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Does Plant Size Matter? Differential Effects of FDI on Wages and Employment in Indian Manufacturing

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Does Plant Size Matter? Differential Effects of FDI on Wages and Employment in Indian Manufacturing *

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Abstract

This paper considers the differential effects of industry-level Foreign Direct Investment (FDI) on plant-level employment and wages of skilled and unskilled workers of India's manu- facturing sector, based on the size of the plant. I find that there are strong positive differential effects to big plants in terms of employment and average wages of both skilled and unskilled workers relative to average sized and small plants with increased industry-level inward FDI. Further, this relative increase in employment of production workers at big plants is biased to- wards male workers. Average sized and smaller plants experience negative effects of inward FDI which can be explained in terms of intra-industry reallocation of output from smaller to bigger plants and poaching of higher quality production and skilled workers by bigger plants as industry-level FDI increases. However, in a more detailed analysis, I find that in regions where FDI inflows are large and persistent, there are strong positive effects in terms of increases in skill composition and wage-skill premium to both big and small plants alike. This suggests that for plants to experience positive effects of industry-level FDI, a critical mass of inward FDI needs to be achieved. The findings are important especially in the context of India's recent Make-in-India campaign which combined with the objectives of the National Manufacturing Policy and the National Skill Development Corporation strives to increase India's productive capacity in order to generate positive employment effects, and especially increase the pool of skilled workers in India's manufacturing sector.

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1 Introduction

Economic theory and policy has often stressed on the important role of Foreign Direct Investment (FDI) in terms of transforming the productive capacities of an economy as well as contributing to development of human capital. It is posited that increased globalization in inward FDI has greater beneficial effects than tariff liberalization because of the scope of a greater transfer of technol- ogy and skills to the domestic economy than imports or trade. Most highlighted are the effects of spillovers to other domestic players in the industry. While most studies have focused heavily on what factors attract FDI, and under what conditions does one observe the spillover effects, the impact of such FDI on employment and wages of workers is less extensive, especially in the developing country context and more specifically, for South Asia.

Most developing countries' policies have been aimed at trying to encourage more inward FDI in keeping with their growth and development objectives. India has moved to a more liberalized FDI regime over the past few years which includes allowing FDI to enter through the automatic route in most cases, and raising FDI cap for many sectors. More recently, India launched its Make-in-India campaign, which aims towards attracting more investment in India but with a special thrust towards improving domestic production capabilities.

While Indian policy has been successful in attracting FDI — according to UNCTAD it was $34 billion in 2014[1] making it one of the global top ten countries in terms of FDI inflows — little is known about how this is affecting workers in terms of wages and employment. An important goal of the Make in India campaign that is aligned with India's National Manufacturing Policy, is to increase the level of employment in manufacturing. Moreover, the National Skill Development

[1] *UNCTAD World Investment Report (2015) Reforming International Investment Governance, United Nations Publication., United Nations Conference on Trade and Development. 2015*

Corporation has been set up, to provide skills to India's labour force acknowledging the fact that the development of an economy is contingent on the growth and development of its human capital. Most studies on FDI in India are focused on the determinants of inward FDI in India and are either industry-level studies or case studies. While the former does not take into account important within- industry plant heterogeneity while estimating the effects of FDI, the latter may be informative but not statistically robust or generalizable.

This paper focuses on the effects of industry-level FDI on plant-level employment and wages of both skilled and unskilled workers in India's manufacturing sector. It investigates whether FDI increases plant-level employment and average wages, but more importantly, whether the change in demand for workers due to increased FDI inflows is skill biased or not. According to traditional theory, foreign ownership provides host country with access to knowledge, which if absorbed by domestic workers enhances domestic human capital stock making it permanently more productive. This spills over to domestic firms through training of suppliers, imitation, and labour mobility — wherein workers migrate from multinational firms to domestic firms and through various channels of formal and informal interaction transfer their know-how to domestic workers (Aitken and Harrison (1999), Poole (2013)). An increase in quality of workers should lead to an increase in average wages of workers both in domestic and foreign firms. Further, if there are complementarities be- tween foreign inputs accompanied with foreign investment and the skills of workers, increase in FDI should also lead to an increase in demand for skilled workers, and increase the skill composi- tion at foreign plants while putting an upward pressure on the wage-skill premium. Spillovers to domestic plants however, might not occur if inflows of FDI are small and not persistent enough to transform the workforce at FDI firms, or create a large enough supply of skilled workers who can then migrate to smaller, domestic firms. In such a case, we would see a greater poaching of skilled workers in the domestic industry by foreign firms as opposed to an increase in the supply of skilled workers.

The paper estimates the above relationship by using plant-level data available from Annual Sur- vey of Industries by the Ministry of Commerce, India, and industry-level FDI data from the Depart- ment of Industrial Policy and Promotion, Ministry of Finance, India for the years 2000-2006. The main finding is that with increased inflows of industry-level FDI, bigger plants experience a greater increase in employment of, and average wages paid out to both skilled and unskilled workers, rela- tive to average sized and smaller plants in the industry. The effects are negative for smaller plants as far as employment of production workers is concerned, which suggests that there are greater mar- ket reallocation effects away from smaller plants with increased industry-level FDI, causing them to reduce production and employment. Moreover, there are negative effects for average sized and smaller plants even in terms of average wages paid out to skilled and unskilled workers, suggesting that there is poaching of higher quality production and skilled workers by big plants as industry- level FDI increases. I also find that the differential increase in employment of production workers at bigger plants is biased towards male workers as industry-level FDI increases. When considering the differential impact on regions, however, I find that states that are the biggest winners in terms of FDI inflow — both in terms of quantity and persistence of flows, experience strong spillover effects in terms of the wage-skill premium and skill composition, i.e. big and small plants alike experience an increase in the relative wages as industry-level FDI increases as well a higher com- position of skilled workers. This could point towards the fact that it is likely, that for an industry to experience positive horizontal spillovers in wages, a critical mass of FDI should be reached and the inflow should persist over a period of time. Only then do we observe greater training, mobility and imitation that contributes to a higher pool of skilled workers in the industry, such that plants can benefit from this increased supply and experience an increase in the skill composition of the workforce. For instance, Poole (2013) highlights that higher skilled former multinational workers are better able to transfer the multinational's technology while higher-skilled incumbent workers are better able

to absorb the transferred technology. Based on this mode, we can expect workers at multinationals to experience an increase in their skills only after a certain period of working and training, and further, incumbents to increase their level of skills only when there is a substantial share of multinational workers at their firms. Morevoer, regions with high FDI might even have better backward and forward linkages, allowing FDI to flow over a sustained period of time.

This paper is divided into 9 sections. Section 2 reviews the literature on the impact of FDI on employment and wages and the evidence of spillovers, and places this paper in the context of the current literature. Section 3 specifically focuses on FDI studies in India, which are mainly focused on the factors that influence inward FDI. Important lessons drawn from these studies will be incorporated into the empirical analyses of this paper. The empirical model is discussed in Section 4. A description of the data and measurement of the variables used in the empirical model can be found in Section 5. Section 6 discusses the estimation results, while robustness checks across various specifications are presented in Section 7. Section 8 considers the differential impact of FDI on the outcome variables across regions and Section 9 concludes.

