

THE EFFECT OF FOREIGN DIRECT INVESTMENT ON LABOR INCOME: EVIDENCE FROM OECD COUNTRIES

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—Abstract —

This study investigates whether and to what extent Foreign Direct Investment (FDI) affects labor income in fourteen OECD countries by using a panel approach over the 1990-2010 period. The study uses three labor income measures: average annual wage, statutory annual minimum wage and labor income share. By using different income measures the study identifies to what extent the effect of FDI differs on different classes of labor (i.e. average wage earners versus minimum wage earners). The estimation results show that FDI increases labor income in OECD countries. Both the average and the minimum wage earners benefit from FDI. However, the positive effect of FDI is distributed unevenly between average and minimum wage earners. It implies that FDI can widen the labor income gap between the average and minimum wage earners in OECD countries. Such an effect of FDI on the different classes of labor should be considered by policy makers while designing and following pro FDI policies.

Key Words: *Foreign Direct Investment, Labor Income, Wage, Productivity*

JEL Classification: F21, F23, J31

1. INTRODUCTION

With the rise of globalization, global FDI inflows increased dramatically. The growth in FDI inflows exceeded the pace of trade and economic growth. Nevertheless, host country effects of FDI remain indecisive. Although several OECD reports (2002, 2008) and many scholars (e.g. Stiglitz, 2000; Meyer, 2004; Lipsey 2004) show that the positive impacts of FDI outweigh the negative ones, there is still considerable amount of empirical findings that find FDI is not beneficial for the host country or even harmful for development (e.g. Das, 2002; Vijaya and Kaltani, 2007).

This study aims to make an empirical contribution to this strand of the economic literature by investigating the *labor income effect* of FDI in host countries. More specifically, the study seeks an answer whether FDI improves labor income using three measures: the average wage, the statutory minimum wage and the labor income/GDP ratio in host countries. The study uses a panel of 14 OECD countries for the period 1990-2010 and employs the panel OLS estimation method with fixed effects. It also takes a possible lagged effect of FDI on labor income measures into account.

The study differs from other studies in two respects. First, the study examines the labor income effect of FDI without discriminating between domestic and multinational firms. Many previous studies mainly concentrated on the labor income effect of FDI either on *domestic* firms or *multinational* firms in host countries. Moreover, these effects were investigated mostly with firm-level data for a single or for a few countries (e.g. Aitken et al., 1996). Such studies cannot draw economy-wide conclusions about the total labor income effect of FDI which leaves the question of whether FDI improves labor income in host countries unclear. Also, it is also hard to make cross-country comparisons by using firm-level datasets that are generated and collected in different ways.

Second, in investigating the labor income effect of FDI our study uses three labor income measures as the dependent variables: the average wage, the statutory minimum wage, and the labor income share. Such a setting helps us to identify possible different effects of FDI on different classes of the labor force (i.e. average wage earners versus statutory minimum wage earners). To our knowledge the effect of FDI on the statutory *minimum wage level* has not been investigated before in this context. The use of the labor income share further helps us to understand whether the labor income share improves with FDI in OECD countries in aggregate terms.

2. LITERATURE REVIEW

Recent empirical literature has evolved in two directions. A first set consists of studies which use firm and sector-level data that provide micro-level and sector specific information on the labor income effect of FDI (e.g. Aitken et al. 1996; Lipsey and Sjöholm, 2004). A second set of studies use aggregate data and a panel approach. Such studies have a wider coverage of countries and a longer span of time (e.g. Vijaya and Kaltani, 2007; Gopinath and Chen, 2003). Lipsey (2004) reports that the evidence is strong enough to conclude that FDI increases wages on average. OECD (2008) surveys the firm level and worker level studies that examined the impact of FDI on wages and concludes that multinationals pay

higher wages than domestic companies. Gorg and Greenaway (2004) find that empirical evidence on productivity and wage spillovers from FDI on domestic firms is mixed at best.

Aitken et al. (1996) explore the relationship between wages and FDI in Mexico, Venezuela and the United States by using a plant level dataset which was collected by surveys between 1977 and 1990. For the combined plant data, which cover both foreign and domestically-owned plants, they find that for both skilled and unskilled workers, a higher share of FDI raises the wage level. The coefficient of FDI varies from 0.22 (for unskilled workers) to 0.29 (for skilled workers), suggests that a 10 percent increase in the share of foreign investment in the overall employment of a region leads to a 2.2 percent increase in wages.

Gopinath and Chen (2003) investigate the impact of FDI on wages with a factor endowment approach. They use a panel dataset of 26 countries over the period 1970-1995. The estimation results with OLS fixed effects reveal that FDI inflows increase the host country wage level of skilled labor both in developed and developing countries. For the aggregate labor force, the elasticity of wage with respect to FDI is estimated as 0.12.

