 percent during this period (Reserve Bank of India, 2018).[2] It can therefore be expected that the dramatic increase in FDI may have led to employment generation in India. However, there is hardly any study to understand the relationship between FDI inflows and employment generation in India. This paper intends to fill this gap by examining the possibility of employment effect of FDI in Indian manufacturing industries. It also deals with how the nature of employees mediates employment effect of FDI in the local manufacturing industries.

The rest of the paper is organised as follows. The next section discusses the related literature on employment effect of FDI in host countries. Section 3 presents the theoretical framework to estimate the effect of FDI on employment in host countries. The empirical methodology and required data sources are discussed in Section 4. Section 5 analyses the estimated results on employment effect of FDI in Indian manufacturing industries. The final section concludes the discussion.

## 2. Related Literature

### 2.1. Employment Effects of FDI in Host Countries

There are several channels through which FDI can affect the employment situation in host countries. Firstly, in setting up affiliates or new industries in host countries and hiring

[1] FDI, foreign firms and foreign affiliates are used interchangeably.

[2] Because of the data unavailability on FDI inflows in India, the FDI stock (inward FDI stock) is calculated from the year 1990-91 only.

workers, multinational enterprises (MNEs) can directly help employment generation in these countries (Karlsson *et al.*, 2009). Secondly, MNEs through technology spillovers can affect employment generation in host countries. MNEs own, produce, and control most of world's technologies, and they account for the bulk of global business expenditures on research and development (R&D) (UNCTAD, 2005). These technologies owing to their non-rival characteristics spill over to host countries which affect the output and thus employment in these countries. Thirdly, through competition effect, FDI can influence the overall demand for labour in host countries. FDI sometimes leads to deterioration of employment in host countries when MNEs with their firm-specific advantages crowd out non-competitive domestic firms and force them to exit the market or downsize their workforce (Coniglio *et al.*, 2015).

Finally, FDI inflows can affect employment in host countries when foreign affiliates establish linkages (backward or forward linkages) with domestic firms in these countries. For example, when foreign firms purchase locally produced goods, demand addressed to upstream industries could increase which leads to potential job creation in host countries (Jude and Silaghi, 2016). It is also plausible that foreign firms introduces new or better quality inputs to be used in the production of upstream domestic firms, making them more competitive and helping them expand production and employment in host countries (Karlsson *et al*., 2009).

However, employment effect of FDI is not spontaneous to occur. It may condition upon some factors such as characteristics of FDI and characteristics of the host country. The heterogeneous nature of FDI such as share of foreign ownership in foreign affiliates, trade-orientation of foreign firms, nationality of foreign firms, production technologies chosen by foreign firms, and so on can influence the employment effect of FDI in host countries. Secondly, the characteristics of host country such as skill-level of employees can mediate the employment effect of FDI in host countries. The foreign firms tend to use relatively advanced technologies, requiring skilled workers or less workers to produce in host countries which may bring about a reduction on demand for labour in these countries.

### 2.2. Empirical Evidence on Employment Effects of FDI

Empirical studies have not yet reached at any consensus on contribution of FDI to employment generation in host countries. In the studies of developed economies, we have seen somewhat mixed results with respect to the effect of FDI on employment, as revealed from the following studies. In the study of Central and Eastern European countries (CEEC), Jude and Silaghi (2015) have discovered a phenomenon of creative destruction due to FDI. They find that the introduction of labour saving technologies by foreign firms have led to an initial negative effect on employment, while the progressive vertical integration of FDI into the domestic economy eventually brought about a positive long run effect. Prior to the study of Jude and Silaghi, Onaran (2008) in a study of 8 CEEC found an overall insignificant effect of FDI on employment. While considering manufacturing industries within these countries, she concluded that FDI had significant positive effect on

employment only in Lithuania and in some medium and low skill sectors in Slovakia. In the cross-country studies, Hijzen *et al*. (2013) also found that FDI is associated with a fall in employment in Germany and the UK, though this effect is not found to be significant. At the other end of the spectrum, Dinga and Munich (2010) employing data from Czech National Bank underscore that FDI brings about improvement in local labour market by increasing the employment rate and reducing the level of unemployment. In the study of Swedish manufacturing data, Bandick and Karpaty (2011) also confirmed the positive employment effect of FDI and they found the employment effect of FDI is stronger for skilled employees. Similarly, using matched employer-employee data, Almeida (2007) corroborated that an increase in employment following foreign acquisition in Portugal.

In developing economies, there are scarce researches analyzing effect of FDI on employment. Nevertheless, most of the studies confirm the positive effect of FDI on employment in host developing countries. Coniglio *et al*. (2015) have analysed the relationship between foreign ownership and employment at firm level for 19 Sub-Saharan African countries, and their results suggests that foreign-owned firms generate more jobs compared to domestic firms, even though the employment generated is less-skill intensive in nature. In the study of Uruguay, Peluffo (2015) found that FDI has positive and significant effect on employment, but she asserts that FDI is found to be associated with an increased demand for skilled labour compared to unskilled one. Similarly, Karlsson *et al*. (2009), using firm-level information on Chinese manufacturing sector during 1998-2004, unraveled a positive effect of FDI on employment in Chinese manufacturing sector and they attribute this effect to the high survival rate of foreign-owned firms. Furthermore, in the study of Mexico, Waldkirch and Nunnenkamp (2009) noticed that FDI is found to have increased employment in both skilled and unskilled workforce, though the employment effect of FDI is stronger in export-oriented industries.