2 Related Literature and Motivation

In the literature investigating the impacts of FDI, there has been a recent shift towards plant-level analyses as opposed to industry-level or sector-level analyses. Post Melitz (2003), studies now take into account heterogeneity within industries across plants and firms, which are crucial to under- standing the effects of FDI. Earlier studies investigating the role of FDI on labour focused mainly on the impact of FDI on labour productivity and whether there were any spillover effects to domestic plants. Blomstrom and Persson (1983) find that an increase in foreign share in an industry is corre- lated with an increase in labour productivity at even

domestically owned plants in the industry. This however, is a cross-sectional industry-level study and suffers from a crucial identification problem that it can't control for fixed differences in productivity across industries, which may be a source of endogeneity bias. Controlling for these industry-level fixed effects for a study in Venezuela, Aitken and Harrison (1999) distinguish between the "own plant" effect and spillover effect of FDI by considering both plant-level FDI and industry-level FDI, while controlling for industry-level fixed effects. While Aitken and Harrison (1999) focus on productivity as an outcome of interest, I will follow a similar methodology but apply it to understand the effects on levels of employment, skill composition and wages. They find that while there is a positive effect of own plant FDI on productivity, the spillover effects to domestic plants are negative, owing mainly to the market re- allocation effect. I expect to find similar effects of industry-level employment of small plants, that are unlikely to receive inward FDI and unable to stay competitive with increased foreign presence in their industry.

There are various other studies that estimate the effect of FDI on productivity and wages for developed and developing countries. Feenstra and Hanson (1995) find during the relaxation of the FDI regime in Mexico, the offshoring of jobs that were relatively unskilled labour intensive in the US but relatively skill intensive in Mexico, explained nearly 50 per cent of the increase in relative wages during the early 1980s in Mexico. This effect was largely driven by the changes because of FDI at maquiladoras, the export processing zones. The other strand of literature pertains to identifying spillovers. While positive spillovers of FDI are found for the US, both in terms of gains in total factor productivity (Keller and Yeaple (2009)) and wages (Aitken, Harrison and Lipsey (1995)), these are found to be absent for developing countries such as Mexico and Venezuela (Aitken et al. (1995)). While my study also finds negative spillovers for smaller plants in India, in a regional analysis, I find that regions receiving large and persistent FDI inflows actually experience positive spillovers. It is possible that high FDI regions

in India mimic a developed country environment, where FDI (presumably in the presence of strong backward and forward linkages) has been able to transform domestic capability over time, resulting in increased spillovers.

More recently, a paper that provides evidence of positive spillovers of FDI in Brazil is by Poole (2013). Using matched employer-employee data, the paper shows that as workers migrate from multinational to domestic firms, there is an increase in the wages of even domestic workers at in- cumbent firms. Further, the transfer of technology is greater the higher the skills of the worker migrating from the multinational and the higher the skill of the worker at the incumbent firm. Av- erage wages for incumbent workers at the domestic firm increase as the share of workers from multinationals increase at the domestic firm. Using my regional analysis, I am able to show similar effects for small firms in high FDI receiving regions. Using the mechanism described in Poole (2013), it is likely that there is a bigger pool of skilled workers in regions that have experienced a sustained, large inflow of FDI, that even small firms are able to benefit from these workers.

The literature on the impact of trade liberalization and offshoring provides some insight into the relationship between inputs that embody foreign technology and the skills of plant-level workers. For Indonesia, it has been found that increased importing behavior leads to higher average wages paid out to workers through increased profit sharing by firms that experience productivity benefits through these technologically sophisticated imports (Amiti and Davis (2012)). However, while increasing average wages in Indonesia, these imports reduced the relative wage, a posited reason being that imported inputs substituted away skilled workers at plants that were producing the inputs in-house. On the contrary, in the case of Hungary, Csillag and Koren (2011) find that imported machines embodying superior technology are complementary to skills of workers, leading to both an increase in skill composition and skill premium at importing plants. If inward FDI leads to a decline in average wages and employment of skilled

workers in India, I can expect to derive an explanation in terms of in-house substitution of inputs and workers. However, if I observe an increase in skill composition and wage-skill premium, I can conclude that there are complementarities between foreign investment (embodying superior technology) and the skills of workers. If the latter is the case, developing countries can rely on FDI to create a skill-biased demand for workers in their countries.

This paper significantly derives motivation from Das (2002) who theoretically models the ef- fects of FDI on relative wages in developing countries. Under certain conditions in his model, FDI might actually decrease relative wage. One possible channel is a decline in demand for skilled work- ers as there is intra-industry substitution of output from the less efficient domestic firms to the more efficient (by assumption) foreign firms. The second is through influencing occupational choices of skilled workers and crowding them out from entrepreneurial jobs to equally skilled for-wage positions at multinationals. This paper empirically finds that there is an intra-industry substitution of labour from the smaller to the larger plants as the industry-level FDI increases. Based on the assumption that size may be a proxy for efficiency and likelihood of receiving FDI, I believe that this result corroborates what Das (2002) predicts will happen in case there is a technological gap. If there is an intra-industry substitution of output from smaller plants to bigger plants, we must also expect an intra-industry substitution of labour, with employment declining at smaller plants and increasing in bigger plants. While Das (2002) makes a prediction about what would happen to the relative wage on average, this paper considers differential effects on average wages of both skilled and unskilled workers. The main finding is that while average wages of both skilled and unskilled workers increase differentially for bigger plants, smaller plants actually experience a de- cline. Assuming that the technology gap between foreign plants and domestic plants still exist, this result is in line with the expectation of the model. In fact, in states that are (historically) the largest recipients of FDI, this differential is likely to be smaller, and I find that there are actually positive spillovers to both small and

large plants alike.

3 Inward FDI in India

Most of the literature on FDI for India thus far has been focused on the determinants of FDI inflows, however there are few studies that focus on the impact of FDI on various industry-level or firm- level outcomes. FDI has been increasing in India post liberalization and India is now one of the major recipients of FDI among the emerging economies (United Nations Conference on Trade and Development (2015)). These changes in FDI have been a response to continually liberalized policy as well as changes in state-level policies that have increased the ease of doing business and made it more attractive for foreign investors to invest in India.

In a study that investigates the role of state-level policies that affect inward Foreign Direct In- vestment, Banga (2003), finds that there is a differential effect of state-level policies on the source of FDI. While removal of restrictions increases FDI from developed countries to developing coun- tries, fiscal incentives are more effective for attracting FDI from developing countries. In addition, Bilateral Investment Treaties play an important role in attracting FDI from developed to developing countries. Aggarwal (2005) further investigates the role of labour market institutions in attracting FDI. She distinguishes between domestic-market seeking and export oriented FDI, and finds that while rigid labour market institutions discourage both kinds of FDI, the effect is more pronounced on domestic market seeking FDI. Mukherjee (2011) shows that FDI in India is highly regionally concentrated and examines the state level factors that play an important role. Market size, agglom- eration effects and size of manufacturing and services base in a state have a positive and significant effect on FDI inflows. On the other hand, she finds that taxation policies and labour

costs have a significant negative impact on FDI inflows. Morris (2004) echoes the findings that FDI is strongly regionally concentrated and further examines the determinants of FDI inflows specifically for Gu- jarat.

These studies highlight the regional concentration of FDI and the importance of state-level policies that affect taxes, infrastructure and labour market institutions which are instrumental in determining the level of FDI inflows. In keeping with these findings, I will control for these effects while empirically estimating the relationship between industry-level FDI and plant-level outcomes. Further, I will also investigate how the estimated relationship varies for each region. I will divide the states into three regions — those receiving the highest FDI inflows, followed by those receiving medium inflows and finally the region with the lowest inflows.

