Kiel Institute for the World Economy

Duesternbrooker Weg 120
D-24105 Kiel (Germany)

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FDI in Mexico:
An Empirical Assessment of Employment Effects

by

Peter Nunnenkamp

José Eduardo Alatorre Bremont[1]

Andreas Waldkirch

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Abstract: We raise the question whether foreign direct investment (FDI) has contributed to employment generation in Mexico and, thereby, helped overcome the country's pressing labor market problems. The analysis draws on highly disaggregated FDI and employment data covering almost 200 manufacturing industries. We estimate dynamic labor demand functions for blue and white collar workers, including both FDI and its interaction with major industry characteristics. By employing the GMM estimator suggested by Arellano and Bond, we account for the relatively short time dimension of our panel (1994-2006). It turns out that FDI has a significantly positive, though quantitatively modest impact on manufacturing employment in Mexico. In contrast to a widely held view, this applies to both white collar and blue collar employment. However, the positive effect on blue collar employment diminishes with increasing skill intensity of manufacturing industries.

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Peter Nunnenkamp
Kiel Institute for the World Economy
P.O. Box 4309
D-24100 Kiel, Germany
Phone: ++49-431-8814209
Email: peter.nunnenkamp@ifw-kiel.de

José Eduardo Alatorre Bremont
Facultad de Economía, UNAM
Av. Universidad 3000, C. P. 04510
México, D. F.
Phone: ++55-5622-2100
Email: ealatorre@economia.unam.mx

Andreas Waldkirch
Department of Economics
Colby College
5244 Mayflower Hill
Waterville, ME 04901
Email: andreas.waldkirch@colby.edu

1. Introduction

Mexico is fairly attractive to foreign direct investment (FDI). It has participated more than proportionally in booming FDI since the early 1990s. Inward FDI stocks amounted to 8.5 percent of Mexico's GDP in 1990, closely resembling the ratio of worldwide FDI stocks in world GDP at that time. Subsequent developments in this ratio indicate that Mexico outperformed most host countries in terms of attracting FDI. FDI stocks in 2005 reached 27.3 percent of its GDP, compared to 22.7 percent worldwide (UNCTAD 2006: Annex table B.3).

Yet, it remains disputed whether Mexico's openness to FDI has supported the country's economic development. In particular, it is open to question whether FDI has added to employment and, thereby, helped overcome Mexico's pressing labor market problems: "Mexico is faced with the daunting task of creating one million *new* jobs a year just to keep up with the entry of young workers into the labor force" (Gereffi 2003: 237).[2] Furthermore, concerns are that FDI may have unfavorable distributional consequences as concerns the employment and income prospects of less skilled workers (Feenstra and Hanson 1997; Hanson 2003). However, FDI may have improved the employment situation of less skilled workers, with which Mexico is vastly endowed, even if FDI draws on relatively skilled labor in the first place.

The employment effects of FDI have received little attention in the recent literature. Jenkins (2006) provides an exception, finding that the indirect employment effects of FDI have been minimal, or even negative in the case of Viet Nam. Typically, however, the literature focuses on the links between FDI and the relative wages of skilled and unskilled workers in the host country, if labor market issues are addressed at all.[3] In a recent overview on who gains from FDI, the Overseas Development Institute notes that there is little systematic evidence of the employment effects in the host countries of FDI (ODI 2002). The comprehensive and detailed review of the relevant literature by Lipsey (2002) refers repeatedly to (possibly negative) employment effects of outward FDI in the home countries of multinational companies, while (possibly positive) employment effects of inward FDI are hardly mentioned. Likewise, the links between inward FDI and employment receive hardly any attention in the survey by the OECD (2002).

[2] See also Salas and Zepeda (2003).

[3] With few exceptions, the empirical evidence reveals that, while inward FDI is associated with higher wages for both skilled and unskilled workers, skilled workers benefit more from higher wages than unskilled workers. For reviews of the literature, see Lipsey (2002) and ODI (2002).

This is rather surprising given that employment generation appears to be a major motive underlying the fierce international competition for FDI inflows.[4] Policymakers in various host countries, including Mexico, are under pressure to create jobs. Oman (2001) notes that incentive packages have often surpassed US$ 100,000 per job “to be created” through FDI in manufacturing industries such as car assembly.

Against this backdrop, we summarize previous findings on FDI effects in Mexico in Section 2 and show some stylized facts on FDI and labor market trends in Section 3. The analytical background and the approach of empirically assessing employment effects are presented in Section 4. The results are discussed in Sections 5 and 6. It turns out that FDI had a significantly positive, though quantitatively modest impact on employment in Mexico’s manufacturing sector. In contrast to a widely held view, FDI adds to both white and blue collar employment in the first place. However, the positive effect on blue collar employment diminishes with increasing skill intensity of manufacturing industries. Section 7 concludes.

2. FDI Effects in Mexico: Previous Findings and Open Questions

FDI effects in Mexico have attracted considerable attention in the literature. One strand of the literature focuses on economic growth effects. According to Graham and Wada (2000: 779), Mexico has derived “significant economic benefit” from FDI inflows, e.g., in terms of higher incomes and wages.[5] Adames (2000) finds FDI in Mexico to be positively associated with GDP growth in 1971-1995.[6] Calderón, Mortimore and Peres (1995: 17) observe that industries that received more FDI developed more dynamically, but the direction of causation is left open to debate. The regression analysis of Jordaan (2004) suggests that a higher share of FDI-related employment in total employment of manufacturing industries positively affects labor productivity of local companies in the same industry.[7] This corroborates the earlier finding of Blomström (1986) that foreign entry into a manufacturing industry enhances average labor productivity within this industry, though not that of the least efficient firms. Blomström argues that this is mainly because FDI adds to competitive pressure.

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[4] According to Cohen (2007: 292-293), “the primary motive for national and regional governments giving incentives to attract incoming MNCs is expectation that high-quality, relatively high-paying jobs will be created.” Ruane and Görg (1999) stress that employment creation has been the overriding focus of Ireland’s FDI strategy in order to tackle high unemployment and emigration rates, i.e., economic problems also figuring high on Mexico’s policy agenda.

[5] For a more skeptical view, see Paus and Gallagher (2006: 2); Mexico has “been able to attract considerable amounts of high-tech FDI over the last ten years, yet without reaping lasting development benefits from it.“ For a similar assessment, see Gallagher and Zarsky (2004).

[6] However, the econometric analysis of Adames (2000) does not account for the endogeneity of FDI and includes a limited set of control variables.

Applying cointegration analysis, Ramírez (2000) finds the increase in FDI stocks to have Granger-caused labor productivity growth in 1960-1995. Likewise, the multivariate VAR approach of Cuadros, Orts and Alguacil (2004), which accounts for complementarities between FDI and trade liberalization, reveals a strong FDI-growth nexus in the case of Mexico. Herzer, Klasen and Nowak-Lehmann (2006) question the robustness of these results; their refined cointegration analysis suggests that FDI in Mexico is a consequence of economic growth rather than its cause. Máttar, Moreno-Brid and Peres (2003: 143) find that FDI had a positive, albeit not very significant, effect on total manufacturing investment. Furthermore, FDI played a crucial role in Mexico's rapid expansion of manufactured exports (Palma 2003).

Another strand of the literature addresses labor market implications of FDI in Mexico. The focus is on whether FDI contributed to increasing wage gaps between skilled and unskilled workers, whereas the question of whether FDI generates additional employment opportunities has received little attention. Aitken, Harrison and Lipsey (1996) show that a 10 percent higher foreign share in manufacturing employment is associated with an increase in skilled wages by 2.2 percent, whereas the increase in unskilled wages is just 0.3 percent. They also find that the wage effects of FDI are limited to foreign-owned firms and do not spill over to domestic firms in Mexico. According to Feenstra and Hanson (1997), the relative demand for skilled labor increased in Mexican regions where FDI was concentrated. They attribute more than 50 percent of the increase in the wage share of skilled workers that occurred during the late 1980s to FDI-related offshoring, mainly by US based companies in so-called *maquiladoras*. Hanson (2003) concludes from a survey of the earlier literature that FDI and trade liberalization in Mexico has raised the relative demand for skilled labor in the country. Moreover, the returns to skill appear to have further increased since Mexico became a member of NAFTA in 1994. Wage effects turned out to be much stronger in regions with higher levels of FDI.

By contrast, employment effects have received little attention. This is even though FDI is widely believed to have contributed little to employment generation in Mexico. Dussel Peters (2003) notes that major exporting firms and *maquiladoras* employed less than six percent of the Mexican labor force in 2002. According to UNCTAD data, multinational companies accounted for 7 percent of total employment in Mexico (UNCTAD 2002).[8] Dussel Peters also stresses that employment growth was significantly below the growth of the

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[7] Moreover, Jordaan (2004) finds this effect to be more pronounced when the endogeneity of FDI is taken into account. This somewhat surprising result is attributed to the concentration of FDI in labor intensive manufacturing.

[8] By contrast, Ruane and Görg (1999) show that foreign companies accounted for almost half of employment in Irish manufacturing.

economically active population (Dussel Peters 2003). Gallagher and Zarsky (2004: 5) come to the verdict that the FDI-led integration strategy "performed very poorly in terms of job growth."

FDI appears to have created rising employment in the *maquiladoras*, at least until 2000 (Ernst 2005). Nevertheless, the export sector is often blamed for not having absorbed Mexico's growing labor force (Dussel Peters 2003; Gallagher and Zarsky 2004). According to Palma (2003), the rapid FDI-induced export expansion has been completely decoupled from GDP growth and employment generation since the 1980s, notably in the non-maquila sector.[9] Likewise, Salas and Zepeda (2003) argue that economic reforms in the late 1980s and early 1990s failed to deliver more and better-paid jobs.[10] By contrast, Díaz-Bautista (2006) claims that the FDI-induced export expansion accounts for more than half of the 3.5 million jobs created in Mexico since 1995. Moreover, the finding of Salas and Zepeda (2003) that wage employment in most industries decreased in relative terms in the 1990s is in contrast to Stallings and Peres (2000), according to whom the share of wage earners in total employment increased. FDI may also have contributed to increasing economic and social disparities and North-South polarization in Mexico (Dussel Peters 2003: 268-9; Hanson 2003).[11]

In summary, there is little analytical work on employment effects of FDI in Mexico. Most of the available evidence is purely descriptive, e.g, by comparing sector-specific FDI and employment trends (Ernst 2005). The analysis of Aroca and Maloney (2005) represents a rare exception. These authors provide indirect evidence of FDI-induced job creation in Mexico by showing that FDI deterred out-migration. Moreover, earlier findings may no longer apply. The type and structure of FDI appears to have changed significantly in recent years, and these changes may have important implications for the labor market effects of FDI in Mexico. Graham and Wada (2000) suspect that FDI has been increasingly motivated by cost considerations and taking advantage of Mexican locations to serve the whole North American market. Waldkirch (2003) shows that the vertical type of FDI figures prominently indeed in Mexico.[12]

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[9] While employment declined in the non-maquila sector in 1991-2000, it increased by about 175 percent in the maquila sector (Palma 2003: 16).

[10] In this context, it should be noted that low official unemployment rates are grossly misleading. Informal sector employment accounted for about 45 percent of total employment in Mexico in the late 1990s (Salas and Zepeta 2003: 524-5). According to Gallagher and Zarsky (2004: 45), official estimates of the share of informal sector employment range from 30 to more than 60 percent.

[11] However, FDI turns out to be insignificant in the 2SLS regression on regional economic growth performed by Díaz-Bautista (2006).

[12] See also Calderón, Mortimore and Peres (1995) on the new role of FDI in the Mexican economy. Underlying this new role was the transformation of Mexico from a fairly closed economy to a highly open one (Máttar, Moreno-Brid and Peres 2003). Ernst (2005) stresses that different types of FDI may have different employment effects, but does not analyze this issue systematically.