In the study of a less developed country, Indonesia, Lipsey *et al* (2010) explored positive relationship between foreign ownership and employment. On the basis of data of a large number of plants between 1975 and 2005, the authors underscored that foreign-owned manufacturing plants in Indonesia grew more rapidly in employment than plants that were domestically owned.

It is followed from the above discussion that studies from developing and less-developed countries are affirmative about the effect of FDI on employment whereas the studies from developed countries are inconclusive about the effect of FDI on employment in host countries. In addition, as clear from the discussion, the employment effect of FDI is found to be more or less conditional on the nature of employees (i.e. the skill-level of employees) in host countries.

## 3. Theoretical Framework

The paper uses the dynamic labour demand framework to estimate the effect of FDI on employment in India's manufacturing industries.[3] The labour demand function can be derived from the following Cobb-Douglas production function for industry *i* at time *t*:

$$Y_{it} = A^{\gamma} K_{it}^{\alpha} N_{it}^{\beta} \text{ --- (1)}$$

where, $Y$ = real output; $K$ = capital stock; $N$ = unit of labour utilised; and $\alpha$ and $\beta$ represent the factor share coefficients and $\gamma$ allows for factors changing the efficiency of production process (Milner and Wright, 1998; Greenaway *et al*., 1999). The profit maximising firm will employ labour and capital in such a manner that its marginal revenue productivity of labour is equal to the wage ($w$) and its marginal revenue productivity of capital is equal to the cost of capital ($r$). Solving this system simultaneously for optimal capital and substituting the optimal value of capital in equation (1) yields the following:

$$Y_{it} = A^{\gamma} \left(\frac{\alpha}{\beta} N \frac{w_{it}}{r_t}\right)^{\alpha} N_{it}^{\beta} \text{ --- (2)}$$

Note that wages are assumed to vary both over time and across industries, whereas the cost of capital ($r$) only varies over time. Now, applying logarithmic transformation to equation (2) and rearranging the terms will yield the following labour demand of industry *i* at time *t:*

$$lnN_{it} = \emptyset_0 + \emptyset_1 lnY_{it} + \emptyset_2 ln\frac{w_{it}}{r_t} \text{ --- (3)}$$

where, $\emptyset_0 = -(\gamma lnA + \alpha ln\alpha - \alpha \ln\beta)/(\alpha + \beta)$

$\emptyset_1 = 1/(\alpha + \beta)$ $\emptyset_2 = -\alpha/(\alpha + \beta)$.

Considering the role of FDI, it is documented that FDI can influence technical efficiency parameter $A$ (Borensztein *et al*., 1998). It can therefore be assumed that the technical efficiency of production increases over time and its evolution can be influenced by technological transfer through FDI. Greenaway *et al.* (1999) argued in favour of trade induced technological change and modelled the technical efficiency factor in accordance. This paper however focuses on FDI induced technological change and accordingly models the technical efficiency as a function of FDI (a similar approach was adopted by Waldkirch *et al.* (2009) and Jude *et al.* (2016)).

[3] See Nickell (1986); Hamermesh (1993); and Bresson et al. (1996), for dynamic labour demand functions.

$$A_{it} = e^{\delta_0 T_i} FDI_{it}^{\delta_1} \text{ --- (4)}$$

where, T is the time trend and $\delta_0, \delta_1 > 0$.

Taking logarithm of $A_{it}$ and replacing it in Equation (3), the following can be obtained.

$$lnN_{it} = \theta + \emptyset_1 lnY_{it} + \emptyset_2 ln\frac{w_{it}}{r_t} + \emptyset_3 lnFDI_{it} + \emptyset_4 T \text{ --- (5)}$$

where, $\theta = -(\alpha \ln\alpha - \alpha ln\beta)/(\alpha + \beta)$; $\emptyset_3 = \mu\delta_1$; $\emptyset_4 = \mu\delta_0$; $\mu = -\gamma/(\alpha + \beta)$.

Here, the cost of capital is assumed to vary over time, and it can be addressed in empirical estimation by including a time dummies, thereby capturing the variation over time (Milner and Wright, 1998; and Onaran, 2008). Thus, equation (5) can be transformed as follows:

$$lnN_{i,t} = \theta + \emptyset_1 lnY_{i,t} + \emptyset_2 lnw_{i,t} + \emptyset_3 lnFDI_{i,t} + \emptyset_4 T \text{ --- (6)}$$