4 Empirical Estimation

In the estimation exercise, I want to distinguish between the effects of industry-level inward FDI on employment and wages for big and average-sized or small plants. For the baseline specification, I will use Total Sales by the plant as a measure for size. Data on whether a plant is the recipient of FDI or not is not available in the ASI data. However, there are certain benefits of not using plant-level FDI for the estimations. Plant level FDI will generate various endogeneity bias concerns, when studying its impact on plant-level variables. Using industry level FDI and a proxy — size, for whether a plant receives FDI help overcome these concerns to better understand the effect of FDI on the variables of interest. In Section 5, I discuss why size is a reasonable proxy for plant-level FDI. The proxy also helps distinguish between those plants that are better able to adjust to increase in competition from those that cannot. Further, in Section 5, using Prowess data I will also show that it is not the case that there are a few focal

firms in an industry receiving all the FDI to further alleviate concerns regarding endogeneity. I use the following specification for my estimation:

$$\ln y_{it} = \alpha_i + \alpha_{rt} + \alpha_j + \beta_1 * \ln FDI_{jt} + \beta_2 * \ln FDI_{jt} * \ln size_{it} + \beta_3 * \ln size_{it} + \beta_4 * \ln X_{it} + \epsilon_{it} \quad (1)$$

The various outcomes of interest are at the plant level and these are: total employment, employ- ment of skilled workers (further, we will consider two sub-categories — employment of managerial and supervisory staff and other skilled employees), employment of production (unskilled) workers, skill composition, total wages, total average wages, and relative wages. Consider the impact of an increase in industry-level FDI. Given that bigger firms are likely to be the recipients of this FDI, and probably direct beneficiaries of the technology transfer from such FDI, we can expect an increase in production activity, which further has a positive impact on total employment of workers. Fur- ther, given the technology transfer, and complementarities between superior technology and quality (proxied by skill of workers), we can assume that bigger firms will also experience an increase in relative demand for skilled workers. Therefore for all the outcome variables, we should expect $\beta_2 > 0$. Even in cases where size does not act as a proxy for presence of foreign equity and tech- nology in a plant, we can expect the biggest plants to compete most aggressively to the increase in FDI in the industry by upgrading their own technology and skill of workers (even increasing wages to retain workers), such that $\beta_2 > 0$. β_1, in this specification, captures the spillover effects. It captures the impact of FDI on all the small plants in the industry. If spread of technological know-how due to presence of foreign investors leads to an increase in economic activity industry-wide, and if this know-how is transferred to workers on a persistent basis leading to an increase in skill of the workforce in general, we should expect $\beta_1 > 0$ for all outcome variables as well. However, if there is a greater market contraction effect on

smaller domestic firms, and there is no transfer of technology, but rather a poaching of skilled workers from domestic plants to bigger plants with FDI, we should expect $\beta_1 < 0$ for the outcome variables.

There is a concern that perhaps for regions receiving high FDI, even smaller plants are recipients of inward FDI, so a positive β_1 does not capture spillovers but the effects of plant-level FDI. In Section 5, I show that even in high FDI regions, it is plants that are sized much higher than the average or median that receive FDI, and it not the case that FDI is more evenly distributed across size. So even in these regions, β_1 continues to capture spillover effects.

In order to control for within-industry plant heterogeneity, the estimation controls for plant fixed effects. This will control for any unobservable characteristics that may cause a plant to select into engaging in FDI, which may further influence the relationship I'm estimating. Further, as stressed by Aitken and Harrison (1999) and Keller and Yeaple (2009), various time-invariant unobservable industry characteristics may cause higher FDI to flow into certain industries than others. To make sure these do not affect my estimation, I also control for industry fixed effects. Finally, while year fixed effects would control for any economy-wide policy that affects all plants equally, from Mukherjee (2011), Aggarwal (2005), Banga (2003) and Morris (2004), we know that there are important regional variations in the distribution of FDI and that state policy plays a crucial role in attracting FDI. The estimation therefore controls for state-year fixed effects, which control for any unobservable (in the data) changes that were made at the state-level, which would affect inward FDI and the outcome variable. The standard errors in the estimation are robust, and have been clustered at the industry-year level.

5 Data and Measurement

The main dataset used to measure the variables in the above specification is the plant-level data from the Annual Survey of Industries released by the Ministry of Commerce, India. The survey is the most comprehensive dataset of India's manufacturing sector available, and has recently been made available as a panel. This dataset is better suited to this project than the other commonly used Prowess dataset because it contains detailed information on employment and wages of production and skilled workers that the latter is unable to provide. The data is very detailed and provides information on various plant characteristics such as fixed assets, working capital, total sales, em- ployment and wages for all categories of workers and employees, five digit NIC industry and state of location. For this study, I have used a strongly balanced panel of 5, 425 plants. Outcome vari- ables of interest have been used or calculated from the dataset. For instance, skill composition has been calculated as a ratio of skilled employees (measured as supervisory and managerial staff as well as other professionals such as engineers, accountants, designers etc.) to total workers, and relative average wages have been calculated by taking a ratio of the average wages paid out to a skilled employee to the average wages paid out to a production worker. The estimations use natural logs of all variables except skill composition (which is a ratio), and summary statistics for these variables are reported in Table 1

Table 1: Summary statistics

	Mean	Standard Deviation
Log(Fixed Capital)	18.96	(1.86)
Log(Working Capital)	16.32	(2.80)
Log(Production	4.87	(1.68)
Log(Total	5.13	(1.67)
Log(Skilled Workers)	3.51	(1.65)
Log(Male Workers)	4.40	(1.75)
Log(Female Workers)	3.27	(1.74)
Log(Managerial	2.68	(1.61)

Log(Other Workers)	3.00	(1.58)
Log(Total Sales)	18.53	(2.50)
Skill Composition	0.24	(0.16)
Observations	3687	

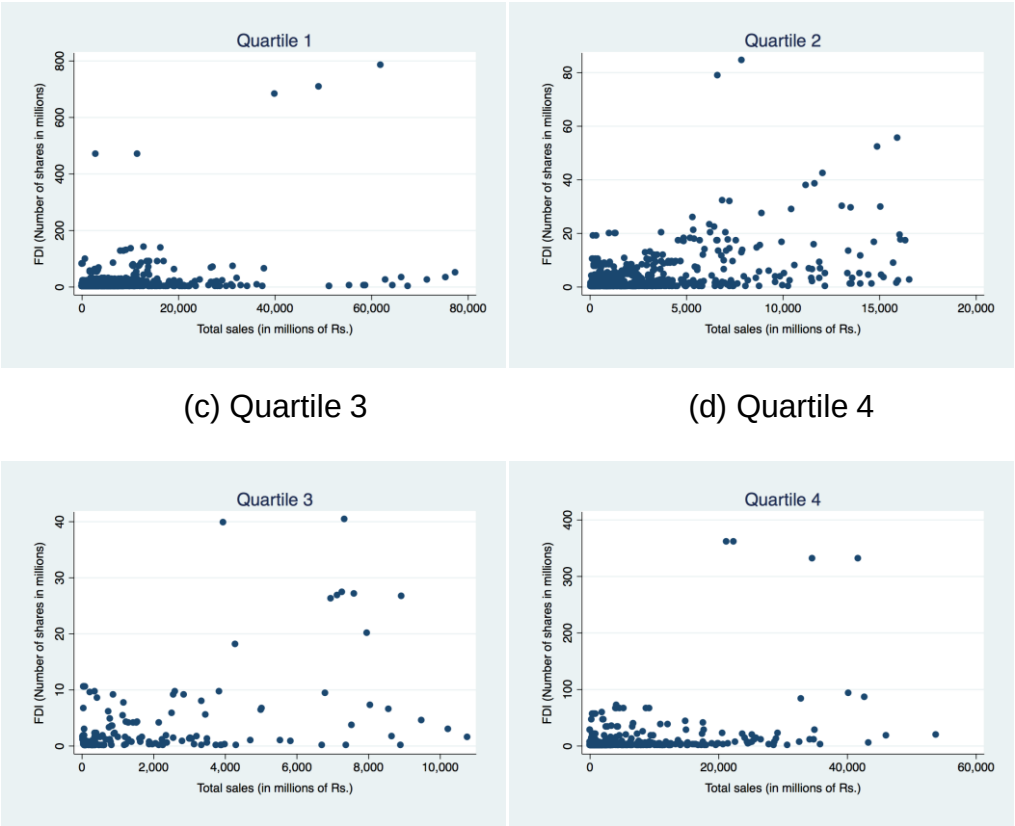
In Section 4, I mention that size is used as a proxy for whether plants receive FDI or not. The proxy is used because ASI plant-level data does not provide information on FDI or foreign ownership. Using data from Prowess, which has data on firms that are listed, but includes data on foreign ownership, I try to show that firms with FDI are on average much bigger in terms of total sales, fixed assets and total wages (as mentioned before, Prowess data does not have information on employment). Table 2 shows the size distribution of firms receiving FDI from the Prowess dataset in the first column, followed by all firms in the Prowess dataset and all plants in the ASI dataset in the second and third columns respectively. This is presented for all plants followed by regions receiving low, medium and high FDI respectively. It is clear that firms that receive FDI have a much higher mean and median than all firms in the Prowess dataset and even more so as compared to plants in the ASI dataset. This holds for the entire sample as well as when considered for the low FDI, medium FDI and high FDI regions. While adding credibility to using size as a proxy for receiving FDI (in addition to reflecting a plant's ability to compete with foreign firms), it further allays concerns that in my empirical model, the coefficient on industry-level FDI in high regions may not quite capture spillovers, but the effects of plant-level FDI in smaller plants.