3. Stylized Facts on FDI and Employment in Mexico

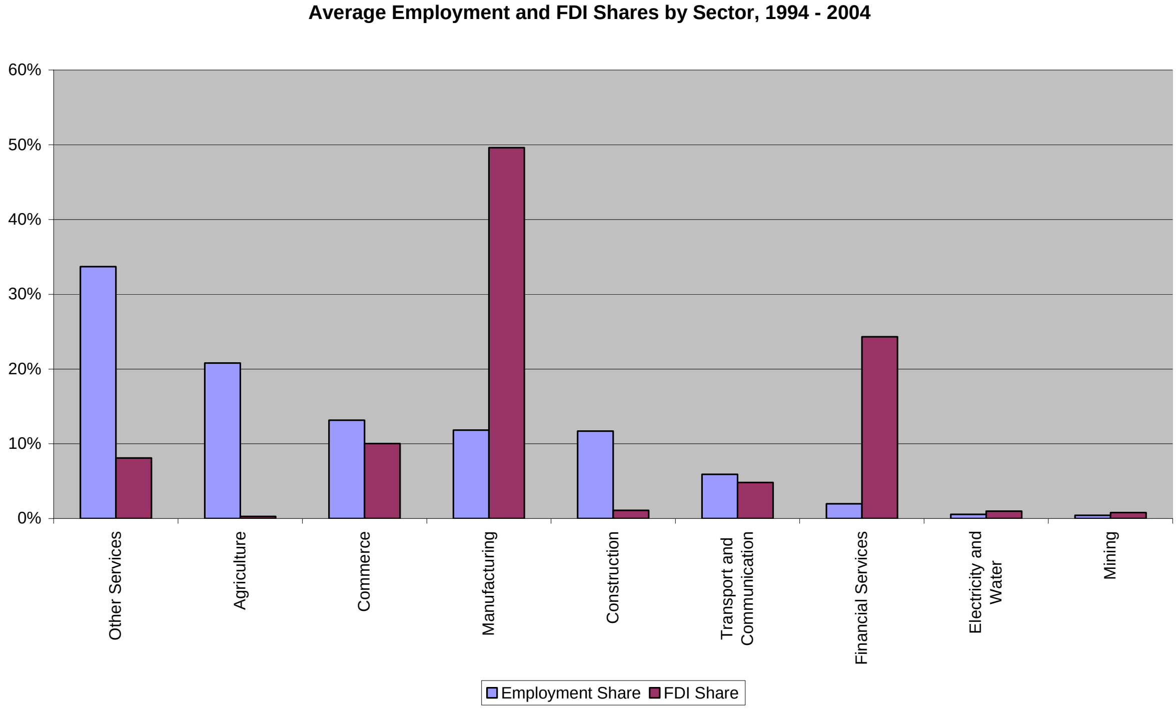
For the Mexican economy as a whole, the employment effects of FDI are bound to be relatively small. Comparing the structure of employment and the sectoral composition of FDI inflows, FDI is heavily concentrated in economic activities that contributed little to overall formal employment. About three quarters of FDI inflows in 1994-2004 went to the manufacturing sector and financial services, which taken together accounted for just 13.7 percent of formal employment (Figure 1).[13] The FDI share in manufacturing exceeds the employment share by a factor of 4.2. Financial services attracted, on average, about 25 percent of total FDI inflows, whereas the sector's contribution to overall employment remained as low as 2 percent. The huge gap between FDI and employment in financial services is at least partly because mergers and acquisitions (M&As) represented a major mode of FDI in this sector (UNCTAD 2002: 67).[14] On the other hand, several sectors accounting for significant employment shares attracted hardly any FDI inflows, most notably agriculture.

Moreover, average annual employment growth was below average in sectors where the bulk of FDI was located. While overall employment growth in 1994-2004 amounted to 1.34 percent, employment growth in manufacturing and financial services was 0.8 and 1.2 percent, respectively. As concerns manufacturing, it should be noted that employment trends differed sharply between the *maquila* (6.5 percent) and *non-maquila* sub-sectors (-1.0 percent). However, the dynamic *maquila* sub-sector, on average, accounted for less than one third of employment in manufacturing so that its impact on overall employment trends remained modest. As a consequence, the manufacturing sector as a whole and financial services contributed just 4.2 and 1.7 percent, respectively, to formal employment creation in 1994-2004 (Figure 2). Rather, employment creation was concentrated in construction and services sectors in which foreign direct investors played a minor role.

[13] Note that FDI data and data on employment in specific manufacturing industries are available up to 2006. Most recent data are included in the subsequent analysis as far as possible. In several instances, however, we have to restrict the period of observation as most recent data are lacking for some variables considered. For example, employment data for broadly defined sectors as given in Figure 1 are available only up to 2004.

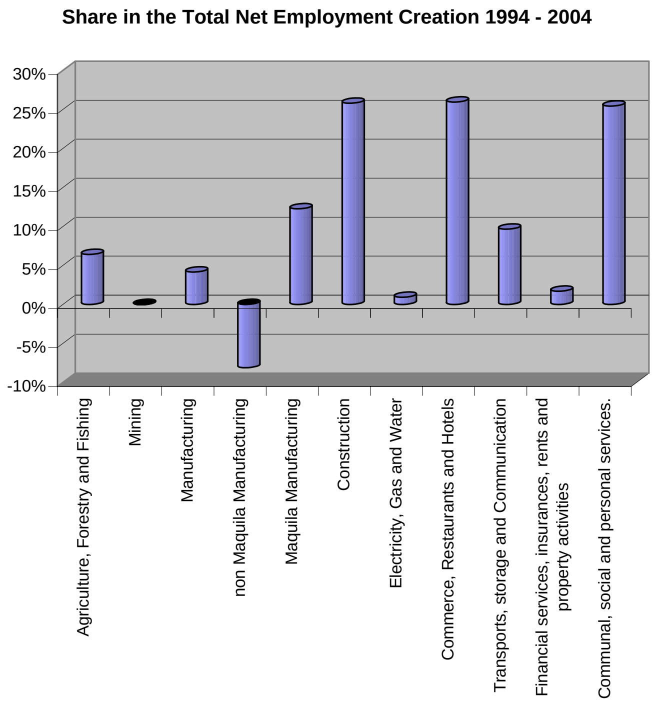
[14] This was especially so in 2001, when financial services received 53 percent of total FDI inflows. This was mainly due to the acquisition of Banamex, the most important bank in Mexico, by US based Citicorp for US$ 12.5 billion; see also Máttar, Moreno-Brid and Peres (2003: 133).

Figure 1



Note: sectors ranked from left to right according to their employment share; other services include: professional, specialized and technical services, education, medical services, personal services, public administration and defense.
Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

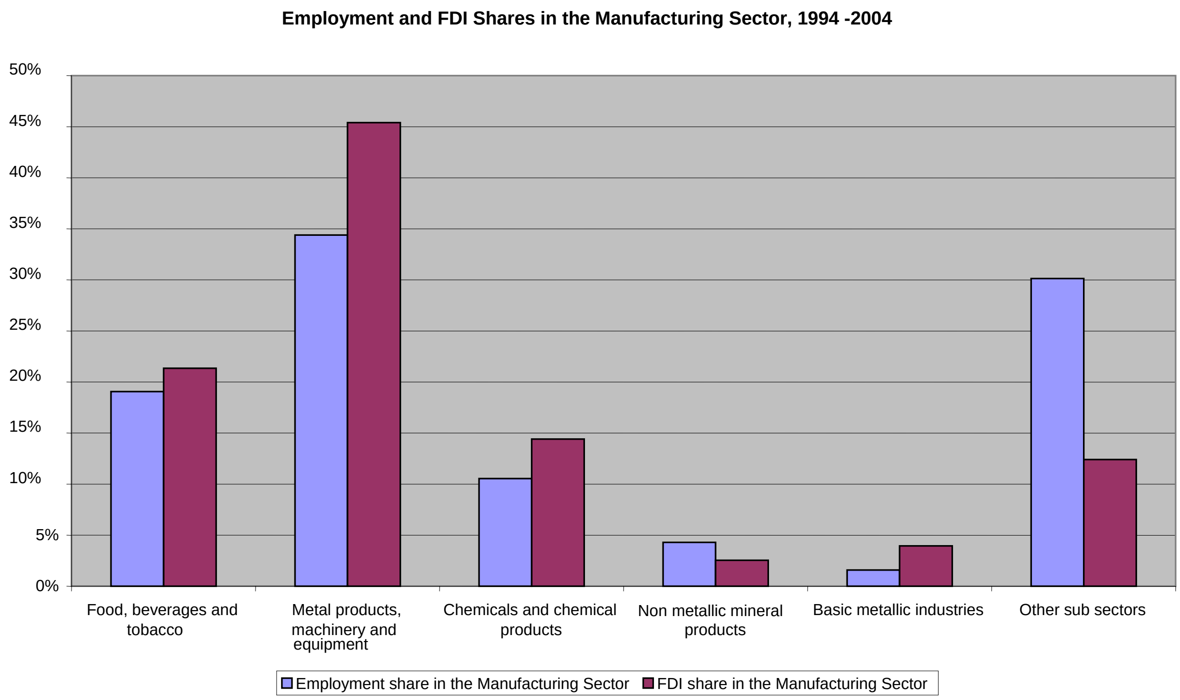
Figure 2



Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

Yet, the link between FDI inflows and employment should not be discarded by comparing trends at the still fairly aggregate level of major economic sectors. A more disaggregated account may be provided for the manufacturing sector. In striking contrast to Figure 1 above, FDI and employment shares are largely in line when compared across major manufacturing industries (Figure 3). Most notably, metal products, machinery and equipment stand out with the highest share by far in terms of both employment and FDI inflows. By contrast, non-metallic mineral products and basic metallic products clearly rank at the bottom in both respects.

Figure 3



Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

Subsequently, we turn to a much finer disaggregation of the manufacturing sector, in order to assess the employment implications of FDI. Comparable employment and FDI data are available for 197 industries at the 6-digit level of the Mexican Industrial Classification System (CMAP). Data on employment come from INEGI's Monthly Manufacturing Survey (EIM) and FDI data come from the Ministry of Economy. Table 1 lists the top-5 industries at this level of disaggregation in terms of FDI inflows in 1994-2003 and provides the industry-specific employment shares plus some industry characteristics that may have an impact on the employment effects of FDI.[15] The top-5 industries accounted for more than one third of FDI flows into the manufacturing sector. Except for non-alcoholic beverages, the FDI share by far exceeded these industries' contribution to employment in the manufacturing sector. Yet, it should be noted that two of the top-5 FDI industries (production of carbonated beverages and other non alcoholic beverages; and production and assembly of automobiles and trucks) also rank at the top in terms of employment in manufacturing (not shown).

Table 1
Industries with the Highest Share in FDI Inflows in the Manufacturing Sector, 1994 - 2003

Industry	*FDI share (percent)*	*Employment share (percent)*	*Exports, percent of total sales*	*White collar – total employment ratio*	*Capital – labor ratio*
Production of parts and accessories for automobiles and trucks	10.7	1.6	19.4	0.25	207
Automobiles and trucks, production and assembly	7.6	3.5	73.4	0.21	1,010
Production of cigars	6.0	0.3	2.2	0.53	622
Production of carbonated beverages and other non alcoholic beverages	5.3	5.9	0.5	0.39	271
Electric materials and accessories	4.4	1.0	29.7	0.22	160
Mean, 197 industries	0.5	0.50	20.6	0.2969	411.40
Median, 197 industries	0.12	0.31	15.9	0.2679	203.32

FDI share is the industry's share in total manufacturing FDI.
Employment share is the industry's share in total employment of the manufacturing sector.
Exports are the share of the industry's sales in foreign markets in total net sales; only available for 1994-2003.
White collar – total employment ratio is the number of non-production workers to the number of all workers.
Capital - labor ratio is the ratio between the value of the industry's total assets in 1998 (thousands of 2003 pesos) and its total employment.

Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI); INEGI, Annual Manufacturing Survey (for exports); INEGI, Economic Census 1999 (for value of assets).

At the same time, the industry characteristics shown in Table 1 clearly reveal the heterogeneity of FDI in Mexico's manufacturing sector. Automobile production represents the case of vertical FDI with exports accounting for about three quarters of total output.[16] By

[15] We restrict the period of observation to 1994-2003 in Table 1 as some of the variables used to compare industry characteristics are not available for more recent years (e.g., exports). Extending the period of observation to 2006 to identify the most important industries in terms of FDI shares does not change the picture significantly. The "processing of other products for human consumption" would enter the top-5, but only because of exceptionally large FDI inflows in one year (2004), while the "production of cigars" would drop to position six among the 197 industries under consideration.

[16] Various authors refer to CEPAL's classification of different types of FDI in Latin American countries in considering FDI in Mexico's automobile industry to be efficiency seeking; other industries listed in this category include electronics and clothing (see, e.g., Dussel Peters 2000; Máttar, Moreno-Brid and Peres 2003; Ernst

contrast, FDI in the production of non-alcoholic beverages and cigars is almost purely local market seeking. Likewise, the capital and skill intensity of production varies considerably between the five industries in which FDI is concentrated. Not surprisingly, automobile production is highly capital intensive; but its skill intensity is below the manufacturing average. The high capital intensity of export oriented automobile production provides a first hint of why export-oriented FDI may have helped little to absorb Mexico's increasing labor force (see the references given in Section 2 above). The skill intensity is similarly low in the production of electrical materials and accessories, while this industry has the lowest capital intensity among the top-5 FDI industries. Thus, FDI could be expected to have relatively favorable employment effects, in particular for less skilled workers, in the production of electrical materials and accessories. The production of cigars represents the opposite case of an above average capital intensity combined with an extremely high skill intensity.

Given the wide variation of important characteristics between the top-5 FDI industries, it does not come as a surprise that the bivariate correlations between the relative importance of FDI and the three industry characteristics are fairly weak when calculated across the whole sample of 197 manufacturing industries (Table 2). In particular, the correlation with the capital-labor ratio is completely insignificant. FDI and the export intensity of industries are positively correlated, though only at the 10 percent level. It remains open to question, however, whether causation runs from FDI to exports, or the other way round (i.e., export-oriented industries attracting more FDI). The correlation between FDI and skill intensity of industries (ratio of white collar to total employment) is ambiguous. It turns out to be significantly positive when reducing the impact of outliers by running non-parametric (Spearman) correlations. The latter finding may indicate that FDI draws on more skilled workers in the first place.

Table 2
Bivariate Correlations between FDI and Selected Industry Characteristics across Manufacturing Industries: Period Average 1994 – 2003

	Pearson correlation		*Spearman correlation*	
	coefficient	t-stat.	coefficient	t-stat.
Exports, in percent of total sales	0.11*	0.096	0.13*	0.065
White collar – total employment	0.099	0.165	0.19***	0.006
Capital – labor ratio	-0.002	0.877	0.05	0.446

***, **, * denote significance at the 1%, 5% and 10% level, respectively.
Definition of variables as given in Table 1.

Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

2005). See also Waldkirch (2003), who finds considerable support for the vertical FDI model in the case of Mexico.

Before turning to the estimation of the employment effects of FDI within the framework of labor demand functions, we present some simple correlations between FDI and employment in the remainder of this section (Table 3). Both parametric and non-parametric correlations turn out to be fairly strong, suggesting that FDI has added to manufacturing employment even though it may have failed to absorb Mexico's significantly increasing labor force. As concerns the correlations of FDI with employment in different skill categories, the picture is ambiguous. Parametric correlations are similarly strong for production and non-production workers. By contrast, FDI appears to be more strongly correlated with (more skilled) white collar workers once the impact of outliers is reduced by performing non-parametric Spearman correlations (see also the scatter plots in the Appendix).

Table 3
Bivariate Correlations between FDI and Employment across Manufacturing Industries: Period Average 1994 – 2006

	Pearson correlation		*Spearman correlation*	
	coefficient	t-stat.	coefficient	t-stat.
Total employment	0.44***	0.000	0.36***	0.000
Blue collar workers	0.43***	0.000	0.30***	0.000
White collar workers	0.39***	0.000	0.44***	0.000

***, **, * denote significance at the 1%, 5% and 10% level, respectively.

Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

4. Analytical Background, Methods and Data

Feenstra and Hanson (1996) develop a North-South model based on endowment-driven comparative advantage to assess the labor market effects of FDI. Accordingly, the South has a comparative advantage in unskilled labor intensive production. The model implies that FDI-related offshoring to the South raises the skill premium not only in the North, but also in the South which now produces a more skill intensive mix of goods than without FDI.[17] This is because the offshored stages of the value chain tend to draw on relatively unskilled labor in the advanced Northern country, whereas they require relatively skilled labor in the less advanced Southern country.[18]

[17] See also ODI (2002) for a number of reasons why FDI in developing host countries is likely to increase the demand for skilled labor in the first place.

[18] In other words, labor classified as less skilled in the source country of FDI may well qualify as relatively skilled in the host country; see Robertson (2000) for a similar line of reasoning with regard to the labor market implications of trade liberalization in Mexico.

Yet, theoretical predictions on FDI-induced changes in the skill intensity of production remain ambiguous (Blonigen and Slaughter 2001). Multinational companies are supposed to own firm-specific assets, related to technology, marketing and management, which can be used across all subsidiaries of the company. Assuming that skill-intensive headquarter services are located in the home country of the multinational company, the operations of foreign subsidiaries tend to be less skill intensive than headquarter operations. FDI-induced changes in the relative demand for skilled labor in the host country then depend, *inter alia,* on whether the operations of foreign subsidiaries are still more skill intensive than the operations of local companies that do not employ skilled labor to provide headquarter services to plants located abroad. As concerns foreign assembly operations in Mexico, Hanson (2003: 13) argues that foreign subsidiaries do use skilled labor more intensively than local manufacturing operations.

Apart from shifts in the *relative* demand for skilled labor, it remains open to question whether FDI adds to overall employment generation in the host countries. Theoretical models based on the assumption of full employment do not address this question, even though it is of overriding concern in host countries such as Mexico which are plagued by substantial (open or disguised) unemployment.

Consequently, we are not only interested in FDI-induced changes in the wage structure and the skilled labor share of the total wage bill as most previous studies are (e.g., Feenstra and Hanson 1997; Driffield and Taylor 2000; Blonigen and Slaughter 2001; Hanson 2003). Rather, we start with estimating a basic labor demand function.[19] Following the labor demand literature (see Hamermesh 1993; Bresson, Kramarz and Sevestre 1996) we consider a dynamic employment equation of the form:

$$n_{it} = \rho n_{it-1} + \alpha_1 w_{it} + \alpha_2 w_{it-1} + \alpha_3 y_{it} + \alpha_4 y_{it-1} + \lambda_t + \mu_i + v_{it}; \quad i = 1,2,...,N; t = 1,2,...,T; \qquad (1)$$

Here, n_{it} is the natural logarithm of total employment of industry i at time t; w_{it} and y_{it} are the natural logarithm of the real wage and output of industry i at time, respectively.[20] The specification includes a time effect, λ_t, that is common to all industries, and an unobserved

[19] Jenkins (2006) applies a similar approach to assess the employment implications of FDI in Viet Nam. However, Jenkins does not account for possible endogeneity of FDI and does not consider interactions of FDI with industry characteristics, as we do in the following.

[20] Optimally, relative factors prices should be included in factor demand equations. However, data on the price of capital are not available in the present context. See below on how we assess whether the employment effects of FDI depend on the capital intensity of industries.

industry–specific time–invariant effect, μ_i, which allows for heterogeneity between industries; v_{it} is a disturbance term.

Equation (1) is derived from a dynamic optimization system in which every firm solves a benefit maximization problem that considers employment-related adjustment costs such as hiring and firing costs (Bresson, Kramarz and Sevestre 1996).[21] Equation (1) can be interpreted as an error correction model including the long and short run dynamics. In the short run, the actual employment deviates from the long run equilibrium because of the existence of adjustment costs. It is important to note that the rational expectation assumption in the derivation implies that the disturbance term is serially uncorrelated.

It would be unreasonable to assume that the industry-specific effect is uncorrelated with the right-hand-side variables in equation (1). For instance, the capital intensity of industries is likely to be an important determinant of wages. Since the explanatory variables and μ_i are correlated, and v_{it} is serially uncorrelated, the Ordinary Least Squares (OLS) estimator of ρ would be inconsistent. Differencing (1) to eliminate μ_i, we obtain:

$$\Delta n_{it} = \rho \Delta n_{it-1} + \alpha_1 \Delta w_{it} + \alpha_2 \Delta w_{it-1} + \alpha_3 \Delta y_{it} + \alpha_4 \Delta y_{it-1} + \Delta \lambda_t + \Delta v_{it};\ i = 2,3,...,N; t = 1,2,...,T; \qquad (2)$$

where $\Delta z_{it} = z_{it} - z_{it-1}$. The dependence of Δv_{it} on v_{it-1} implies that OLS estimates in (2) are inconsistent. To obtain consistent estimates of the parameters, we apply Two Stages Least Squares (2SLS) which use instruments that are both correlated with the explanatory variables and orthogonal to the disturbance term (Anderson and Hsiao 1982). The disturbance term in (2) follows a first order moving average process which renders the 2SLS estimates asymptotically inefficient. In the context of N being relatively large and T being small,[22] Arellano and Bond (1991) developed a GMM estimator for (2) which provides us with asymptotically efficient estimates.

Bond (2002) shows that the set of instruments depends on assumptions concerning the explanatory variables.[23] If the explanatory variables are assumed to be exogenous, the set of instruments will take the form $(n_{i1}, n_{i2},..., n_{iT-2}, x_{i1}, x_{i2},..., x_{iT})$, where n is the dependent variable and x includes all the explanatory variables. If the explanatory variables are assumed to be

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[21] Specifically it assumes a continuous quadratic function on employment. For a detailed derivation of equation (1), see Nickell (1986) as well as Bresson, Kramarz and Sevestre (1996).

[22] Our analysis covers 197 industries (N) and 13 years (T).

[23] An explanatory variable may be exogenous in the sense that the variable is uncorrelated with the current, past and future realizations of the disturbance term. An explanatory variable may be predetermined if it is uncorrelated with the current disturbance term, while it is correlated with past realizations of the disturbance

predetermined, the set of instrument will be $(n_{i1}, n_{i2}, ..., n_{iT-2}, x_{i1}, x_{i2}, ..., x_{iT-1})$. Finally, if the explanatory variables are treated as endogenous, the set of instruments will be $(n_{i1}, n_{i2}, ..., n_{iT-2}, x_{i1}, x_{i2}, ..., x_{iT-2})$.

As equation (2) is over identified, the validity of the instruments can be tested using the Sargan test (Sargan 1988). Recalling the key identifying assumption that there is no serial correlation in v_{it}, Arellano and Bond (1991) suggest a test for first and second order autocorrelation to validate the model.[24]

Equation (2) represents the basic specification of the labor demand function which we then augment by including FDI and FDI-related interaction terms in the subsequent estimations. The data on employment, wages and output are taken from INEGI (Annual and Monthly Manufacturing Survey). FDI data are from the Ministry of Economy (Secretaría de Economía). While the former source covers 205 manufacturing industries, the subsequent analysis includes only 197 industries for which the latter source provides FDI data.