Further, "if there are costs associated with employment adjustment then the level of employment may deviate from its steady state as adjustment to equilibrium takes place" (Greenaway *et al*., 1999, p. 492). To take this into account, a lagged employment is introduced as an additional determinant of current employment.[4] Moreover, as argued by Greenaway *et al.* (1999), merely specifying dynamics in terms of lags of the dependent variable implicitly imposes a common evolution for employment following a change in an explanatory variable; and this restriction can be relaxed by introducing a distributed lag structure for the independent variables. The present study adopts this approach because the source of dynamics is ambiguous**.** Thus, the dynamic labour demand model can be modelled as follows:

$$lnN_{i,t} = \theta + \emptyset_0 lnN_{i,t-1} + \emptyset_{11} lnY_{i,t} + \emptyset_{12} lnY_{i,t-1} + \emptyset_{21} lnw_{i,t} + \emptyset_{22} lnw_{i,t-1} + \emptyset_{31} lnFDI_{i,t} + \emptyset_{32} lnFDI_{i,t-1} + \lambda_t + v_i + e_{i,t} \text{ --- (7)}$$

where, $\lambda_t$ is the time-specific effect; $v_i$ is the individual specific effect (the so-called, unobserved heterogeneity); and $e_{it}$ is the random error term, $e_{i,t} \sim N(0, \sigma_e^2)$, $\sigma_e^2 > 0$.

[4] This lagged structure in the labour demand function is justified because there are different adjustment costs when employing aggregated measures of employment across different skill categories (Nickell, 1986). And it is necessary if serially correlated technological shocks are present (Greenaway *et al*., 1999).

# 4. Methodology and Data

## 4.1. Empirical Methodology

Equation (7) contains a lagged dependent variable as an explanatory variable which poses a challenge to estimation because the equation also contains the unobserved time-variant and time-invariant effects. Time-variant effects can be captured through inclusion of time dummies, however the common estimators—within-group or differenced estimators—are not appropriate if the model is dynamic in nature. Besides, most of explanatory variables are likely to be jointly endogenous with the dependent variable; thus, the biases resulting from simultaneous or reverse causations need to be corrected while estimating the regression equation.

Generalised Method of Moment (GMM) estimators—difference-GMM and system-GMM—are mostly resorted to estimate the dynamic panel data models, like Equation (7). The difference-GMM estimator was developed by Arellano and Bond (1991) to control for the unobserved time-invariant effects and joint-endogeneity in dynamic panel model. This estimator first differences the regression equation to remove the time-invariant unobserved effects, then, it uses the previous observations of explanatory variables and lagged dependent variables as instruments (known as internal instruments) to correct the likely endogeneity of the differenced lagged dependent variable $(lnN_{i,t-1} - lnN_{i,t-2})$ with the differenced error term $(e_{i,t} - e_{i,t-1})$. This method of estimating dynamic panel regression is superior to fixed effect estimation. Nevertheless, the differenced-GMM estimator is found to have been associated with the following shortcomings. It assumes that the error terms are not serially correlated, so if the errors are auto-correlated then it fails to give efficient estimate of coefficients. Blundell and Bond (1998) assert that the explanatory variables are persistent over time, the lagged value of these variables are weak instruments for the differenced regression equation and the weak instruments influence the asymptotic and small-sample performance of the difference-GMM estimator toward inefficient and biased estimates, respectively.

The potential bias and imprecision akin to the difference-GMM estimator are however efficiently taken care by system-GMM estimator, developed by Arellano and Bover (1995) and Blundell and Bond (1998). The system-GMM estimator combines the equation in level and equation in differences into a system; and employs previous observations of the regressors as instruments for equation in difference and the lagged differences of the regressors as instruments for equation in levels. However, the validity of this estimator is conditional upon the fact that instruments are exogenous—i.e. they are not correlated with the error terms. Sargan and Hansen-J tests are therefore designed to detect the violation of this condition.[5] Again, the validity of the estimator relies on another condition, i.e. the

[5] The Sargan test has null hypothesis—the instruments as a group are exogenous. Thus, the higher p-value of Sargan statistic is generally preferred, because it fails to reject the null hypothesis and

errors of regression equation are not serially correlated. In this regard, Arellano-Bond auto-correlation (AR) test is designed to check the autocorrelation in the model.[6]

GMM estimators in general and system-GMM estimator in particular are appropriate in dealing with endogeneity bias and joint-endogeneity of explanatory variables with the dependent variables and thereby providing unbiased and more efficient estimate of the true parameters of the model. The GMM estimator is suggested when there is a small time period and a large group. In addition, the GMM-estimator has two additional advantages which are as follows: (i) it does not require any distributional assumptions, such as normality which is subject to diagnostic testing; and (ii) it allows for heteroscedasticity of unknown form, which can be allowed for by estimating robust parameters (Petreski, 2009).

### 4.2. Data and Descriptive Statistics

Sample of the study consists of a balanced panel covering 54 three-digit industries (National Industrial Classification (NIC) 2008) over a period of maximum 8 years (2008-09 to 2015-16).[7] The study period is limited to eight years because of data constraint. Annual Survey of Industries (ASI) from Central Statistics Office and FDI Newsletter from Department of Industrial Policy and Promotion are the main data sources of the study.