Table 2

	All plants			Low-FDI Region			Medium-FDI Region			High-FDI Region		
	Prowess FDI	Prowess All	ASI All	Prowess FDI	Prowess All	ASI All	Prowess FDI	Prowess All	ASI All	Prowess FDI	Prowess All	ASI All
	Total sales (in millions of Rs.)											
Observations	4114	36160	29267	151	1887	5590	706	7079	6571	2949	24981	15808
Mean	1212.77	518.63	446.1	948.59	385.1	219.53	1370.24	578.11	450.35	1222.63	515.22	559.68
Median	841.2	192	179.13	891.6	133.6	64.17	1036.3	231	148.85	847.7	191.1	314.1
Standard Deviation	1151.42	784.97	638.99	899.87	615.58	438.38	1199.86	817.71	671.64	1143.83	786.35	673.89
	Total wages (in millions of Rs.)											
Observations	4246	36789	32922	144	1853	6118	766	7304	7196	3012	25372	18039
Mean	63.27	25.46	25.74	47.52	23.29	12.97	64	24.31	23.33	65.69	26.47	33.17
Median	42.45	8.20	12.79	24.3	7.9	3.62	42.2	7.4	10.12	45.65	8.80	21.46
Standard Deviation	60.49	40.85	33.04	56.6	37.51	23.19	60.38	39.97	32.23	60.85	41.81	35.05
	Fixed Assets (in millions of Rs.)											
Observations	4172	40345	20387	142	2084	3196	695	8049	4524	3017	27658	12500
Mean	761.1	278.84	359.82	847.57	242.11	191.82	768.80	266.7	369.38	772.97	284.63	403.67
Median	535.9	98.8	159.79	500.05	79.2	62.3	587.80	92.90	127.39	548.5	101.4	219.48
Standard Deviation	702.1	450.1	493.92	818.65	419.53	361.75	684.84	442.82	533.47	703.2	452.49	500.83

Figure 1: Distribution of FDI by firm size for industry quartiles

(a) Quartile 1 (b) Quartile 2



(c) Quartile 3 (d) Quartile 4

Further, using Prowess data I also show the distribution of FDI across firm size, measured as total sales. This is to show that it is not the case that for our data, there are a handful of focal firms receiving FDI which may raise concerns regarding endogenity for the use industry-level FDI. Figures 1a, 1b, 1c and 1d show the distribution for the four industry quartiles (quartile 1 receiving the lowest amount of FDI and quartile 4 receiving the highest).

The industry-level FDI data used in this study is from the Department of Industrial Policy and Promotion by the Ministry of Commerce and Industry,

Government of India. The report[2] compiles statistics released by the Reserve Bank of India for the years 2000-2006. Using the concordance between the DIPP sector level codes and the three digit NIC 2004 codes as provided in the 2009 report, as well as concordance tables for three digit NIC classification from 2004 to 1998 from the Ministry of Commerce website, inward FDI flows are reported at the three digit NIC 1998 level (because industry classification of plants is only provided for the NIC 1998 classification in the ASI data). There are a total of 75 industries considered in the data for the manufacturing sector and there is significant variation across industries.

Section 8 of this paper studies the relationship between industry-level FDI and various plant- level employment and wage outcomes for different regions of India. Based on the combined FDI and plant-level data, the states have been divided into three regions: those that received the highest FDI, moderate FDI and lowest FDI. The states included in the region that receives the highest FDI are: Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu, Haryana, West Bengal and Uttar Pradesh. The states included in the second (moderate FDI) region are: Madhya Pradesh, Goa, Orissa, Dadar and Nagar Haveli, Rajasthan, Delhi, Jharkhand, Uttaranchal and Punjab. The states included in the third (low FDI) region are: Pondicherry, Assam, Himachal Pradesh, Kerala, Bihar, Daman & Diu, Chandigarh, Chattisgarh and Jammu & Kashmir. The rest of the states receive no FDI and are not included in the analysis in this section. As mentioned before, Banga (2003), Aggar- wal (2005) and Mukherjee (2011) provide evidence on how FDI inflows are spatially distributed, and Section 8 of this study delves into the consequences these regional disparities in FDI inflows have on employment and wages of skilled and unskilled workers.

6 Results and Discussion

[2] *"FDI in India and its Growth linkages." Sponsored by Department of Industrial Policy and Promotion. Ministry of Commerce and Industry (National Council Of Applied Economic Research - NCAER (2009))*

The specification in Section 4 has been estimated for various outcome variables. In Table 3, I will first show how alternate specifications, especially in terms of various fixed effects, affect the coefficient of interest. The dependent variable in Table 3 is total employment at the plant-level. Model 1 only considers the levels of FDI, size is proxied by Total Sales, and it also includes various plant-level controls, which include total fixed capital and working capital. The first model only controls for plant fixed effects and year fixed effects. We find that the effect of aggregate industry level FDI on plant-level total employment is negative, but it's not statistically or economically significant.

Model 2 introduces the interaction term between FDI and plant-level Total Sales, which is the measure of size being used in this estimation. If we only consider the levels of FDI and Total Sales, which are two continuous variables, in our interaction term, the coefficient is not very informative. It will give the differential effect of FDI on plants that have non-zero Total Sales relative to plants that have zero Total Sales. To make this more informative, Total Sales has been centered around the mean, so we can compare the effect of FDI on plants that are of average size relative to plants that are below average size. We find that the coefficient on the interaction term is positive and significant, which means that for plants that are larger than the average plant in the sample, an increase in industry-level FDI leads to a bigger increase in total employment relative to plants that are smaller than average. These plants are either engaging in FDI or large enough to compete with plants benefiting from FDI, and are expanding production activity and total employment more than the smaller plants in the industry. β_1 in this model is negative but insignificant, which can be interpreted as a lack of industry-level spillovers in terms of employment, or simply smaller plants not gaining from the increased levels of FDI in their industry. The coefficient β_2 varies from 0.002 to about 0.003. While this may not seem economically significant, many industries have seen large percentage increases in FDI. Also, this effect will be bigger, the larger the plant is relative to an average sized plant. The estimation reveals that a 1000 percentage point

increase in industry-level FDI, which is what is observed for the top quartile of industries that receive FDI from 2003 − 2006, leads to a 2 percentage point increase in total employment at the average sized plants. This effect, of course, will be bigger, the bigger the size of the plant, and will vary from industry to industry and region to region. The variations in industry and region are explored in Section 7.