In addition to overall employment, we run separate regressions for blue collar employment (production workers) and white collar employment (non-production workers), in order to assess whether FDI affects major categories of labor differently. More specifically, disaggregating employment in this way allows us to test the proposition that FDI increases the demand for more qualified labor (white collar workers) in the first place. As right-hand-side variables, we include the real wages of both blue and white collar workers. Wages, output (i.e., gross production of industries) as well as FDI inflows are deflated using sectoral producer price indices from the Banco de México (www.banxico.org.mx).

In order to determine the lag structure of the instrumental variables we use the Difference Sargan test. As concerns the total employment equation, this test leads us to consider all right-hand-variables, except for FDI, to be predetermined so that the instruments are the first and subsequent lags of the differenced explanatory variables. For the blue collar and white collar equations, the assumption of exogeneity is not rejected so that the instruments are the current value and subsequent lags of the differenced explanatory variables. All variables are in logarithms. The estimations are performed by applying the DPD program for Ox (Doornik, Arellano and Bond 2006).

As concerns FDI inflows, annual observations are rather volatile at the level of industry disaggregation employed in the present analysis. Therefore, we smooth the FDI series by using three years moving averages. Furthermore, considering FDI inflows in logs

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term. Finally, an explanatory variable may be endogenous if it is correlated with the current and past disturbance terms.

[24] Note that first order autocorrelation is expected by construction.

implies that we lose some observations with negative or zero inflows (about 12 percent of all FDI observations after taking moving averages).[25]

5. Major Results

In the following, we present one-step GMM estimations of equation (2) for total, blue collar and white collar employment, in order to assess the employment effects of FDI in Mexico.[26] We focus on the long-run elasticities of the included explanatory variables. These are calculated by dividing the sum of the current and lagged coefficients of the explanatory variable by one minus the coefficient of the lagged dependent variable. In addition, we report half-life adjustment, calculated as ln (0.5)/ ln (ρ), where ρ is the coefficient of the lagged dependent variable. Time dummies are included in all estimations, but are not shown in the tables. The standard errors are robust to general cross section and time series heteroskedasticity.

We report the specification tests suggested by Arellano and Bond (1991). The Sargan test for overidentifying restriction is based on the two-step estimation according to Bond (2002); m1 and m2 test for first and second order autocorrelation, respectively. Finally, the Wald statistic tests for the joint significance of the independent variables, excluding time dummies; it is asymptotically distributed as χ^2 with k degrees of freedom under the null of no relationship, where k is the number of coefficients estimated.

Basic labor demand equation: Our main objective is estimating the impact of FDI on employment. However, we start with a basic labor demand equation without FDI in order to compare its major properties with previous labor demand estimations in the relevant literature. The results reported in columns *(a)* of Table 4 reveal satisfactory Sargan and m2 test values. The m1 test is significant as expected.

Not surprisingly, the lagged dependent variable as well as the industry's current output enter strongly significant and are quantitatively important for current total employment (Table 4, first column). This also applies to the estimations with blue and white collar employment as the dependent variable. Note, however, that the lagged dependent variable has a considerably higher impact on current white collar employment than on current blue collar employment, while the opposite pattern holds for the impact of the industry's current output on employment. This suggests that higher skilled white collar employment is more path

[25] In Section 6, we assess whether our major results are affected by excluding negative and zero inflows.
[26] We also performed two-step GMM estimations. The coefficient estimates turned out to be essentially the same and are, therefore, not reported.

dependent than less skilled blue collar employment that reacts more strongly to short-term variation in output.

Table 4
Labor Demand Equations
GMM estimates (all variables in first differences)

Dependent variable	**Total employment**		**Blue collar employment**		**White collar employment**	
Independent variables	***a***	***b***	***a***	***b***	***a***	***b***
Dependent variable$_{t-1}$	0.4166***	0.4588***	0.3962***	0.4101***	0.5822***	0.6129***
	(0.1178)	(0.1178)	(0.1345)	(0.1332)	(0.0879)	(0.0929)
bw_t	-0.2824*	-0.3156**	-0.3312***	-0.3131***	-0.0667	-0.1402***
	(0.1477)	(0.1224)	(0.0546)	(0.0498)	(0.0699)	(0.0538)
bw_{t-1}	0.1001	0.0931*	0.1171*	0.0677	0.0413	0.0236
	(0.0619)	(0.0536)	(0.0666)	(0.0723)	(0.0452)	(0.0413)
ww_t	-0.2238**	-0.0910	0.0289	0.0310	-0.1348***	-0.1181**
	(0.1086)	(0.0943)	(0.0271)	(0.0319)	(0.0416)	(0.0480)
ww_{t-1}	-0.0108	0.0174	0.0101	0.0144	0.0741***	0.0690
	(0.0343)	(0.0281)	(0.0241)	(0.0261)	(0.0340)	(0.0425)
y_t	0.3831***	0.4320***	0.3844***	0.4059***	0.2349***	0.2563***
	(0.0613)	(0.0625)	(0.0334)	(0.0364)	(0.0290)	(0.0336)
y_{t-1}	-0.0609	-0.1166***	-0.0880	-0.1075**	-0.0626*	-0.0833**
	(0.0497)	(0.0435)	(0.0576)	(0.0539)	(0.0374)	(0.0424)
FDI_t	-	0.0006	-	0.0001	-	0.0002
		(0.0017)		(0.0018)		(0.0015)
FDI_{t-1}	-	0.0042**	-	0.0048**	-	0.0041**
		(0.0017)		(0.0023)		(0.0018)
Constant	0.0598***	0.0122	0.0472	0.0175*	0.0328***	0.0108
	(0.0150)	(0.0091)	(0.0078)	(0.0097)	(0.0100)	(0.0084)
Half life adjustment	0.7916	0.8897	0.7487	0.7778	1.2816	1.4161
Wald	126.9***	251.6 ***	396.2***	504.2***	427.2***	396.3***
m1	-2.716***	-2.829***	-2.763***	-3.034***	-2.973***	-2.927***
m2	-1.493	-0.3334	-1.649*	-0.6668	-1.302	-1.677*
Sargan	74.45(64)	72.67(62)	69.02(67)	74.13(65)	70.55(67)	66.99(65)
Observations	1954	1435	1954	1435	1954	1435

(a) Time dummies are included in all equations.
(b) Asymptotic standard errors robust to general cross-section and time series heteroskedasticity in parenthesis.
(c) ***, **,* denote significance at the 1%, 5% and 10% level, respectively.
(d) The GMM estimates reported are one – step. Coefficient estimates in the two – step estimation were practically similar.
(e) Half life adjustment is calculated as ln(0.5)/ln(ρ), where ρ is the coefficient of the lagged dependent variable.
(f) The Wald statistic is a test of the joint significance of the independent variables; it is asymptotically distributed as χ^2 with k degree of freedom under the null of no relationship, where k is the number of coefficients estimated (excluding time dummies).
(g) The Sargan test is based on the two – step estimation (Bond, 2002).

The total employment equation in the first column of Table 4 exhibits a long run own-wage elasticity of -0.48 and -0.38 for blue collar and white collar wages, respectively. Blue collar employment reacts fairly strongly to changes in blue collar wages, with a long run elasticity of -0.35. By contrast, the reaction of white collar employment to changes in white collar wages is considerably weaker (long run elasticity: -0.15). Blue and white collar employment have in common, however, that the wages of the respective other employment group do not exert a significant impact.

The results for our basic labor demand function are largely consistent with earlier findings. The analysis of Hamermesh (1993) is based mainly on evidence in developed countries, while Hamermesh (2004) focuses on Latin American countries.[27] According to these studies, the average own-wage elasticity is around -0.30. Our findings are also in line with Hamermesh in that there exists an inverse relationship between the skills embodied in a group of workers and the absolute value of the own-wage elasticity of demand for their labor. Furthermore, as shown in Table 4, the half lives of the adjustment processes are 0.79, 0.75 and 1.28 years for total, blue and white collar employment, respectively. Likewise, Hamermesh (2004) finds that the adjustment of white collar employment takes longer than the adjustment of blue collar employment.[28]

Augmented labor demand equation: In the next step, we augment the basic labor demand equation and add FDI as an explanatory variable. Columns *(b)* of Table 4 include current FDI as well as its lag to analyze the impact of the FDI on total, blue collar and white collar employment.[29] Augmenting equation (2) in this way has little impact on the significance and quantitative importance of the standard determinants of labor demand. The coefficient of the lagged dependent variable increases slightly when comparing columns *(a)* and *(b)* in Table 4. Likewise, the long run elasticity of blue collar wages in the labor demand equation for blue collar workers as well as that of white collar wages in the labor demand equation for white collar workers increases in absolute terms. However, the previous finding that blue collar employment reacts more strongly to changes in wages than white collar employment remains unaffected. As concerns total employment, the effect of white collar wages turns insignificant when FDI is added as an explanatory variable. The Sargan test does not reject the optimality of the instruments used; the m2 test is insignificant for total and blue collar employment in columns *(b),* but significant at the 10 percent level for white collar employment.

Turning to our variable of principal interest, the estimations suggest that, after controlling for wages and output, FDI has a modest but positive effect in all three labor demand equations. While current FDI remains insignificant, lagged FDI has a significantly

[27] Fajnzylber and Maloney (2000; 2001) estimate a labor demand function for blue and white collar employment in Mexico. However, their findings are not comparable with ours because they employ firm based data for a different time period.

[28] However, the adjustment of employment in Mexico generally takes somewhat longer than that Hamermesh finds for developed countries (on average two quarters).

[29] For the reasons stated above, we employ three years moving averages of FDI. However, we will test for the robustness of results by using annual observations in Section 6 below.

positive effect on total employment as well as on blue and white collar employment at the 5 percent level. The long run effects of FDI on employment are 0.0078, 0.0082 and 0.0108 for total, blue collar and white collar employment, respectively. The impact on white collar employment appears to be somewhat larger than the impact on blue collar employment. However, the difference between the two effects is fairly small. In other words, we do not find strong evidence supporting the view that FDI generates employment for more skilled workers in the first place.

Interacting FDI with industry characteristics: The results reported so far suggest that, on average, workers in Mexico's manufacturing sector have benefited from higher FDI inflows in terms of higher employment, though only modestly so. Next, we account for the possibility that the average effect blurs inter-industry variations. In other words, we test whether the employment effects of FDI depend on specific industry characteristics. The available data allow us to consider three industry characteristics that may have a say on the employment effects of FDI:

- The skill intensity of industries is measured by the ratio of white collar to total employment.
- The capital intensity of industries is calculated as the value of the industry's total assets (in 1998) per worker employed. In contrast to the other two industry characteristics, this indicator refers to 1998 only as time series data for capital stocks are not available.
- The export orientation of industries is measured as the share of the industry's sales in foreign markets in total net sales.