Total employees, workers, and supervisory and managerial staff are collected from the ASI database. Workers are considered as blue collar employees and supervisory and managerial staffs are as white collar employees.[8] Total wages and salaries, and wages and salaries for blue and white collar employees, obtained from the ASI database, are deflated

ensures the validity of system-GMM estimator. However, in robust estimation, we are generally report Hansen-J statistic instead of Sargan; and both Sargan and Hansen-J statistic have the same null hypothesis.

[6] AR test has a null hypothesis of "no autocorrelation", and it is applied to the difference residuals. The test for AR (1) process in first differences usually rejects the null hypothesis, but this is expected since $\Delta e_{i,t} = e_{i,t} - e_{i,t-1}$ and $\Delta e_{i,t-1} = e_{i,t-1} - e_{i,t-2}$ both have $e_{i,t-1}$. The test for AR (2) in first differences is more important because it will detect autocorrelation in levels. If we fail to reject the null gives support to the model and ensures the validity of system-GMM estimator.

[7] These three-digit industries are belonging to the 18 two-digit industries, viz., food products (10), textiles (13), leather and leather related products (15), wood and wood products (16), paper and paper products (17), printing (18), coke and petroleum products (19), chemicals (20), pharmaceuticals (21), rubber products (22), other non-metallic mineral products (23), basic metals (24), computer & electronics (26), electrical equipments (27), machinery and equipments (28), motor vehicles, trailer and semi-trailers (29), other transport equipments (30), and other manufacturing (32).

[8] Workers, the blue collar workers include all persons employed directly or indirectly in any manufacturing process or in cleaning any part of machinery or premises used for manufacturing process or in any kind of work connected with manufacturing process or the subject of manufacturing process. And, the persons engaged in repair and maintenance of production of fixed asset for factory's own use or persons employed for generation of electricity, etc. are also blue collar workers.

by the Consumer Price Index for industrial workers (base year 2004-05) from the Labour Bureau of India. Since the average wage (wage) is needed for the analysis, it can be obtained by dividing total wages and salaries by total employees. Similarly, wage for blue and white collar employees are obtained by dividing wages and salaries of blue and white collar employees by blue and white collar employees, respectively. Gross value added, obtained from the ASI database, is a proxy measure for output and it is deflated by two-digit industrial wholesale price indices (base year 2004-05) obtained from the Office of the Economic Advisory, Ministry of Commerce and Industry, India. FDI is the FDI inflows at two-digit industry level, taken from the FDI Newsletter. The nominal value of FDI is deflated by GDP deflator (base year 2004-05) to reach at real FDI value.

Table 1 offers a description of the variables used, while Table 2 reports the summary statistics of dependent and independent variables.

**Table 1**
**Description of Variables Employed**

| | |
|---|---|
| Total employment | Total employees |
| White collar employment | Supervisory and managerial staffs |
| Blue collar employment | Number of workers |
| Output | Gross value added |
| Wage | Average wages |
| White collar wage | Average wage of supervisory and managerial staff |
| Blue collar wage | Average wage of the workers |
| FDI | FDI inflows |

**Table 2**
**Summary Statistics of the Dependent and Explanatory Variables**

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Total employment | 432 | 187253.4 | 240876.3 | 38 | 1249927 |
| Blue collar employment | 432 | 143699.7 | 194761 | 21 | 1072916 |
| White collar employment | 432 | 19576.72 | 22952.21 | 5 | 143405 |
| Wage | 432 | 118788.6 | 73001.72 | 28197.93 | 760888.8 |
| Blue collar wage | 432 | 71468.49 | 39444.7 | 25459.16 | 614990.4 |
| White collar wage | 432 | 410889.5 | 549962.5 | 17524.43 | 7679888 |
| FDI | 432 | 2.63e+10 | 3.64e+10 | 4.88e+07 | 2.06e+11 |
| Output | 432 | 1.08e+11 | 1.51e+11 | 1.13e+07 | 1.05e+12 |

*Source*: Author's computation

# 5. Estimation of Employment Effect of FDI

## 5.1. Estimation Results

This section presents the estimated effect of FDI on employment in Indian manufacturing industries during 2008-09 through 2015-16. Here, three sets of regressions are estimated to see the employment effect of FDI in the local manufacturing industries. The first set estimates the effect of FDI on total employment, whereas the second and third set estimates the effect of FDI on white- and blue-collar employment respectively. Each set of regressions comprises two regressions: one estimates the dynamic labour demand equation without FDI and other includes FDI into the equation to see its impact on employment generation. All regressions are estimated by two-step system-GMM estimator and the results of them are presented in Table 3 through Table 5.