Model 3 includes industry fixed effects, which control for any fixed differences across industries that may lead to a higher inflow of FDI and also affect plant-level employment. Model 4 includes state fixed effects in addition to industry fixed effects, which further controls for any fixed differences across states that may be affecting the relationship between inward FDI and plant-level employment. It may be possible however; that the differences across industries vary over time and β_1 may pick up these changes that are affecting the dependent variable. In order to control for this, Model 5 includes industry-year fixed effects, which allows us to estimate only the differential effects across big and small plants of industry level FDI changes. Similarly, differences across states do vary across time, especially with respect to state-policy and as it has been highlighted by Aggarwal (2005), Mukherjee (2011), Banga (2003) and Morris (2004), these play a very important role in affecting FDI inflows. Model 6 therefore, controls for state-year fixed effects. Model 7 controls for both, industry-year and state-year fixed effects. The main coefficient of interest β_2, continues to be positive and statistically significant across all models, and the magnitude also roughly remains the same, being the biggest in model 7, where we include the most controls. Ideally, we would like to use specification in Model 7 as the baseline, because it includes both state-year and industry-year fixed effects, but because β_1 is of interest to us, in order to estimate the spillover effects to small plants, we use state-year fixed effects and industry fixed effects in all the following estimations.

The specification used in all models in Table 4 includes firm fixed effects, industry fixed effects and state-year fixed effects. The outcome variables all

pertain to employment of workers, starting with total employment at the plant level in Model 1. The effects are not different from those dis- cussed in Table 3, wherein we find evidence of a relative increase in total employment in large plants, possibly those that benefit from increased industry-level FDI, and no evidence of spillovers to small plants. Similar effects are found for employment of skilled workers and production work- ers in Models 3 and 4. Both models show that big plants differentially employ more skilled workers and production workers relative to small plants as industry-level FDI increases. However, Model 3 shows evidence of negative spillovers of production workers to small plants. This can be interpreted as the market contraction effect for smaller firms in favor of large firms due to FDI. As industry- level FDI increases, small plants, which are likely not receiving this FDI nor are productive enough to compete with plants with foreign presence experience a decline in market share, and there is therefore a lower derived demand and employment of production workers. In terms of the com- position however, Model 4 shows that there are no differential effects in terms of the bias towards skilled workers. At least compositionally, I find no evidence of the complementarities between skilled workers and sophisticated technology that is embodied in FDI either in terms of differential effects or in terms of spillovers. Models 5 and 6 analyze how the two sub-categories of skilled workers are affected by industry-level FDI — these are managerial and supervisory staff, as well other technically skilled employees. The estimations reveal that the differential effects are much larger in the case of other technically skilled employees as compared to supervisory and managerial staff. This is indicative of the fact there are bigger complementarities between technical skills and FDI than managerial skills and FDI. Alternatively, it could mean that although plants would like to adjust their organizational structures and hire more and better managers as FDI increases, but are unable to do so because of systemic lags in adjustment or rigidities in organizational structures. This could further be exacerbated by the fact that there are supply side constraints as far as hiring managers is concerned.

Table 5 studies the relationship between wages of various worker categories and industry-level inward FDI. Model 1 examines how the total wage bill at the plant-level changes with industry-level FDI, and I find that not only do bigger plants pay out higher wage bills relative to small plants, there are negative spillovers to small plants as industry-level FDI increases. The total wage bill, however, captures both changes in employment and average wages, and may just be a reflection of the employment effects observed in Table 4. Model 2 therefore, considers the average wages paid out to workers, and the positive differential effect for big plants as well as the negative spillover effect to small plants still persists. The dependent variables in Models 3 and 4 are the average wages paid out to skilled workers and production workers respectively. I find that again, bigger plants differentially pay higher average wages to both skilled workers and production workers relative to small plants, whereas smaller plants experience negative spillovers as industry-level FDI increases. This implies that there is no evidence of transfer of technology or skills to workers or upskilling of the labour pool, and perhaps plants with foreign ownership try to poach the existing high quality managers and production workers by offering higher wages. Bigger plants that are either recipients of FDI or are more aggressively able to compete with plants with FDI poach these workers to stay competitive in the market. There is however, no differential increase in relative wages, or the wage-skill premium, pointing to the fact that for the manufacturing sector as a whole, there is no evidence of a skill biased increase in demand for workers. Skilled employees are further classified into two categories — managerial and supervisory staff, and other skilled employees (engineers, accountants etc.) in Models 6 and 7 respectively. The differential effects are strong for these categories as well, and there are negative spillovers for the average sized plant.

Table 3

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)
Log(FDI)	-0.00150	-0.00275	-0.00398	-0.00398	0.104	-0.00391*	0.0739
	(0.00208)	(0.00235)	(0.00256)	(0.00256)	(.)	(0.00227)	(.)
Log(FDI) * Log(TotalSales)		0.00210*	0.00240**	0.00240**	0.00298**	0.00255**	0.00337**
		(0.00114)	(0.00117)	(0.00117)	(0.00141)	(0.00117)	(0.00141)
Log(TotalSales)	0.203***	0.169***	0.163***	0.163***	0.155***	0.161***	0.148***
	(0.0113)	(0.0205)	(0.0208)	(0.0208)	(0.0241)	(0.0206)	(0.0240)
Constant	2.862***	2.896***	3.045***	3.045***	2.232	2.887***	2.370
	(0.222)	(0.222)	(0.263)	(0.263)	(.)	(0.213)	(.)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	No	No	No	No	Yes	No	Yes
State-year FE	No	No	No	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	No	No
Industry FE	No	No	Yes	Yes	No	No	No
State FE	No	No	No	Yes	No	No	No
Observations	23559	23559	23559	23559	23559	23559	23559
Adjusted R^2	0.200	0.201	0.203	0.203	0.215	0.209	0.223

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log(Total employment)	Log(Skilled workers)	Log(Production workers)	Skill composition	Log(Managerial employees)	Log(Other employees)	Log(Other employee composition)
Log(FDI)	-0.00561**	-0.00268	-0.00712***	0.000765	-0.000351	-0.00461	-0.000232
	(0.00244)	(0.00250)	(0.00260)	(0.000535)	(0.00299)	(0.00326)	(0.00246)
Log(FDI) * Log(TotalSales)	0.00295**	0.00272***	0.00259***	0.0000785	0.00222*	0.00559***	0.00193**
	(0.00119)	(0.00103)	(0.000942)	(0.000197)	(0.00126)	(0.00120)	(0.000785)
Log(TotalSales)	0.154***	0.0872***	0.147***	-0.0132***	0.0993***	0.0339	-0.0363***
	(0.0207)	(0.0179)	(0.0201)	(0.00361)	(0.0220)	(0.0207)	(0.0139)
Constant	3.141***	0.546	2.556***	0.337***	-0.231	1.005*	-0.511
	(0.259)	(0.489)	(0.284)	(0.0763)	(0.390)	(0.593)	(0.310)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23559	23486	23503	23506	23378	22837	22706
Adjusted R^2	0.211	0.119	0.152	0.018	0.069	0.060	0.005