In order to evaluate whether the employment effects of FDI depend on these industry characteristics, we estimate labor demand equations that include not only FDI *per se* but also its interaction with (one of) the three indicators listed above. We would expect, for example, that FDI in relatively skill intensive industries has more favorable effects on white collar employment. The coefficient of the interaction term should then be positive in the labor demand equation for white collar employment. The interaction of FDI with the capital intensity of industries should be negative if higher capital intensity reduces the employment effects of FDI. This may apply to both blue and white collar employment. However, white collar employment may also benefit from FDI in more capital intensive industries if physical capital and human skills are complementary factors of production. Similarly, the impact of higher export intensity on FDI-related employment effects remains ambiguous *a priori*. On the one hand, the effects of FDI on blue collar employment should increase with stronger export orientation if foreign investors producing for overseas markets drew on Mexico's comparative advantage in less skilled labor intensive production. On the other hand, white collar employment would benefit from stronger export orientation if production offshored by means of vertical FDI relied on relatively skilled labor in Mexico, even though it may be classified as unskilled labor intensive in the source country of FDI.[30]

Detailed results with interaction terms included are reported in Table 5. As concerns the control variables, the findings are largely as before. In particular, the lagged dependent variable as well as the industries' current output is strongly and positively related with higher current employment. Higher blue collar wages still tend to reduce current employment, even though the coefficients of blue collar wages turn insignificant in the total employment equation when including the interaction between FDI and export orientation. The latter result may be because the period of observation is shorter in the case of export orientation as recent data are lacking for this industry characteristic. Similar to columns *(b)* in Table 4, the effects of white collar wages often remain insignificant, particularly in the estimations with blue collar employment as the dependent variable. As concerns the white collar employment equation, however, white collar wages enter negatively as expected, except when including the interaction of FDI with skill intensity.

The skill intensity of manufacturing industries turns out to be the most relevant industry characteristic under consideration. Its interaction with FDI is strongly significant in every equation, supporting the view that the employment effects of FDI depend crucially on the skill intensity of industries. Moreover, as expected, the impact of skill intensity works in opposite directions for blue and white collar employment. On the one hand, the favorable impact of FDI on white collar employment becomes stronger in industries with higher skill intensity. On the other hand, favorable employment effects of FDI on blue collar workers weaken with increasing skill intensity. The impact of FDI on blue collar employment turns negative when the skill intensity is higher than 0.295, i.e., in industries with a white collar

[30] See the references to Feenstra and Hanson (1996) as well as Robertson (2000) in Section 4.

Table 5
Labor Demand Equations with Interaction Terms
GMM estimates (all variables in first differences)

Dependent variable	***Total employment***			***Blue collar employment***			***White collar employment***		
Independent variables	c	d	e	c	d	e	c	d	e
Dependent variable$_{t-1}$	0.5169*** (0.1074)	0.3223** (0.1595)	0.4522*** (0.1179)	0.5523*** (0.0976)	0.3208** (0.1617)	0.4053*** (0.1329)	0.5517*** (0.1097)	0.5494*** (0.1459)	0.6060*** (0.0942)
bw_t	-0.2381** (0.1145)	-0.1304 (0.1765)	-0.3160** (0.1235)	-0.2541*** (0.0461)	-0.3121*** (0.0652)	-0.3135*** (0.0497)	-0.1911*** (0.0578)	-0.1923** (0.0820)	-0.1405*** (0.0533)
bw_{t-1}	0.1046** (0.0529)	0.0948 (0.0739)	0.0903* (0.0531)	0.1036* (0.0564)	0.1038 (0.0821)	0.0654 (0.0719)	0.0181 (0.0530)	0.0148 (0.0602)	0.0218391 (0.0411)
ww_t	-0.1871* (0.0980)	-0.2113** (0.1033)	-0.0924 (0.0949)	-0.0372 (0.0314)	-0.0248 (0.0394)	0.0299 (0.0319)	-0.0579 (0.0438)	-0.1125* (0.0656)	-0.1208** (0.0486)
ww_{t-1}	0.0127 (0.0313)	-0.0393 (0.0400)	0.0190 (0.0279)	0.0193 (0.0255)	-0.0153 (0.0267)	0.0159 (0.0262)	0.0620* (0.0331)	0.0603 (0.0432)	0.0699 (0.0426)
y_t	0.4030*** (0.0547)	0.3409*** (0.0676)	0.4289*** (0.0623)	0.3593*** (0.0311)	0.4158*** (0.0361)	0.4056*** (0.0363)	0.3045*** (0.0330)	0.2726*** (0.0446)	0.2565*** (0.0335)
y_{t-1}	-0.1223*** (0.0433)	-0.0632 (0.0674)	-0.1130*** (0.0435)	-0.1292*** (0.0453)	-0.0968 (0.0766)	-0.1052* (0.0539)	-0.1016** (0.0446)	-0.0620 (0.0601)	-0.0808* (0.0425)
FDI_t	0.0128*** (0.0048)	0.0033 (0.0023)	-0.0004 (0.0019)	0.0300*** (0.0062)	0.0042** (0.0021)	-0.0007 (0.0021)	-0.0292*** (0.0055)	0.0056* (0.0030)	-0.0009 (0.0017)
FDI_{t-1}	-0.0027 (0.0041)	0.0025 (0.0018)	0.0045** (0.0020)	-0.0163*** (0.0047)	0.0029 (0.0021)	0.0049* (0.0025)	0.0228*** (0.0074)	0.0036** (0.0017)	0.0052** (0.0023)
*FDI_t * Skill ratio $_t$*	-0.0449*** (0.0143)	-	-	-0.1099*** (0.0155)	-	-	0.1095*** (0.0198)		
*FDI_{t-1} * Skill ratio $_{t-1}$*	0.0212* (0.0117)	-	-	0.0634*** (0.0128)	-	-	-0.0574** (0.0232)		
*FDI_t * Exports ratio $_t$*	-	0.0066 (0.0049)	-	-	0.0074 (0.0045)	-	-	-0.0034 (0.0050)	
*FDI_{t-1} * Exports ratio $_{t-1}$*	-	0.0060* (0.0034)	-	-	0.0061 (0.0041)	-	-	0.0039 (0.0045)	
*FDI_t * Capital labor ratio $_t$*	-	-	2.4E(-6)* (1.4E(-6))	-	-	2.0E(-6) (1.3E(-6))	-		2.7E(-6) (1.6E(-6))
*FDI_{t-1} *Capital labor ratio $_{t-1}$*	-	-	-4.4E(-7) (1.4E(-6)	-	-	-1.4E(-7) (1.7E(-6))	-		-1.9E(-6) (1.4E(-6))
Constant	0.0056 (0.0093)	0.0172 (0.0106)	0.0125 (0.0092)	0.0052 (0.0078)	0.0236** (0.0107)	0.0178* (0.0097)	0.0170** (0.0074)	0.0149* (0.0088)	0.0109 (0.0084)
Wald	329.9***	84.22***	251.0***	689.4***	280.6***	509.1***	793.3***	201.8***	411.1***
m1	-2.805***	-1.169	-2.783***	-3.347***	-1.916*	-3.003***	-3.034***	-1.882*	-2.879***
m2	-0.2474	0.0982	-0.3337	-0.3100	-0.2836	-0.6505	-1.289	-1.320	-1.716*
Sargan	74.51(62)	29.65(32)	74.45(62)	76.00(65)	31.32(35)	73.90(65)	71.88(65)	39.00(35)	67.13(65)
Observations	1435	993	1435	1435	993	1435	1435	993	1435

See the notes to Table 4 above.

employment share of at least 30 percent; this applies to 76 industries out of the overall sample of 197 industries.

As concerns total employment, the interaction of FDI with skill intensity is negative. In other words, total employment effects are dominated by the pattern just observed for blue collar workers. This is not surprising considering that blue collar employment accounts, on average, for 70 percent of total employment in Mexico's manufacturing sector. However, total employment effects would turn negative only in industries employing more white collar workers than blue collar workers; just 11 industries exceed the threshold of a skill intensity of 0.54.

The results on the interaction of FDI with the remaining two industry characteristics are considerably weaker. Most of the coefficients of the interaction terms are insignificant at conventional levels (Table 5). It is only in the equation with total employment that the (lagged) interaction with the export ratio enters significantly, indicating that FDI-induced total employment effects become more pronounced when the export ratio increases. Yet, FDI still has a positive impact on blue and white collar employment when introducing the interaction with the export orientation of industries.

Similarly, almost all coefficients of the interaction terms with the industries' capital intensity remain insignificant. This may be partly because of the aforementioned limitation of this indicator, which is available for just one year (1998). The interaction of FDI with capital intensity enters significantly positive at the 10 percent level for total employment. However, Table 5 does not support the view that white collar workers benefit more from FDI-induced employment effects in industries with higher capital intensity.

6. Sensitivity Tests

It is in several ways that we test for the robustness of previous findings in this section. The tests described in some more detail below have in common that the results for the control variables are hardly affected. In particular, three important findings generally hold. First, the positive coefficient of the lagged dependent variable is almost always strongly significant. Second, the same applies to the impact of the industries' current output on labor demand, with the size of the coefficient always being considerably higher in the estimations for blue collar employment than in those for white collar employment. Third, the own-wage elasticity of labor demand is typically higher for blue than for white collar workers.

As concerns the coefficients of FDI *per se*, the robustness tests typically reveal weaker results than in Section 5. At the same time, the interaction of FDI with the skill intensity of industries still appears to be most relevant among the industry characteristics under consideration.

The first robustness test uses logged annual FDI observations, instead of three year moving averages (Table A1). As discussed before, our main results are based on moving averages of FDI inflows as annual observations tend to be volatile at the level of industry disaggregation employed here. Even though we lose some 400 observations at the beginning of the period under consideration by smoothing the FDI series, the number of observations underlying the estimations with annual FDI data reported in Table A1 declines compared to Table 5. This is because the number of negative and zero observations (which is lost by taking logs) is substantially higher for annual FDI inflows than for three year moving averages.

Against this backdrop, it is hardly surprising that FDI-related results turn out to be weaker in Table A1. This applies especially to the non-interacted FDI terms. Several of the significantly positive non-interacted FDI terms in Table 5 become insignificant or even negative. The results for the interaction terms are less sensitive to using annual FDI observations instead of three year moving averages. In particular, Table A1 corroborates the previous pattern according to which higher skill intensity strengthens the employment effect of FDI on white collar workers, whereas the effect on blue collar workers declines with rising skill intensity. Furthermore, there is at least weak evidence that the employment effects for white collar workers become stronger with increasing skill intensity of industries. The positive interaction of FDI with the capital-labor ratio tends to support the view that physical and human capital are complementary factors of production. More surprisingly, the interaction of FDI with the export intensity of industries becomes significantly negative, though just slightly so, in the estimation with white collar employment as the dependent variable. As concerns blue collar workers, the results for the interaction terms are as before in Table 5.

Next, we make an attempt to account for the observations excluded so far because of negative or zero FDI inflows. One way to include these observations would be to consider FDI inflows without taking logarithms for this variable. However, this would result in an inconsistent specification of the estimated employment equations and render the interpretation of FDI-related coefficients more difficult. Therefore, we follow an alternative approach that is fairly common in the empirical literature. While maintaining the original specification with logged FDI inflows, we at least tentatively account for negative and zero FDI observations by setting them marginally positive (0.00000001) so that logarithms can be calculated. This procedure resembles the variable transformation made by Dollar and Levin (2006) in the context of analyzing foreign aid. Table A2 shows the results when employing three year moving averages of FDI.

Similar to Table A1, it is mainly with regard to the non-interacted FDI term that results become weaker compared to our main results reported in Table 5. Hence, it cannot be ruled out that we tend to overestimate the employment effects of FDI when excluding negative and zero FDI observations. FDI *per se* remains insignificant in two estimations with total employment as the dependent variable (columns *d* and *e*), and is only weakly significant in column *(c)*. As concerns white collar employment, the coefficient of the non-interacted FDI term is significantly negative in two specifications.[31] On the other hand, we still find a modestly positive effect of FDI *per se* on blue collar employment when classifying industries according to their skill intensity. Taken together, this pattern underscores the earlier conclusion that, in contrast to a widely held view, FDI in the manufacturing sector of Mexico does not appear to have benefited white collar workers in the first place.