**Table 3**
**Estimation of Dynamic Labour Demand in Manufacturing Industries, Dependent Variable: Total Employment and Time Period: 2008-09 to 2015-16**

| Independent variables | (1) | (2) |
|---|---|---|
| Dependent Variable$_{(t-1)}$ | 0.558$^{***}$(0.112) | 0.558$^{***}$(0.128) |
| Wage | -0.945$^{***}$(0.133) | -0.903$^{***}$(0.132) |
| Wage$_{t-1}$ | 0.331(0.206) | 0.336 (0.218) |
| Output | 0.623$^{***}$(0.068) | 0.612$^{***}$(0.074) |
| Output$_{-1}$ | -0.174$^{*}$(0.076) | -0.172$^{*}$(0.084) |
| FDI | | -0.0304 (0.046) |
| FDI$_{-1}$ | | -0.0117 (0.034) |
| Year dummies | Yes | Yes |
| Observations | 378 | 378 |
| No. of Industries | 54 | 54 |
| Instruments | 43 | 43 |
| Hansen p-value | 0.506 | 0.605 |
| AR2 p-value | 0.406 | 0.501 |

*Notes*: $^{*}p< 0.05$, $^{**}p< 0.01$, $^{***}p< 0.001$. Values in parentheses are robust standard errors. All the variables are in logarithmic forms. The system-GMM estimations of dynamic labour demand are undertaken by STATA software (xtabond2).

Table 3 presents the estimation of two models—one without FDI and other with FDI. Each of these models includes a lagged depended variable along with level and lagged explanatory variables. In both models presented in Table 3, the Hansen J test and Arellano and Bond auto-correlation test are statistically insignificant which indicates the correct specification of models. To note that the coefficients of lagged dependent variable in both

the models are strongly significant and quantitatively important, indicating the path dependency of employment.

In model (1), the coefficient on current wage is negative and strongly significant at 0.1 percent level of significance, indicating the wage growth has negative effect on total employment; whereas the lagged wage does not have any apparent effect on employment that is clear from its insignificant coefficient. The current output has positive effect on employment generation which is evident from its highly significant coefficient. The lagged output is found to have a negative effect on current employment, i.e. the growth in previous year output leads to reduction in demand for labour in the current year. However, the reduction in employment due to previous year output is lesser than the acceleration in employment because of present year output.

The specification (2) of Table 3 includes FDI to see the effect of FDI on employment generation. Here, the effects of output and wages on employment are almost same as found in model (1). However, both the estimated coefficient on the current FDI as well as on the lagged FDI is negative and statistically not significant at the conventional level of significance. This implies that the presence of foreign firms is crowding out labour demand in the local manufacturing industries but this crowding out effect is not considerable in nature. This result is surprising because most studies on developing countries register a positive contribution of FDI to employment generation. The following explanation could be provided for the absence of significance effect of FDI on employment. In India, as observed by Malik (2015), among others, the presence of foreign firms has not brought about any significant spillover benefit to domestic firms in the same industry. Employment effect of FDI take place via spillover effects, the absence of spillover effect of FDI can therefore be attributed to the insignificant effects of FDI on employment in India's manufacturing industries.

However, the employment effect of FDI in host countries is conditional on some mediating factors such as nature of employees. Therefore, to take into account how the nature of employees affect the employment effect of FDI, two more sets of regressions are run—one estimating effect of FDI on white collar employment and the other estimating employment effects of FDI on blue collar employment—which are presented in Table 4 and 5, respectively.

Table 4 documents the effect of FDI on white collar employment in the local manufacturing industries. In specification (2) of Table 4, the current output is found to have a highly significant effect on white collar employment, and the current white collar wage rate has negative effect on white collar employment; whereas both the lagged output and white collar wage rate do not seem to have any significant effect on white collar employment. And, importantly, as obvious from the coefficients on level FDI, the increase in FDI inflows in current period does crowd out white collar employment, but this is not statistically significant. Similarly, the lagged FDI inflow is not found to have any apparent effect on white collar employment in manufacturing industries. This finding however goes against

the proposition that FDI is skill-biased in nature because it is assumed to complement skilled labour or white collar employment.

**Table 4**
**Estimation of Dynamic Labour Demand in Manufacturing Industries, Dependent Variable: White Collar Employment and Time Period: 2008-09 To 2015-16**

| Independent variables | (1) | (2) |
|---|---|---|
| Dependent variable $_{t-1}$ | 0.534$^{***}$(0.098) | 0.486$^{***}$(0.114) |
| White collar wage | -0.528$^{*}$(0.201) | -0.477$^{**}$(0.169) |
| White collar wage $_{t-1}$ | 0.182(0.193) | 0.153(0.166) |
| Output | 0.509$^{***}$(0.067) | 0.535$^{***}$(0.086) |
| Output$_{t-1}$ | -0.0458(0.102) | -0.037(0.112) |
| FDI | | -0.042(0.052) |
| FDI$_{t-1}$ | | -0.060(0.058) |
| Year dummies | Yes | Yes |
| Observations | 378 | 378 |
| No. of Industries | 54 | 54 |
| Instruments | 43 | 43 |
| Hansen p-value | 0.708 | 0.531 |
| AR2 p-value | 0.535 | 0.659 |

*Notes*: $^{*}p< 0.05$, $^{**}p< 0.01$, $^{***}p< 0.001$. Values in parentheses are robust standard errors. All the variables are in logarithmic forms. The system-GMM estimations of dynamic labour demand are undertaken by STATA software (xtabond2).

The specification (2) of Table 5 has not registered any effect of FDI on blue collar employment which is not significantly different from zero. As observed, the current and lagged FDI inflows lead to reduction in blue collar employment, these effects are however not statistically significant. It is implied that foreign firms because of their technological superiority are crowding out the non-competitive domestic firms and/or also are forcing them to downsize their workforce requirement, and thereby leading to reduction in demand for blue-collar employees in manufacturing industries; however this reduction in employment is not considerable in nature.