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log(Wages)	Log(Average wage)	Log(Skilled Average wage)	Log(Production Average wage)	Log(Relative Wages)	Log(Managerial Average wage)	Log(Other Average wage)
Log(FDI)	-0.0103***	-0.00470**	-0.00493**	-0.00393**	-0.00110	-0.00836***	-0.00628**
	(0.00306)	(0.00188)	(0.00215)	(0.00179)	(0.00195)	(0.00249)	(0.00255)
Log(FDI) * Log(TotalSales)	0.00533***	0.00232***	0.00287***	0.00182***	0.00103	0.00378***	0.00254**
	(0.00125)	(0.000677)	(0.000866)	(0.000668)	(0.000820)	(0.00109)	(0.00101)
Log(TotalSales)	0.167***	0.0139	0.0283*	0.0377***	-0.00948	0.00819	0.0342*
	(0.0241)	(0.0111)	(0.0153)	(0.0116)	(0.0149)	(0.0185)	(0.0177)
Constant	13.77***	10.64***	11.31***	10.35***	0.921**	11.35***	10.50***
	(0.358)	(0.253)	(0.394)	(0.176)	(0.359)	(0.427)	(0.469)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23557	23557	23462	23501	23457	23370	22834
Adjusted R^2	0.337	0.261	0.237	0.193	0.032	0.176	0.147

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Putting the results from the employment and wage effects together, we find that bigger plants experience an expansion in employment of both skilled and unskilled workers relative to smaller plants as industry-level FDI increases, along with a relative increase in the total wage bill and av- erage wages paid out to skilled and unskilled workers. There is no evidence of positive spillovers in terms of wages or employment to the average sized and smaller plants. In fact, there seems to be negative spillovers to smaller plants as far as wages of skilled and unskilled workers are con- cerned, pointing towards the fact that there is probably more poaching than training with increased industry-level FDI. Further, there are negative spillovers to small plants as far as employment of production workers is concerned, likely due to a fall in market share from the market reallocation effect of greater industry-level FDI. Also, there seem to be no relative adjustments in terms of skill composition at bigger plants as FDI increases, and neither is there a relative increase in the demand for skilled workers as reflected by the insignificant effects on the wage-skill premium. It is pos- sible however, that in order to find stronger effects on spillovers in wage-skill premium or skill composition, we should consider lagged effects of FDI. I consider this in Section 7, which also serves as a robustness check for the results. It could be the case that a critical mass of FDI needs to be achieved before one can start observing the spillover effects. This question will be revisited in Section 8, where I consider the regional variation in FDI and compare effects across states that are the so called winners to the states that receive low FDI inflows.

In the concluding part of this section, I investigate how the employment and wages of male and female production workers is affected by industry-level inward FDI. There is differential per- ception about the skill and commitment of male and female production workers, as theorized by Yahmed (2012), such that employers discriminate against female workers. This discrimination is exacerbated as plants globalize and become quality conscious. I find that this holds in the context of FDI in India's manufacturing sector. Table 6 shows that with an increase in industry-level FDI bigger plants differentially increase the

employment and average wages paid out to male workers, while the employment of female workers remains unaffected. This leads to a slightly statistically significant lower relative wage for women at bigger plants relative to smaller plants.

Table 6

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Male workers)	Log(Male average wage)	Log(Female workers)	Log(Female average wage)	Log(Gender relative wages)	Female composition
Log(FDI)	-0.0112***	-0.00439**	-0.00298	-0.00323	0.00600	0.00212*
	(0.00306)	(0.00200)	(0.00640)	(0.00419)	(0.00378)	(0.00128)
Log(FDI) * Log(TotalSales)	0.00245***	0.00215***	0.000709	0.00153	-0.00258*	0.000195
	(0.000907)	(0.000660)	(0.00189)	(0.00193)	(0.00148)	(0.000376)
Log(TotalSales)	0.117***	0.0422***	0.0718*	0.0373	0.0305	-0.00584
	(0.0182)	(0.0119)	(0.0394)	(0.0315)	(0.0256)	(0.00690)
Constant	2.809***	10.20***	1.575***	10.54***	0.281	0.285**
	(0.326)	(0.191)	(0.540)	(0.292)	(0.330)	(0.110)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23155	23152	7954	7940	7888	7966
Adjusted R^2	0.129	0.224	0.057	0.142	0.011	0.036

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7 Robustness Checks

This section addresses the various endogeneity concerns that can arise while estimating the speci- fication in Section 4. It is an extension of Table 3, wherein I address more issues to show that the estimation is robust to various other specifications. First, I show that the estimation is robust to different measures of size. Model 1 in Table 7 considers Fixed Assets as a measure of size instead of Total Sales. The estimation results are not affected by the change in measure of size. Another important concern is the endogeneity of FDI inflows. As mentioned in Section 4, one can expect FDI to flow into productive industries, which may lead to an endogeneity bias in the estimates. A few ways in which we control for that in Table 3 is by including industry-fixed effects, and also showing that the estimation is robust when industry-year fixed effects are included.

I further show that the estimation is robust to considering lagged FDI in Model 2. The differ- ential effect is positive and significant, and in fact of a greater magnitude, showing that the effects of FDI only increase over time. Another important endogeneity bias that the specification possibly suffers from is the possibly reverse causality that may exist between size and the various outcome variables. Bigger plants may employ more workers, pay higher wages, as well as have a higher skill composition. In Model 3 of Table 7, I use lagged Total Sales and find again, that the main result still holds. Model 4 of Table 6 considers lagged effects of both FDI and Total Sales, and finds that the results are robust to this specification as well.

8 Regional Heterogenity

While the estimation exercise so far, has estimated the effect of FDI on plant-level employment and wages, it is important to understand how these effects differ across regions. Banga (2003), Aggarwal (2005), and Mukherjee (2011)

highlight the regional disparities in FDI in India driven by differences in state-policy, infrastructure and labour market institutions. Based on ranking of states in these studies, and the data from DIPP, I have divided the states into three regions (refer to Section 5), the first category that receives the lowest inward FDI, the second category that receives moderate FDI and finally, the third category that receives the highest FDI.

I estimate the relationship for each of these regions, and the models now contain only plant fixed effects, industry fixed effects and year fixed effects. The outcome variables considered are total employment, skill composition, and relative wage (wage-skill premium). The results are shown in Table 8.

Table 7

	(1)	(2)	(3)	(4)
	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)	Log(Total Employment)
Lagged Log(FDI)	-0.00348	-0.00685***		-0.00582**
	(0.00216)	(0.00218)		(0.00267)
Log(FDI) * Log(TotalFixedCapital)	0.00210***			
	(0.000767)			
Log(TotalSales)	0.203***	0.141***		
	(0.0114)	(0.0224)		
Lag(Log(FDI)) * Log(TotalSales)		0.00360***		
		(0.00128)		
Log(TotalFixedCapital)	0.0985***	0.151***	0.200***	0.197***
	(0.0168)	(0.0142)	(0.0186)	(0.0190)
Log(FDI)			-0.00676**	
			(0.00317)	
Log(FDI) * Lag(Log(TotalSales))			0.00369***	
			(0.00126)	
Lag(Log(TotalSales))			0.0876***	0.0901***
			(0.0232)	(0.0257)
Lag(Log(FDI)) * Lag(Log(TotalSales))				0.00345**
				(0.00151)
Constant	1.834***	3.165***	0.0234	2.246***
	(0.275)	(0.310)	(0.350)	(0.398)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes
Observations	23559	20024	20262	19960
Adjusted R^2	0.211	0.198	0.118	0.113