Major results concerning the interaction terms are similar to what has been reported before. Most notably, the impact of FDI on blue collar employment diminishes with rising skill intensity of manufacturing industries, while the interaction of FDI with skill intensity remains positive for white collar employment. Furthermore, we again find FDI to be positively interacted with the capital-labor ratio in the case of white collar employment. In contrast to previous findings, this interaction term is also positive for blue collar employment. However, this counterintuitive result just passes the 10 percent level of significance. Finally, when accounting for negative and zero observations in the way described, there are no indications that the employment effects of FDI depend on the export intensity of manufacturing industries in Mexico. This tends to support the skeptical view that export-oriented FDI has hardly helped absorbing Mexico's increasing labor force.

7. Summary and Conclusions

Employment generation appears to be a major motive of policymakers underlying the fierce international competition for FDI inflows. Nevertheless, the employment effects of FDI have received only scant attention in the empirical literature. We contribute to closing this gap by analyzing whether FDI has added to employment in Mexico and, thereby, helped overcome the country's pressing labor market problems. In particular, we raise the question whether FDI

[31] Note, however, that this does not necessarily imply that the total effect of FDI on white collar employment is negative. The total effect depends on both the non-interacted FDI term and the interaction of FDI with industry characteristics, as shown before with regard to main results.

has improved the employment situation of less skilled (blue collar) workers with which Mexico is vastly endowed.

The focus is on Mexico's manufacturing sector for which highly disaggregated FDI and employment data are available since 1994. We estimate dynamic labor demand functions for blue and white collar workers, including both FDI and its interaction with major industry characteristics. By employing the GMM estimator suggested by Arellano and Bond (1991), we account for the fact that our panel covers almost 200 industries but only 13 annual observations.

It turns out that FDI has a significantly positive, though quantitatively modest impact on manufacturing employment in Mexico in 1994-2006. This applies to both white and blue collar employment. The latter result qualifies the widely held view that FDI adds to white collar employment in the first place. However, the positive effect on blue collar employment diminishes with increasing skill intensity of manufacturing industries. These major findings are fairly robust to changes in the definition of the FDI variable and the treatment of negative and zero observations of FDI flows. In other respects, our results are more sensitive to such changes. In particular, the interactions of FDI with the capital-labor ratio and the export intensity of manufacturing industries are weaker and less robust than the interaction with the skill intensity of industries.

Hence, it may be premature to draw strong policy conclusions from the present analysis. Rather, further research seems to be required in several respects. For example, the employment effects of FDI may not only depend on the characteristics of the receiving industries but also on the sources from which FDI is coming. As shown by Ruane and Görg (1999) for the case of Ireland, the employment effects differ even between (European) foreign investors who are based in the same region. All the more so, US-based foreign investors are likely to pursue FDI strategies in neighboring Mexico that differ from the strategies of European or Japanese investors. As a consequence, employment effects may change when the source structure of FDI changes, which has happened in Mexico with the share of the United States ranging from less than 40 percent to more than 70 percent during the period 1994-2006.

Another issue that shall be addressed in future research relates to the interplay of trade and FDI liberalization in Mexico since the 1980s. As noted by Robertson (2000), Mexico traditionally protected less skilled intensive industries more strongly than skill intensive industries. Trade liberalization may, thus, have impaired the employment chances of less skilled workers (Hanson 2003), precisely when Mexico attracted rising inflows of FDI. The coincidence of trade and FDI liberalization calls for refined analyses attempting to isolate both phenomena, in order not to underestimate any positive employment effects of FDI. However, this would require detailed information on the development of effective trade protection at a highly disaggregated industry level.

Most importantly perhaps, it would be desirable to extend the analysis beyond the manufacturing sector when similarly disaggregated data become available for services industries. As shown in Section 3, Mexico has attracted considerable FDI flows into the services sector. The employment effects in this sector may well differ from those in manufacturing. For instance, FDI in the services sector often takes the form of mergers and acquisitions, in contrast to greenfield FDI which tends to figure more prominently in manufacturing. This is why Blonigen and Slaughter (2001) suggest that factor demand should be examined separately for different forms of FDI. However, data constraints loom large in this respect, too.

In the end, all this does offer an important policy lesson, namely that generalized verdicts on the employment implications of FDI are not warranted. Many proponents and critics of FDI have in common that they ignore the heterogeneity of FDI. The case of Mexico clearly suggests that the employment effects of FDI depend on various factors. On the one hand, this calls into question the euphoria about FDI currently prevailing among policymakers. The United Nations Conference on Financing for Development appears to have created unreasonably high expectations, not least in Mexico who hosted this conference in 2002, by claiming that FDI "is especially important for its potential to transfer knowledge and technology, *create jobs,*…and ultimately eradicate poverty through economic growth and development" (UN 2002: 5; emphasis added). On the other hand, our results indicate that it is equally unreasonable to argue that FDI only deepens the divide within the labor force at the expense of poor and unskilled workers in host countries such as Mexico.

Table A1
Robustness Tests: Labor Demand Equations (annual FDI observations)
GMM estimates (all variables in first differences)

Dependent variable	***Total employment***			***Blue collar employment***			***White collar employment***		
Independent variables	c	d	e	c	d	e	c	d	e
Dependent variable$_{t-1}$	0.47010***	0.3111**	0.4638***	0.4758***	0.3861**	0.4358***	0.5307***	0.4562***	0.5337***
	(0.0884)	(0.1523)	(0.0934)	(0.0981)	(0.1524)	(0.1243)	(0.1017)	(0.1508)	(0.0983)
bw_t	-0.1889	-0.0062	-0.2475*	-0.2531***	-0.2593***	-0.2934***	-0.1790***	-0.1670***	-0.1435***
	(0.1332)	(0.1560)	(0.1366)	(0.0520)	(0.0602)	(0.0504)	(0.0508)	(0.0638)	(0.0536)
bw_{t-1}	0.1208**	0.0674	0.1217**	0.1318*	0.1467	0.1136	0.0217	-0.0017	0.0298
	(0.0607)	(0.0844)	(0.0612)	(0.0684)	(0.0932)	(0.0827)	(0.0555)	(0.0640)	(0.0560)
ww_t	-0.1790	-0.2070	-0.1020	-0.0455	-0.0052	0.0132	-0.1226**	-0.1312**	-0.1704***
	(0.1223)	(0.1406)	(0.1187)	(0.0374)	(0.0410)	(0.0357)	(0.0495)	(0.0614)	(0.0562)
ww_{t-1}	0.0105	-0.0228	0.01328	0.0102	0.0072	0.0100	0.0631*	0.0577	0.0609
	(0.0324)	(0.0332)	(0.0300)	(0.0289)	(0.0280)	(0.0312)	(0.0344)	(0.0405)	(0.0408)
y_t	0.4205***	0.4061***	0.4474***	0.3856***	0.4497***	0.4153***	0.3058***	0.3178***	0.2809***
	(0.0668)	(0.0721)	(0.0739)	(0.0323)	(0.0353)	(0.0367)	(0.0324)	(0.0432)	(0.0325)
y_{t-1}	-0.1071***	-0.0436	-0.1189***	-0.1126**	-0.1154	-0.1170**	-0.0695	-0.0214	-0.0518
	(0.0387)	(0.0584)	(0.0383)	(0.0441)	(0.0728)	(0.0523)	(0.0461)	(0.0643)	(0.0479)
FDI_t	0.0078*	-0.0024**	-0.0024*	0.0208***	-0.0025*	-0.0033**	-0.0213***	0.0003	-0.0020
	(0.0041)	(0.0012)	(0.0013)	(0.0052)	(0.0013)	(0.0016)	(0.0048)	(0.0011)	(0.0018)
FDI_{t-1}	-0.0014	0.0007	0.0018	-0.0066*	0.0015	0.0018	0.0081	0.0015	0.0013
	(0.0036)	(0.0014)	(0.0015)	(0.0040)	(0.0015)	(0.0016)	(0.0051)	(0.0013)	(0.0016)
FDI_t * *Skill ratio* $_t$	-0.0327**	-	-	-0.0776***	-	-	0.0648***	-	-
	(0.0126)			(0.0160)			(0.0145)		
FDI_{t-1} * *Skill ratio* $_{t-1}$	0.0102	-	-	0.0255***	-	-	-0.0195	-	-
	(0.0103)			(0.0116)			(0.0144)		
FDI_t * *Exports ratio* $_t$	-	-0.0047	-	-	-0.0047	-	-	-0.0128*	-
		(0.0059)			(0.0060)			(0.0069)	
FDI_{t-1} * *Exports ratio* $_{t-1}$	-	0.0012	-	-	0.0006	-	-	8.1E(-7)	-
		(0.0036)			(0.0041)			(0.0040)	
FDI_t * *Capital labor ratio* $_t$	-	-	6.1E(-7)	-	-	8.0E(-7)	-	-	1.0E(-6)*
			(4.6E(-7))			(5.3E(-7))			(5.5E(-7))
FDI_{t-1} **Capital labor ratio* $_{t-1}$	-	-	1.3E(-7)	-	-	8.9E(-8)	-	-	3.1E(-7)
			(6.4E(-7))			(7.6E(-7))			(5.6E(-7))
Constant	0.0504***	0.0396***	0.0489***	0.0484***	0.0483***	0.0510***	0.0391***	0.0226*	0.0355***
	(0.0111)	(0.0151)	(0.0114)	(0.0091)	(0.0106)	(0.0101)	(0.0108)	(0.0121)	(0.0118)
Wald	227.0***	153.3***	230.7***	759.9***	378.4***	435.7***	923.5***	331.9***	525.5***
m1	-3.128***	-1.465	-3.429***	-3.357***	-2.521**	-3.546***	-3.392***	-1.948*	-2.732***
m2	-0.441	0.8846	-0.3229	-0.6672	0.4163	-0.7049	-0.5815	-0.8926	-0.9620
Sargan	74.03(64)	40.96(34)	68.32(64)	84.51(67)*	53.25(37)**	76.97(67)	71.43(67)	36.99(37)	70.59(67)
Observations	1287	950	1287	1287	950	1287	1287	950	1287

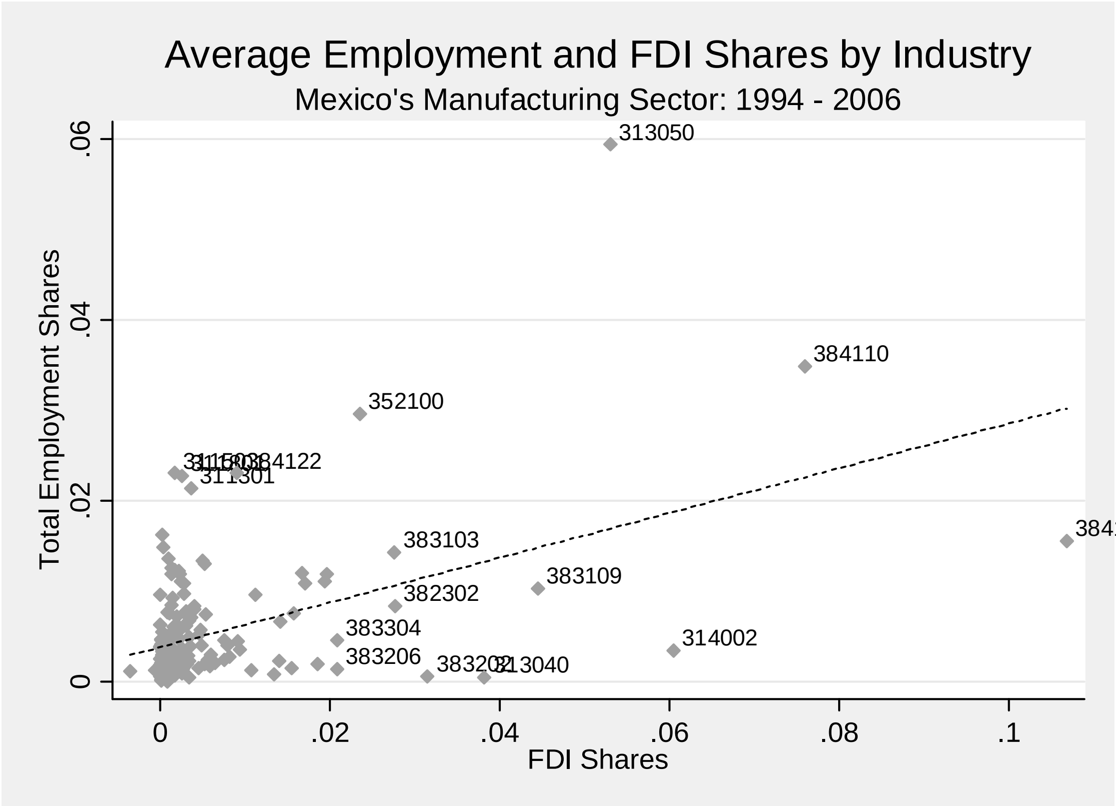
See the notes to Table 4 above.