It is understood from the above analysis that FDI inflows do not have any apparent effect on employment generation in local manufacturing industries. The employment effect of FDI is however dependent upon the nature (quality) of FDI inflows. For example, green-filed FDI, i.e. establishment of wholly-owned foreign firms, is employment inducing in nature whereas brown-field FDI (i.e. mergers and acquisitions (M&As)), as argued by Bagchi-Sen (1991), is generally not employment inducing in nature if the acquired firm is not efficient. Over the last two decades, cross-border M&As has increasingly been an

alternative form of FDI in India.[9] On an average, around 131 cross-border M&As were taken place during the study period, i.e. 2008-2016. Since the nature of FDI mostly has been brown-filed in nature, FDI inflows are not found to have any apparent effect on employment generation in India.[10]

**Table 5**
**Estimation of Dynamic Labour Demand in Manufacturing Industries, Dependent Variable: Blue Collar Employment and Time Period : 2008-09 To 2015-16**

| Independent variables | (1) | (2) |
|---|---|---|
| Dependent variable $_{t-1}$ | 0.633$^{***}$(0.148) | 0.587$^{***}$ (0.138) |
| Blue collar wage | -0.586$^{**}$ (0.212) | -0.575$^{*}$ (0.219) |
| Blue collar wage $_{t-1}$ | -0.032 (0.127) | 0.021 (0.119) |
| Output | 0.712$^{***}$ (0.065) | 0.717$^{***}$ (0.066) |
| Output$_{t-1}$ | -0.336$^{**}$ (0.115) | -0.309$^{*}$ (0.119) |
| FDI | | -0.057 (0.045) |
| FDI$_{t-1}$ | | -0.030 (0.046) |
| Year dummies | Yes | Yes |
| Observations | 378 | 378 |
| No. of Industries | 54 | 54 |
| Instruments | 43 | 43 |
| Hansen p-value | 0.168 | 0.313 |
| AR2 p-value | 0.375 | 0.437 |

Notes:*p< 0.05, **p< 0.01, ***p< 0.001. Values in parentheses are robust standard errors. All the variables are in logarithmic forms. The system-GMM estimations of dynamic labour demand are undertaken by STATA software (xtabond2).

### 5.2. Robustness Check

The estimated results show that the presence of foreign firms has no considerable impact on employment generation in Indian manufacturing industries. Even after controlling for the nature of employees, the result has not shown any significant effect of FDI on employment generation. To check for robustness of the estimated results, an alternative specification of the model, i.e., simple labour demand model is adopted. The simple labour demand model is specified as:

[9] See Table A1 of appendix

[10] The technical efficiency firms involved in cross-border M&As, is found to have declined during the post-liberalisation period, as observed further by Saraswathy (2015); the inefficiency of firms involved in cross-border M&As is therefore not inserting any considerable effect on employment gain in Indian manufacturing industries.

$$lnN_{i,t} = \theta + \emptyset_1 lnY_{i,t} + \emptyset_2 lnw_{i,t} + \emptyset_3 lnFDI_{i,t} + \lambda_t + v_i + e_{i,t} \quad (8)$$

Both fixed effect estimator and random effect estimator have been applied to estimate Equation (8), the Hausman specification test has however rejected the random effect estimation in favour of fixed effect estimation. Here also, three sets of regressions are estimated—the first set estimates the effect of FDI on overall employment and the other two sets estimate the effect of FDI on white-collar and blue collar employment respectively. The estimated results are shown in Table 6 through Table 8. With respect to the effect of FDI on employment generation, these findings are not different from those obtained in Table 3 through Table 5. In Table 6, coefficient of FDI is negative but statistically insignificant that is similar to what obtained in Table 3. Secondly, in Table 7, effect of FDI on white-collar employment is also not significantly different from zero which is similar to the results showed in Table 4. Lastly, Table 8 documents the negative and insignificant effect of FDI on blue-collar employment and it also goes with the results provided in Table 5.

**Table 6**
**Estimation of Simple Labour Demand in Manufacturing Industries, Dependent Variable: Total Employment and Time Period: 2008-09 To 2015-16**

| Independent variables | Fixed effect estimation | Random effect estimation |
|---|---|---|
| Wage | -0.362** (0.124) | -0.575*** (0.055) |
| Output | 0.525*** (0.077) | 0.668*** (0.019) |
| FDI | -0.005 (0.009) | -0.019 (0.013) |
| Constant | 2.760 (2.443) | 2.092** (0.693) |
| Time fixed effect | Yes | Yes |
| *Observations* | 432 | 432 |
| *Number of industries* | 54 | 54 |
| $R^2$ | 0.654 | 0.647 |
| *F Statistics* | 43.00*** | - |
| *Wald Chi2* | - | 1221.33*** |

*Notes*: Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001; All the variables including dependent variable are in logarithmic form; Hausman specification test rejects the Random effect modelling.