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8

	Low FDI Region			Medium FDI Region			High FDI Region		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log(Total employ-ment)	Skill Com-position	Log(Relative Average Wages)	Log(Total employ-ment)	Skill Com-position	Log(Relative Average Wages)	Log(Total employ-ment)	Skill Com-position	Log(Relative Average Wages)
Log(FDI)	-0.0155***	0.000220	0.000325	-0.0208***	-0.00114	0.00285	-0.0265***	0.00132**	0.0210***
	(0.00488)	(0.00122)	(0.00548)	(0.00497)	(0.000895)	(0.00401)	(0.00493)	0.000564)	(0.00385)
Log(FDI) * Log(TotalSales)	0.000999	0.00000979	0.00148	0.00115	0.000340	0.00206	0.00487**	-0.000286	-0.000461
	(0.00179)	(0.000392)	(0.00154)	(0.00164)	(0.000388)	(0.00165)	(0.00229)	(0.000273)	(0.00154)
Log(TotalSales)	0.195***	-0.0170**	-0.0123	0.199***	-0.0213***	-0.0384	0.101***	-0.00442	0.0248
	(0.0325)	(0.00732)	(0.0266)	(0.0328)	(0.00657)	(0.0296)	(0.0355)	(0.00493)	(0.0284)
Constant	4.055***	0.170*	0.181	4.296***	0.107	0.544	4.874***	0.447***	-1.398***
	(0.388)	(0.0935)	(0.441)	(0.384)	(0.108)	(0.489)	(0.303)	(0.0815)	(0.376)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3914	3902	3886	5177	5166	5150	14217	14189	14181
Adjusted R^2	0.220	0.026	0.008	0.205	0.023	0.011	0.152	0.011	0.018

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The estimates reveal that in states that are the lowest recipient of FDI, i.e. those belonging to region 1, there are no differential effects of FDI between big plants and average sized plants. There are only negative spillovers in terms of total employment to small plants owing to market reallocation effects. This continues to be the case in region 2. In region 3, however, while there are no differential effects of FDI between big and small plants, there are strong spillover effects enjoyed by both plants alike. Models 8 and 9 show higher skill composition and relative wages paid at the average sized plants as industry-level FDI increases. Since these are regions where FDI inflows are large and persistent, there is a stronger evidence of spillovers. It is possible that a certain critical mass of FDI inflows have to be reached before skilled workers start gaining from the technological transfer and transfer of know how from foreign investment. Further, the transfer takes place over a period of time, which is why we find evidence only in regions that have historically been, and continue to be the big "winners" as far FDI inflows are concerned.

This is further highlighted in Table 9, where three states are considered — Maharashtra, a state with a very high level of FDI; Madhya Pradesh, a state that received medium FDI inflows based on our data, and finally, Assam, that has a very low-level of FDI. One can see that Maharashtra experiences an increase in both skill composition as well as relative wages in spillovers to even the average sized plants as the industry-level FDI increases, and in fact, there is no differential effect of FDI based on size. In Madhya Pradesh, these spillovers are present for relative wages, but not for skill composition or total employment. In Assam, on the other hand, these spillovers are in fact, absent.

While these tables help us get an aggregate sense of the relationship between FDI and various labour outcomes, I further test for whether one observes these when one considers a specific in- dustry. I pick an industry that belongs to the highest quartile in terms of inward FDI, and is spread across various regions. A good example is Basic Chemicals (NIC 241). Table 10 includes

4 panels

— the first shows the result for the entire industry and the next three show the results for regions receiving low, medium and high FDI respectively. All panels echo the results obtained throughout the paper, that while there is an intra-industry reallocation of labour from large to small plants, in re- gions with high FDI (in this case an industry with high FDI overall), there are positive spillovers to smaller plants in terms of higher average wages for their production workers and skilled employees, as well as an increase in relative wages for skilled workers.

Table 9

	Maharashtra			Madhya Pradesh			Assam		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log(Total employ-ment)	Skill Com-position	Log(Relative Average Wages)	Log(Total employ-ment)	Skill Com-position	Log(Relative Average Wages)	Log(Total employ-ment)	Skill Com-position	Log(Relative Average Wages)
Log(FDI)	-0.0291***	0.00282**	0.0164***	-0.0305***	-0.000244	0.0228**	-0.0187	0.00174	0.00179
	(0.00736)	(0.00116)	(0.00628)	(0.00710)	(0.00163)	(0.0102)	(0.0127)	(0.00446)	(0.0131)
Log(FDI) * Log(TotalSales)	0.0116**	-0.000455	-0.00385	0.00132	-0.000415	0.00372	0.0162**	-0.00149	-0.00211
	(0.00473)	(0.000547)	(0.00281)	(0.00339)	(0.000700)	(0.00318)	(0.00742)	(0.00224)	(0.00650)
Log(TotalSales)	0.00791	-0.00435	0.0921*	0.195***	-0.00144	-0.0624	0.0203	-0.0149	0.0643
	(0.0751)	(0.0102)	(0.0522)	(0.0568)	(0.0132)	(0.0532)	(0.133)	(0.0377)	(0.104)
Constant	5.951***	-0.247	-1.216*	3.935***	0.413**	1.922	3.485***	0.498*	3.309***
	(0.866)	(0.154)	(0.621)	(0.960)	(0.182)	(1.351)	(1.050)	(0.283)	(1.233)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3498	3488	3487	981	981	981	436	435	433
Adjusted R^2	0.193	0.030	0.021	0.247	0.039	0.019	0.309	0.057	0.034

All models include plant fixed effects.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(Total employment)	Log(Production Workers)	Log(Skilled Workers)	Skill Compo-sition	Log(Average wages)	Log(Average production wages)	Log(Average skilled wages)	Log(Relative Average Wages)
All Plants								
Log(FDI)	-0.250***	-0.192***	-0.242***	-0.00726	0.295***	0.258***	0.346***	0.0881
	(0.0493)	(0.0323)	(0.0493)	(0.00613)	(0.0397)	(0.0162)	(0.0505)	(0.0523)
Log(FDI) * Log(Total sales)	0.0241***	0.0322***	0.00568	-0.00529***	-0.0103*	0.00137	-0.0102**	-0.0115**
	(0.00585)	(0.00632)	(0.00544)	(0.00104)	(0.00516)	(0.00613)	(0.00349)	(0.00409)
Log(Total sales)	-0.0508	-0.300*	0.122	0.0852***	0.268**	0.105	0.346***	0.241**
	(0.151)	(0.124)	(0.0806)	(0.0164)	(0.101)	(0.0861)	(0.0446)	(0.0822)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	759	757	756	757	759	757	756	756
Adjusted R^2	0.233	0.097	0.129	0.032	0.254	0.155	0.244	0.035
Low-FDI Region								
Log(FDI)	-0.332**	-0.363**	-0.256***	0.0230	0.296**	0.423***	0.187**	-0.236***
	(0.0952)	(0.112)	(0.0428)	(0.0162)	(0.0959)	(0.0384)	(0.0646)	(0.0533)
Log(FDI) * Log(Total sales)	0.00216	0.0129	-0.0251**	-0.00732	-0.00937	0.0124	-0.00862	-0.0210
	(0.0137)	(0.0193)	(0.00995)	(0.00397)	(0.00482)	(0.0132)	(0.00957)	(0.0172)
Log(Total sales)	0.348	0.221	0.689**	0.0888	0.239**	-0.135	0.227	0.362
	(0.192)	(0.302)	(0.200)	(0.0777)	(0.0660)	(0.212)	(0.154)	(0.284)
Observations	90	90	89	90	90	90	89	89
Adjusted R^2	0.516	0.457	0.480	0.137	0.631	0.397	0.702	0.643
Medium-FDI Region								
Log(FDI)	-0.279**	-0.193**	-0.117	0.0112	0.198***	0.188***	0.302***	0.115
	(0.0758)	(0.0775)	(0.0799)	(0.0151)	(0.0528)	(0.0305)	(0.0627)	(0.0601)
Log(FDI) * Log(Total sales)	0.0148	0.0223	-0.0505***	-0.0137**	0.0180	0.0164	0.0301	0.0137