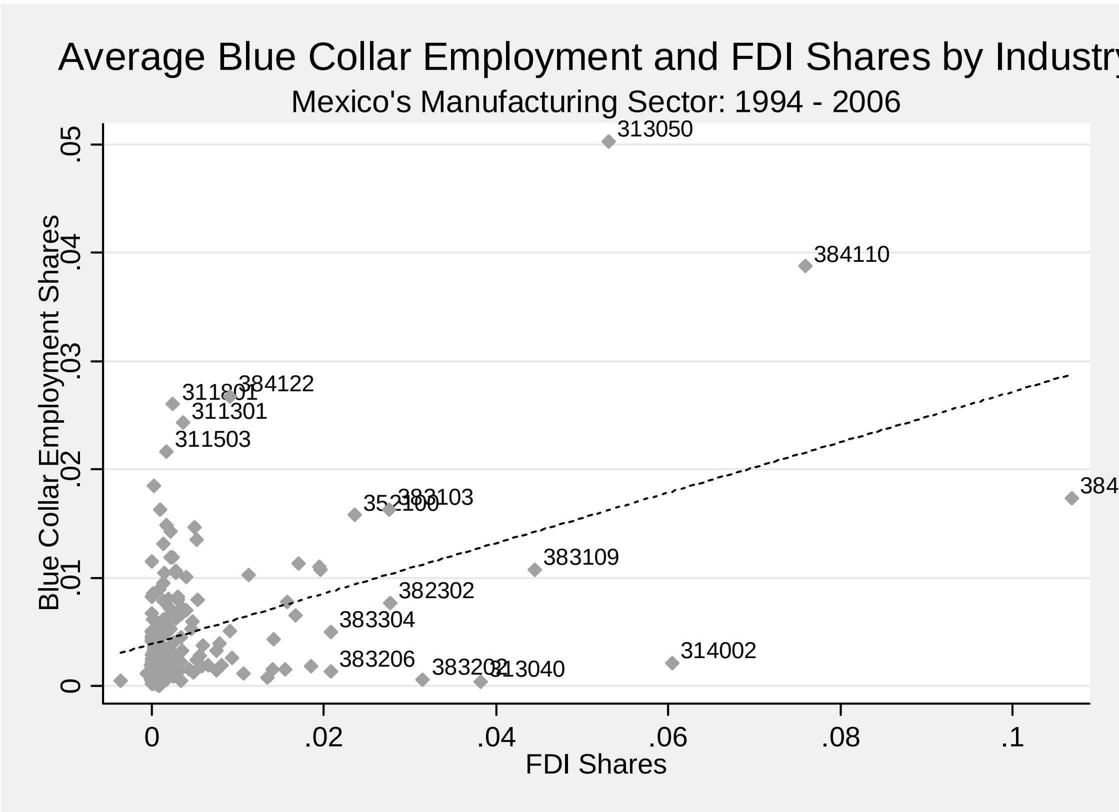
Table A2
Robustness Tests: Labor Demand Equations (including negative/ zero FDI observations)
GMM estimates (all variables in first differences)

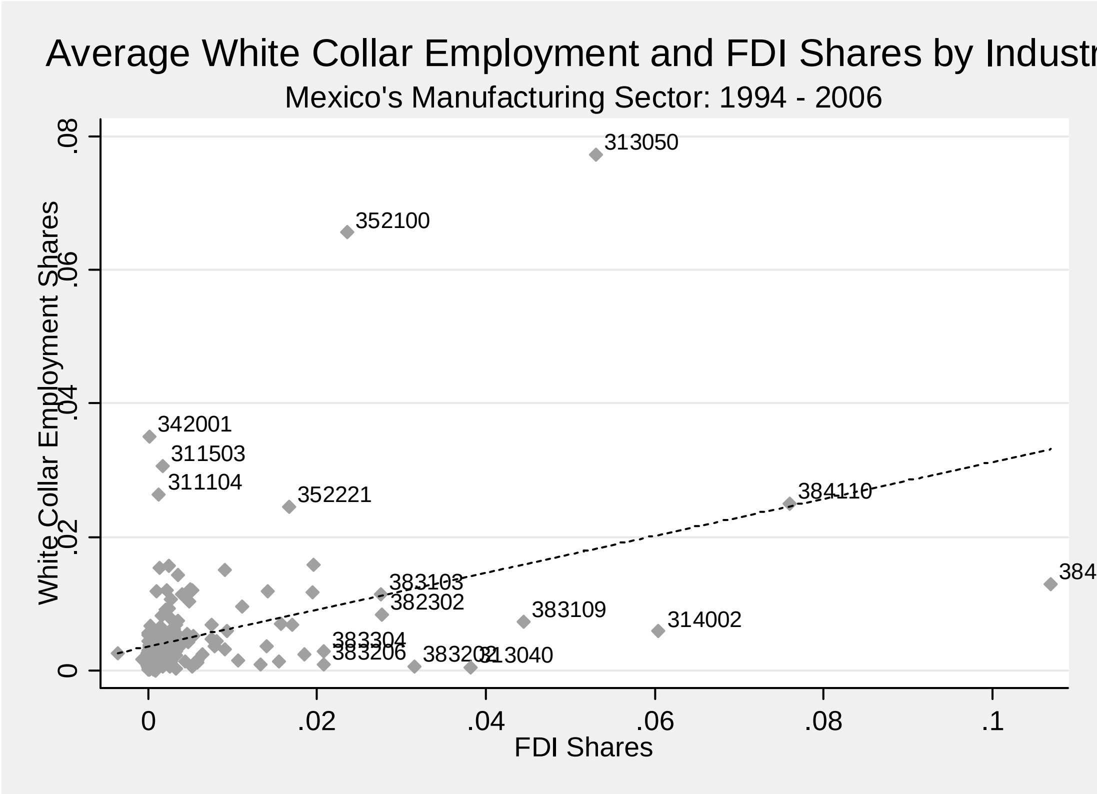
Dependent variable	***Total employment***			***Blue collar employment***			***White collar employment***		
Independent variables	c	d	e	c	d	e	c	d	e
Dependent variable$_{t-1}$	0.4273***	0.3113**	0.4163***	0.3956***	0.2295	0.3757***	0.5785***	0.5127***	0.5839***
	(0.1219)	(0.1585)	(0.1244)	(0.1354)	(0.1591)	(0.1365)	(0.0885)	(0.1360)	(0.0873)
bw_t	-0.2938*	-0.1943	-0.3032**	-0.3344***	-0.3144***	-0.3391***	-0.0733	-0.1577**	-0.0695
	(0.1519)	(0.1523)	(0.1465)	(0.0608)	(0.0633)	(0.0593)	(0.0743)	(0.0736)	(0.0769)
bw_{t-1}	0.1153*	0.1198*	0.1065	0.1248*	0.1096	0.1124	0.0457	0.0343	0.0388
	(0.0691)	(0.0681)	(0.0691)	(0.0708)	(0.0728)	(0.0690)	(0.0475)	(0.0528)	(0.0483)
ww_t	-0.2317**	-0.2650**	-0.2238**	0.0364	-0.0065	0.0403	-0.1436***	-0.1152**	-0.1457***
	(0.1123)	(0.1193)	(0.1102)	(0.0306)	(0.0371)	(0.0306)	(0.0448)	(0.0574)	(0.0457)
ww_{t-1}	-0.0136	-0.0918**	-0.0141	0.0066	-0.0379	0.0033	0.0635*	0.0439	0.0675*
	(0.0374)	(0.0410)	(0.0380)	(0.0273)	(0.0273)	(0.0271)	(0.0350)	(0.0338)	(0.0356)
y_t	0.3908***	0.3237***	0.3828***	0.3821***	0.3943***	0.3813***	0.2295***	0.2373***	0.2295***
	(0.0620)	(0.0695)	(0.0637)	(0.0356)	(0.0360)	(0.0354)	(0.0318)	(0.0391)	(0.0315)
y_{t-1}	-0.0680	-0.0230	-0.0625	-0.0856	-0.0332	-0.0778	-0.0559	-0.0259	-0.0570
	(0.0522)	(0.0594)	(0.0528)	(0.0582)	(0.0688)	(0.0580)	(0.0390)	(0.0534)	(0.0387)
FDI_t	0.0011*	-0.0002	-0.0004	0.0024***	-0.0001	-0.0003	-0.0019**	-2.2E(-5)	-0.0006**
	(0.0006)	(0.0004)	(0.0002)	(0.0008)	(0.0003)	(0.0003)	(0.0008)	(0.0003)	(0.0003)
FDI_{t-1}	0.0001	-2.5E(-5)	3.3E(-5)	4.3E(-5)	0.0001	6.1E(-5)	0.0005	-0.0005	-0.0001
	(0.0006)	(0.0003)	(0.0003)	(0.0007)	(0.0004)	(0.0003)	(0.0007)	(0.0005)	(0.0003)
FDI_t * *Skill ratio* $_t$	-0.0037** (0.0018)	-	-	-0.0072*** (0.0024)	-	-	0.0051** (0.0024)	-	-
FDI_{t-1} * *Skill ratio* $_{t-1}$	-0.0005 (0.0018)	-	-	0.0002 (0.0023)	-	-	-0.0026 (0.0024)	-	-
FDI_t * *Exports ratio* $_t$	-	0.0016 (0.0023)	-	-	0.0018 (0.0022)	-	-	-0.0020 (0.0020)	-
FDI_{t-1} * *Exports ratio* $_{t-1}$	-	0.0013 (0.0019)	-	-	0.0017 (0.0022)	-	-	0.0012 (0.0022)	-
FDI_t * *Capital labor ratio* $_t$	-	-	9.7E(-7)* (5.3E(-7))	-	-	1.0E(-6)* (5.4E(-7))	-	-	8.7E(-7)** (4.2E(-7))
FDI_{t-1} **Capital labor ratio* $_{t-1}$	-	-	-2.4E(-7) (4.8E(-7))	-	-	5.3E(-8) (3.8E(-7))	-	-	-2.9E(-7) (3.0E(-7))
Constant	0.0058	0.0149	0.0074	0.0122	0.0235**	0.0150*	0.0061	0.0097	0.0049
	(0.0087)	(0.0097)	(0.0085)	(0.0088)	(0.0099)	(0.0090)	(0.0079)	(0.0081)	(0.0079)
Wald	169.8***	50.93***	140.5***	379.2***	226.2***	347.0***	434.8***	176.0***	441.9***
m1	-2.688***	-1.015	-2.592**	-2.835***	-1.468	-2.689***	-3.108***	-2.032**	-3.099***
m2	-1.425	-1.250	-1.420	-1.507	-1.071	-1.474	-2.101**	-1.211	-2.150**
Sargan	68.36(62)	35.58(32)	69.71(62)	64.60(65)	31.16(35)	64.87(65)	71.89(65)	41.05(35)	71.61(65)
Observations	1751	1178	1751	1751	1178	1751	1751	1178	1751

See the notes to Table 4 above.