**Table 7**
**Estimation of Simple Labour Demand in Manufacturing Industries, Dependent Variable: White Collar Employment and Time Period: 2008-09 To 2015-16**

| Independent variables | Fixed effect estimation | Random effect estimation |
|---|---|---|
| *White collar wage* | -0.398 (0.218) | -0.534*** (0.0473) |
| *Output* | 0.495*** (0.092) | 0.703*** (0.023) |
| *FDI* | 0.000 (0.012) | -0.012 (0.016) |
| *Constant* | 2.009 (3.164) | -0.990 (0.730) |
| *Time fixed effect* | Yes | Yes |
| *Observations* | 432 | 432 |
| *Number of industries* | 54 | 54 |
| $R^2$ | 0.463 | 0.459 |
| *F Statistics* | 15.29*** | - |
| *Wald Chi2* | - | 931.76*** |

*Notes*: Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001; All the variables including dependent variable are in logarithmic form; Hausman specification test rejects the Random effect modelling.

**Table 8**
**Estimation of Simple Labour Demand in Manufacturing Industries, Dependent Variable: Blue Collar Employment and Time Period: 2008-09 To 2015-16**

| Independent variables | Fixed effect estimation | Random effect estimation |
|---|---|---|
| *Blue collar wage* | -0.183 (0.135) | -0.354*** (0.069) |
| *Output* | 0.510*** (0.094) | 0.615*** (0.020) |
| *FDI* | -0.0104 (0.009) | -0.0274* (0.013) |
| *Constant* | 0.821 (1.894) | 0.574 (0.867) |
| *Time fixed effect* | Yes | Yes |
| *Observations* | 432 | 432 |
| *Number of industries* | 54 | 54 |
| $R^2$ | 0.638 | 0.632 |
| *F Statistics* | 26.32*** | - |
| *Wald Chi2* | - | 935.20*** |

*Notes*: Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001; All the variables including dependent variable are in logarithmic form; Hausman specification test rejects the Random effect modelling.

## 6. Conclusion

There is a strong presumption that FDI inflows lead to employment generation in developing countries. Some studies, though very small in number, have pointed out the positive effect of FDI inflows on employment growth in developing countries. Nevertheless, there is hardly any effort made to evaluate the employment effect of FDI inflow in India. Therefore, this paper has made an attempt to understand the effect of FDI inflows on employment generation in Indian manufacturing industries using industry-level panel data covering periods from 2008-09 to 2015-16. Employing system-GMM estimator of Blundell and Bond (1998), it has estimated a dynamic labour demand model in which FDI is presumed to improve the efficiency of labour usage.

The analysis shows that the current output and current wage are the main determinants of employment dynamics in Indian manufacturing industries as they are statistically significant and quantitatively important for all sets of regressions. It is seen that increase in output will lead to increase in employment generation which indicates absence of job-less growth in Indian manufacturing industries after the world economic crisis. The increase in wage is found to have reduced the demand for labour in the manufacturing industries; and this finding goes in line with theoretical argument.

The paper has however pointed out that the presence of foreign firms leads to reduction in employment generation in the local manufacturing industries but this reduction is statistically not considerable. This finding implies that the foreign firms owing to their firm-specific advantages are crowding out the local firms and/or forcing them to downsize their workforces which is leading to reduction overall employment growth but this reduction is not at all considerable in nature. Further controlling for the nature of employees in terms of their skill-level, the study has not witnessed any apparent effect of FDI on employment in the manufacturing industries. The insignificant effect of FDI inflows on employment generation in Indian manufacturing industries may be attributed to the following. The presence of foreign firms has not led to any technology spillover to the local manufacturing firms in the same industry, as observed by Malik (2015) among others. Since employment effect of FDI takes place via technology spillovers, the absence of technology spillovers from FDI can be attributed to the insignificant effects of FDI on employment in India's manufacturing industries. In addition, quality of FDI can be attributed to the insignificant employment effect of FDI in Indian manufacturing industries. Over the last two decades, the nature of FDI inflows has increasingly been in the form of cross-border M&A which are not employment generating nature, rather employment acquiring one. These kinds of FDI inflows are not found to have any considerable effect on employment generation in local manufacturing industries. This paper therefore does not consider FDI as an important channel for employment generation in Indian manufacturing industries. This paper has however examined the effect of FDI on employment in the same industry, not across industries. Hence, the effect of FDI on employment via backward or forward linkages should be studied to evaluate the vertical employment effect of FDI in India's manufacturing industries.

## References


Almeida, R. (2007), "The labour market effects of foreign owned firms", *Journal of international Economics*, Vol. *72 No.* 1, pp. 75-96.

Arellano, M. and Bond, S. (1991), "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *The Review of Econometric Studies,* Vol. 58 No. 2, pp. 277–297

Arellano, M. and Bover, O. (1995), "Another look at the instrumental variable estimation of error-component models", *Journal of Econometrics*, Vol. 68 No. 1, pp. 29-51.

Bagchi-Sen, S. (1991). Employment in Foreign-owned manufacturing firms in The United States—The Impact of Modes of entry. *Tijdschrift voor economische en sociale geografie*, *82*(4), 282-294.