Continued on next page

	Log(Total employment)	Log(Production Workers)	Log(Skilled Workers)	Skill Composition	Log(Average wages)	Log(Average production wages)	Log(Average skilled wages)	Log(Relative Average Wages)
	(0.0130)	(0.0182)	(0.0131)	(0.00395)	(0.0200)	(0.0141)	(0.0204)	(0.0158)
Log(Total sales)	0.351	0.0766	1.262***	0.234**	-0.118	-0.254	-0.298	-0.0437
	(0.239)	(0.320)	(0.258)	(0.0713)	(0.353)	(0.246)	(0.365)	(0.256)
Observations	115	114	114	114	115	114	114	114
Adjusted R^2	0.476	0.279	0.210	0.031	0.350	0.142	0.311	0.023
High-FDI Region								
Log(FDI)	-0.260***	-0.170***	-0.266***	-0.0159*	0.348***	0.237***	0.406***	0.169***
	(0.0352)	(0.0369)	(0.0141)	(0.00747)	(0.0337)	(0.0331)	(0.0299)	(0.0161)
Log(FDI) * Log(Total sales)	0.0277**	0.0474***	0.0356**	-0.00266	0.000198	-0.0108	-0.00730	0.00352
	(0.0100)	(0.00825)	(0.00983)	(0.00252)	(0.00845)	(0.00602)	(0.00826)	(0.00831)
Log(Total sales)	-0.218	-0.780***	-0.571***	0.0460	0.0559	0.400**	0.343	-0.0567
	(0.292)	(0.166)	(0.154)	(0.0383)	(0.210)	(0.111)	(0.230)	(0.177)
Observations	552	551	551	551	552	551	551	551
Adjusted R^2	0.170	0.061	0.133	0.029	0.213	0.137	0.219	0.011

All models include plant fixed effects, year fixed effects and controls.
Standard Errors are clustered at the three digit NIC industry-year level.
Log (Total Sales) has been centered around its mean.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

9 Conclusion

In this paper, I investigate the impact of industry-level FDI on plant-level employment and wages for both skilled and unskilled workers. The expectation is, that given the nature of FDI, which is traditionally expected to embody superior technology with increased inflows, there should be a transfer of technology to plants and workers, which further enhances the skill and wages of workers. Such a transfer especially through training of workers, and combined with labour mobility and imitation between plants in an industry is expected to have spillover effects to even those plants that do not engage in FDI, i.e. one can expect spillovers of FDI to all plants in an industry.

My hypothesis is that the effect of industry-level FDI, in terms of spillovers, will be differential based on the size of the plant. My empirical analysis, that covers 5425 plants in India's manufactur- ing sector, confirms this hypothesis. While larger plants experience a differential increase in total employment – which includes employment of both skilled and unskilled workers —– as well as average wages paid out to both skilled and unskilled workers, relative to average sized and smaller plants, the smaller plants experience negative spillovers for employment of production workers and average wages paid out to both skilled and unskilled workers. This suggests that there are strong market reallocation effects, and mainly poaching of higher quality production and skilled workers from average sized to small plants as there is increased foreign-ownership of plants in an indus- try. Further, increased industry-level FDI is associated with a relative increase in demand for male blue-collar workers at bigger plants relative to average sized to small plants while the demand for female blue-collar workers remains unaffected. While there is evidence of an increase in skilled workers, there are no differential compositional changes at big plants, neither is there evidence of an increase in relative wage skill premium at bigger plants. While this may suggest that increase in industry-level FDI in India is not skill-biased in its demand for workers nor does it contribute to an increasing pool of skilled workers, a careful analysis at the regional level provides a better picture of the actual effects. Analyzing the effects of industry-level FDI on different regions reveals that even average to small sized plants in regions that receive the highest FDI experience an increase in skill composition of workers as well as the wage skill premium. This indicates that perhaps a critical mass of FDI is required in order to influence the demand for skilled workers at plants as well as contribute to the pool of skilled workers in an industry.

The above findings are important for understanding the effects of a liberalized FDI policy. It is important to understand that if the inflow of FDI into an industry is low and not sustained over a period of time, we should expect to observe greater intra-industry reallocation of output from domestic firms to multinational

firms due to FDI, and greater poaching of workers as opposed to a contribution towards the transformation of the work force. The current “Make in India” campaign should ensure that conditions in the domestic economy are such that it not only attracts initial small flows of FDI, but that these persist over a period of time to be able to benefit the industry-level workforce. Only then will the objectives of the “Make in India” campaign go hand in hand with those of other initiatives such as the National Skill Development Corporation, which aims to upskill India’s workforce, instead of proving to be counterproductive.

References

Aggarwal, Aradhna, "The Influence of Labour Markets on FDI: Some Empirical Explorations in Export Oriented and Domestic Market Seeking FDI across Indian States," Technical Report, Oxford University 2005. Global Conference on Business and Economics.

Aitken, Brian, Ann Harrison, and Robert E. Lipsey, "Wages and Foreign Ownership: A Comparative Study of Mexico, Venezuela and the United States," Working Paper 5102, National Bureau of Economic Research May 1995.

Aitken, Brian J. and Ann E. Harrison, "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela," *American Economic Review*, 1999, *89* (3), 605–618.

Amiti, Mary and Donald R. Davis, "Trade, Firms, and Wages: Theory and Evidence," *Review of Economic Studies*, 2012, *79* (1), 1–36.

Banga, Rashmi, "Impact of government policies and investment agreements on FDI inflows," Indian Council for Research on International Economic Relations, New Delhi Working Papers, Indian Council for Research on International Economic Relations, New Delhi, India 2003.

Blomstrom, Magnus and Hakan Persson, "Foreign investment and spillover efficiency in an underdeveloped economy: Evidence from the Mexican manufacturing industry," *World Development*, June 1983, *11* (6), 493–501.

Csillag, Márton and Miklós Koren, "Machines and machinists: Capital-skill complementarity from an international trade perspective," CeFiG Working Papers 13, Center for Firms in the Global Economy March 2011.

Das, Satya P., "Foreign direct investment and the relative wage in a developing economy," *Journal of Development Economics*, February 2002, *67* (1), 55–77.

Feenstra, Robert C. and Gordon H. Hanson, "Foreign Investment, Outsourcing and Relative Wages," Working Paper 5121, National Bureau of Economic Research May 1995.

Keller, Wolfgang and Stephen R. Yeaple, "Multinational Enterprises, International Trade, and Productivity Growth: Firm-Level Evidence from the United States," *The Review of Economics and Statistics*, November 2009, *91* (4), 821–831.

Melitz, Marc, "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, 2003, *71*, 1695–1725.

Morris, Sebastian, "A Study of the Regional Determinants of Foreign Direct Investments in India, and the Case of Gujarat," IIMA Working Papers. WP2004-03-07, Indian Institute of Management Ahmedabad, Research and Publication Department. March 2004.

Mukherjee, Atri, "Regional Inequality in Foreign Direct Investment Flows to India: The Problem and the Prospects Industry," Technical Report 2, Reserve bank of India Occasional papers. 2011.

National Council Of Applied Economic Research - NCAER, "FDI in India and its Growth linkages. Sponsored by Department of Industrial Policy and Promotion. Ministry of Commerce and Industry," Technical Report, Government of India. 2009.

Poole, Jennifer P., "Knowledge Transfers from Multinational to Domestic Firms: Evidence from

Worker Mobility," *The Review of Economics and Statistics*, May 2013, *95* (2), 393–406.

United Nations Conference on Trade and Development, "UNCTAD World Investment Report (2015) Reforming International Investment Governance," United Nations Publication., United Nations Conference on Trade and Development. 2015.

Yahmed, Sarra Ben, "Gender Wage Gaps across Skills and Trade Openness," AMSE Working Papers. 1232, Aix-Marseille School of Economics, Marseille, France November 2012.

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