Appendix - FDI and Employment Shares by Industry in Mexico's Manufacturing Sector, 1994 – 2006.







Note: Industry – specific shares in total employment, blue collar employment, white collar employment and FDI in Mexico's manufacturing sector, respectively.
Source: Authors' calculations based on the national accounts system data from the Instituto Nacional de Estadística, Geografía e Informática (INEGI).

Industry Code	*Industry*
311104	Canned foods and sausages manufacturing
311301	Canned fruit and vegetables manufacturing
311503	Bread and bakery product manufacturing
311801	Sugar manufacturing
313040	Malt manufacturing
313050	Production of carbonated beverages and other non alcoholic beverages
314002	Cigars manufacturing
342001	Newspapers and magazines printing
352100	Pharmaceutical and medicine manufacturing
352221	Perfumes and make-up manufacturing
382302	Computers manufacturing, assembling and repair.
383103	Accessories and parts for the automobile electric system
383109	Electric materials and accessories
383202	Communication equipment manufacturing
383206	Radio, television and stereo components manufacturing
383304	Water heaters manufacturing
384110	Automobiles and trucks, production and assembling
384122	Automobile and trucks motors and motor parts production
384126	Production of parts and accessories for automobiles and trucks

Source: Instituto Nacional de Estadística, Geografía e Informática (INEGI).

References:

Adames, Leslie (2000). The Relationship between Foreign Direct Investment and Economic Growth in Mexico, 1971-1995. Universidad de Puerto Rico, Ensayos y Monografías 101. San Juan.

Aitken, Brian, Ann Harrison and Robert E. Lipsey (1996). Wages and Foreign Ownership: A Comparative Study of Mexico, Venezuela, and the United States. *Journal of International Economics* 40 (3-4): 345-371.

Anderson, Theodore W., and Cheng Hsiao (1982). Formulation and Estimation of Dynamic Models Using Panel Data. *Journal of Econometrics* 18 (1): 47 – 82.

Aroca, Patricio, and William F. Maloney (2005). Migration, Trade, and Foreign Direct Investment in Mexico. *World Bank Economic Review* 19 (3): 449-472.

Arellano, Manuel, and Stephen Bond (1991). Some Test of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies* 58 (194): 277 – 297.

Banco de México (www.banxico.org.mx). (accessed: June 2007).

Blomström, Magnus (1986). Foreign Investment and Productive Efficiency: The Case of Mexico. *Journal of Industrial Economics* 35 (1): 97-110.

Blonigen, Bruce A., and Matthew J. Slaughter (2001). Foreign-Affiliate Activity and U.S. Skill Upgrading. *Review of Economics and Statistics* 83 (2): 362-376.

Bond, Stephen (2002). Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice. *Portuguese Economic Journal* 1 (2): 141 – 162.

Bresson, Georges, Francis Kramarz and Patrick Sevestre (1996). Dynamic Labour Demand Models. In: László Matyas and Patrick Sevestre (eds.), *The Econometrics of Panel Data.* Kluwer Academic Publishers, Boston.

Calderón, Alvaro, Michael Mortimore and Wilson Peres (1995). Mexico's Incorporation into the New Industrial Order: Foreign Investment as a Source of International Competitiveness. ECLAC, Desarrollo Productivo 21. United Nations, Santiago de Chile.

Cohen, Stephen D. (2007). *Multinational Corporations and Foreign Direct Investment: Avoiding Simplicity, Embracing Complexity*. Oxford University Press, New York.

Cuadros, Ana, Vicente Orts and Maite Alguacil (2004). Openness and Growth: Re-Examining Foreign Direct Investment, Trade and Output Linkages in Latin America. *Journal of Development Studies* 40 (4): 167-192.

Díaz-Bautista, Alejandro (2006). Foreign Direct Investment and Regional Economic Growth Considering the Distance to the Northern Border of Mexico. *Análisis Económico* 21 (1): 355-367.

Dollar, David and Victoria Levin (2006). The Increasing Selectivity of Foreign Aid, 1984-2003. *World Development* 34 (12): 2034-2046.

Doornik, Jurgen, Manuel Arellano and Stephen Bond (2006). Panel Data estimation using DPD for Ox (www.doornik.com).

Driffield, Nigel, and Karl Taylor (2000). FDI and the Labour Market: A Review of the Evidence and Policy Implications. *Oxford Review of Economic Policy* 16 (3): 90- 103.

Dussel Peters, Enrique (2000). La inversion extranjera en México. CEPAL, Serie desarrollo productivo 80. Naciones Unidas, Santiago de Chile.

Dussel Peters, Enrique (2003). Industrial Policy, Regional Trends, and Structural Change in Mexico's Manufacturing Sector. In: Kevin J. Middlebrook and Eduardo Zepeda (eds.), *Confronting Development: Assessing Mexico's Economic and Social Policy Challenges*. Stanford University Press, Stanford: 241-274.

Ernst, Christoph (2005). The FDI-Employment Link in a Globalizing World: The Case of Argentina, Brazil and Mexico. International Labour Office, Employment Strategy Paper 2005/17. Geneva.

Fajnzylber, Pablo, and William F. Maloney (2000). Labor Demand and Trade Reform in Latin America. The World Bank, Policy Research Working Paper 2491. Washington, D.C.

Fajnzylber, Pablo, and William F. Maloney (2001). How Comparable Are Labor Demand Elasticities across Countries? The World Bank, Policy Research Working Paper 2658. Washington, D.C.

Feenstra, Robert C., and Gordon H. Hanson (1996). Foreign Investment, Oursourcing and Relative Wages. In: Robert C. Feenstra et al. (eds.), *Political Economy of Trade Policy: Essays in Honor of Jagdish Bhagwati*. MIT Press, Cambridge: 89-127.

Feenstra, Robert C., and Gordon H. Hanson (1997). Foreign Direct Investment and Relative Wages: Evidence from Mexico's Maquiladoras. *Journal of International Economics* 42 (3-4): 371-393.

Gallagher, Kevin P., and Lyuba Zarsky (2004). Sustainable Industrial Development? The Performance of Mexico's FDI-led Integration Strategy. Tufts University, Global Development and Environment Institute. Medford, MA.

Gereffi, Gary (2003). Mexico's Industrial Development: Climbing Ahead or Falling Behind in the World Economy. In: Kevin J. Middlebrook and Eduardo Zepeda (eds.), *Confronting Development: Assessing Mexico's Economic and Social Policy Challenges*. Stanford University Press, Stanford: 195-240.

Graham, Edward M., and Erika Wada (2000). Domestic Reform, Trade and Investment Liberalization, Financial Crisis, and Foreign Direct Investment into Mexico. *World Economy* 23 (6): 777-797.

Hamermesh, Daniel (1993). *Labor Demand*. Princeton University Press, Princeton, N.J.

Hamermesh, Daniel (2004). Labor Demand in Latin America and The Caribbean: What Does It Tell Us? In: James Heckman and Carmen Pagés (eds.), *Law and Employment: Lessons from Latin America and the Caribbean*. Chicago University Press, Chicago: 553-562.

Hanson, Gordon H. (2003). What Has Happened to Wages in Mexico since NAFTA? Implications for Hemispheric Free Trade. National Bureau of Economic Research, NBER Working Paper 9563. Cambridge, MA.

Herzer, Dierk, Stephan Klasen and Felicitas Nowak-Lehmann (2006). In Search of FDI-led Growth in Developing Countries. University of Goettingen (http://ideas.repec.org/p/got/iaidps/150.html).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). Online data from the Annual and Monthly Manufacturing Survey (www.inegi.gob.mx). (accessed: June 2007).

Jenkins, Rhys (2006). Globalization, FDI and Employment in Viet Nam. *Transnational Corporations* 15 (1): 115-142.

Jordaan, Jacob A. (2004). Estimating FDI-induced Externalities when FDI is Endogenous: A Comparison between OLS and IV Estimates of FDI-induced Externalities in Mexican Manufacturing Industries. London School of Economics and Political Science, Research Paper in Environment and Spatial Analysis 92. London.

Lipsey, Robert E. (2002). Home and Host Country Effects of FDI. National Bureau of Economic Research, NBER Working Paper 9293. Cambridge, MA.

Máttar, Jorge, Juan Carlos Moreno-Brid and Wilson Peres (2003). Foreign Investment in Mexico after Economic Reform. In: Kevin J. Middlebrook and Eduardo Zepeda (eds.), *Confronting Development: Assessing Mexico's Economic and Social Policy Challenges*. Stanford University Press, Stanford: 123-160.

Nickell, Stephen J. (1987). Dynamic Models of Labour Demand. In: Orley Ashenfelter and Richard Layard (eds.), *Handbook of Labor Economics*, Volume 1. Elsevier, Amsterdam: 473-522.

ODI (2002). Foreign Direct Investment: Who Gains? Overseas Development Institute, Briefing Paper April 2002. London.

OECD (2002). *Foreign Direct Investment for Development: Maximizing Benefits, Minimizing Costs*. OECD, Paris.

Oman, Charles P. (2001). The Perils of Competition for Foreign Direct Investment. In: Jorge Braga de Macedo and Enrique V. Iglesias (eds.), *Foreign Direct Investment Versus Other Flows to Latin America*. OECD, Paris: 63-84.

Palma, Gabriel (2003). Trade Liberalization in Mexico: Its Impact on Growth, Employment and Wages. International Labour Office, Employment Strategy Paper 2003/55. Geneva.

Paus, Eva A., and Kevin P. Gallagher (2006). The Missing Link between Foreign Investment and Development: Lessons from Costa Rica and Mexico. Tufts University, Global Development and Environment Institute, Working Paper 06-01. Medford, MA.

Ramírez, Miguel D. (2000). Foreign Direct Investment in Mexico: A Cointegration Analysis. *Journal of Development Studies* 37 (1): 138-162.

Robertson, Raymond (2000). Trade Liberalization and Wage Inequality: Lessons from the Mexican Experience. *World Economy* 23 (6): 827-849.

Ruane, Frances, and Holger Görg (1999). Irish FDI Policy and Investment from the EU. In: Ray Barrell and Nigel Pain (eds.), *Innovation, Investment and the Diffusion of Technology in Europe.* Cambridge University Press, Cambridge: 44-67.

Salas, Carlos, and Eduardo Zepeda (2003). Employment and Wages: Enduring the Costs of Liberalization and Economic Reform. In: Kevin J. Middlebrook and Eduardo Zepeda (eds.), *Confronting Development: Assessing Mexico's Economic and Social Policy Challenges*. Stanford University Press, Stanford: 522-558.

Sargan John D. (1988). The Estimation of Economic Relationships Using Instrumental Variables. In: Esfandiar Maasoumi (ed.), *Contributions to Econometrics: John Denis Sargan*, Volume I. Cambridge University Press, Cambridge, MA.

Secretaría de Economía. Online data on FDI (www.economia.gob.mx). (accessed: June 2007).

Stallings, Barbara, and Wilson Peres (2000). *Growth, Employment, and Equity: The Impact of the Economic Reforms in Latin America and the Caribbean*. Brookings Institutions Press, Washington, D.C.

UN (2002). Final Outcome of the International Conference on Financing for Development. A/Conf/198/. United Nations, New York.

UNCTAD (2002). *World Investment Report 2002.* United Nations, New York.

UNCTAD (2006). *World Investment Report 2006.* United Nations, New York.

Waldkirch, Andreas (2003). Vertical FDI? A Host Country Perspective. EconWPA, International Trade (http://econpapers.repec.org/paper/wpawuwpit/0403008.htm).