Bandick, R., and Karpaty, P. (2011), "Employment effects of foreign acquisition", *International Review of Economics & Finance*, Vol. 20 No. 2, pp. 211-224.

Blundell, R. and Bond, S. (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of econometrics*, Vol. *87 No.* 1, pp. 115-143.

Borensztein, E., De Gregorio, J. and Lee, J. W. (1998), "How does foreign direct investment affect economic growth?" *Journal of international Economics*, Vol.45 No. 1, pp. 115-135.

Bresson G., Kramarz F. And Sevestre P. (1996), "Dynamic Labour Demand Models", Mátyás L. and Sevestre P. (Eds.), *The Econometrics of Panel Data*: *Advanced Studies in Theoretical and Applied Econometrics*, Springer, Dordrecht, pp. 660-684.

Coniglio, N. D., Prota, F. and Seric, A. (2015), "Foreign Direct Investment, Employment and Wages in Sub-Saharan Africa", *Journal of International Development*, *27*(7), 1243-1266.

Dinga, M. and Münich, D. (2010), "The impact of territorially concentrated FDI on local labour markets: Evidence from the Czech Republic", *Labour Economics*, Vol. 17 No. 2, pp. 354-367.

Greenaway, D., Hine, R. C. and Wright, P. (1999), "An empirical assessment of the impact of trade on employment in the United Kingdom", *European journal of political economy*, Vol. *15 No.*3, pp. 485-500.

Hamermesh, D. S. (1993), "Labor *demand and the source of adjustment costs"*, working paper (No. w4394), National Bureau of Economic Research.

Jude, C. and Silaghi, M. I. P. (2016), "Employment effects of foreign direct investment: New evidence from Central and Eastern European countries", *International Economics*, Vol. *145*, pp. 32-49.

Karlsson, S., Lundin, N., Sjöholm, F. and He, P. (2009), "Foreign firms and Chinese employment", *The World Economy*, Vol. *32 No.* 1, pp.178-201.

Lipsey, R. E., Sjöholm, F. and Sun, J. (2010), "*Foreign ownership and employment growth in Indonesian manufacturing"*, working paper (No. w15936), National Bureau of Economic Research.

Malik, S. K. (2015), "Conditional technology spillovers from foreign direct investment: evidence from Indian manufacturing industries", *Journal of Productivity Analysis*, Vol. *43 No.* 2, pp. 183-198.

Milner, C. and Wright, P. (1998), "Modelling labour market adjustment to trade liberalisation in an industrialising economy", *The Economic Journal*, Vol. *108* No. 447, pp. 509-528.

Nickell, S. J. (1986), "Dynamic models of labour demand". Ashenfelter, O.C. and Layard R., *Handbook of Labor Economics*, North Holland, pp. 473-522.

Onaran, O. (2008), "Jobless growth in the central and east European countries: a country-specific panel data analysis of the manufacturing industry", *Eastern European Economics*, Vol. *46 No.* 4, pp. 90-115.

Peluffo, A. (2015), "Foreign direct investment, productivity, demand for skilled labour and wage inequality: An analysis of Uruguay", *The World Economy*, Vol. *38No.* 6, pp. 962-983.

Petreski, M. (2009), "Analysis of exchange-rate regime effect on growth: Theoretical channels and empirical evidence with panel data", Economics Discussion Papers (No 2009-49), Kiel Institute for the World Economy. http://www.economics-ejournal.org/economics/discussionpapers/2009-49

Saraswathy, B. (2015). Production efficiency of firms with mergers and acquisitions in India (No. 299). *Working paper* 299, Indian Council for Research on International Economic Relations, New Delhi. http://icrier.org/pdf/Working_Paper_299.pdf.

Waldkirch, A., Nunnenkamp, P. and Alatorre Bremont, J. E. (2009), "Employment effects of FDI in Mexico's non-maquiladora manufacturing", *The Journal of Development Studies*, Vol. 45 No. 7, pp. 1165-1183.

# Appendix

**Table 1A**
**Net cross-border M&As sales by India**

| Year | Number | Millions of Dollars |
|---|---|---|
| 2000 | 86 | 708 |
| 2001 | 73 | 812 |
| 2002 | 32 | 560 |
| 2003 | 54 | 729 |
| 2004 | 72 | 1135 |
| 2005 | 104 | 698 |
| 2006 | 141 | 5114 |
| 2007 | 157 | 4652 |
| 2008 | 144 | 10303 |
| 2009 | 114 | 5877 |
| 2010 | 122 | 5613 |
| 2011 | 134 | 12795 |
| 2012 | 133 | 2805 |
| 2013 | 142 | 4644 |
| 2014 | 125 | 7857 |
| 2015 | 139 | 1323 |
| 2016 | 128 | 7958 |
| 2017 | 134 | 22763 |

*Note*: Net cross-border M&As are calculated considering sales of companies in a host economy to foreign MNEs. It excludes sales of foreign affiliates (already owned by foreign MNEs) to other foreign MNEs

*Source*: UNCTAD cross-border M&A database (www.unctad.org/fdistatistics).

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# Employment Effect of Foreign Direct Investment in Indian Manufacturing Industries

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