Lipsey and Sjöholm (2004) look into whether foreign-owned plants pay higher wages than domestic-owned plants in Indonesia. They find that in Indonesia foreign-owned plants pay about 50 percent higher than private domestic plants (at the three-digit industry level). Onaran and Stockhammer (2008, 2009) show that FDI raises wages modestly in the short run that a 10 percentage point increase in the FDI stock to output ratio leads to a 1.2 percent increase in average annual real wages. Majid (2004) investigates the impact of globalization or openness by using two commonly used proxy variables: trade/GDP and FDI/GDP. He concludes that trade and FDI have a negative temporary impact on real wages.

According to Eckel and Egger (2009), multinational firms are in a better position in wage bargaining because they have plants and operations in different countries. The existence of such a power lowers the influence of labor unions and the labor force in wage bargaining. Vijaya and Kaltani (2007) examine the effect of FDI on nominal wages by using the wage bargaining approach in the manufacturing sector of 19 countries for the period 1987-2001. They find that FDI lowers wages and the effect is greater for female workers. The coefficient of FDI inflows variable in their baseline specification shows that a 1 percent increase in FDI inflows leads to a 0.045 percent decrease in the wage rate.

The review of some surveys and selected empirical studies points out that the results of both strands of studies (micro-level and panel) remain mixed at best and therefore the subject needs further research to explore how and to what extent FDI affects labor income in host countries. Especially, the labor income effect of FDI on different classes of workers (i.e. average wage and minimum wage earners) remains unanswered.

3. THEORY

Two main theoretical approaches are used in the literature to explain the labor income effect of FDI.

3.1 Productivity and Wage Spillover Effects of FDI

Standard economic theory expresses nominal wages as $W = P \times MPL$, where P represents the price of final goods and MPL is the marginal product of labor. The real wage rate can be written as $W/P = MPL$, which implies that labor payoff is directly depending on its marginal product. Therefore, any increase in the real wage stems from an increase in the marginal product of labor. With FDI inflows, incoming multinationals are assumed to bring with them certain, largely intangible, assets that are then used to offset any advantages of incumbency possessed by domestic firms (Stiglitz, 2000). Hence, the access to knowledge backed by FDI is expected to make the local labor force permanently more productive (Aitken, et al., 1996). Foreign investors may also pay higher wages for several other reasons: a) to decrease labor turnover, b) to attract best workers (the most skilled ones) in the market which may have a preference to work in domestic companies due to home bias of local workers (due to culture and language) (Decreuse and Maarek, 2008; Lipsey and Sjöholm, 2004), c) to have good public relations with the society which constitutes the potential local customers (Lipsey, 2004).

3.2 Wage Bargaining Effect of FDI

According to the wage bargaining approach, reduced transportation costs across countries, technological improvements, and globally declining trend of labor unions bring multinational companies in a better position, if not superior, in the wage bargaining. Multinational companies operate in different countries and benefit from having plants in different countries. Thus, they are partially or fully able to shift their production and services across different host countries, so called the mobility advantage. Compared to multinationals, the ability of domestic firms to move production elsewhere is limited. In sum, the wage spillovers and the labor

market effects of FDI suggest a possible positive final effect on labor income in host countries whereas the wage bargaining approach claims the presence of a possible negative effect on labor income.

3.3 Empirical Model

By keeping the insights from the two abovementioned approaches in mind, we use an empirical model to explain whether and to what extent FDI affects the labor income measures in 14 OECD countries:

$$\ln(Y_{i,t}) = \beta_0 + \beta_1 FDI_{i,t} + \beta_2 \ln(LP_{i,t}) + \beta_3 OPEN_{i,t} + \beta_4 EMP_{i,t} \\ + \beta_5 FDI_{i,t-1} + \beta_6 FDI_{i,t-2} + e_{i,t}$$

The explanation of the variables used in models is as follows:

- Y : AW: Real average annual wage level (2010 US\$)
MW: Real statutory annual minimum wage level (2010 US\$)
LIS: Labor income as a percentage of GDP
- FDI : FDI inward stock as a percentage of GDP
- LP : Labor productivity (output per person employed), 2010 US\$
- OPEN : International trade openness, calculated by (exports+ imports)/GDP
- EMP : Employment rate (number of employed workers/ total workforce)
- i : 14 OECD countries (Australia, Belgium, Canada, Czech Republic, France, Greece, Hungary, Japan, Korea, Netherlands, Poland, Portugal, Spain, US)
- t : 1990-2010
- e : error term

We gathered the data of the variables for a sample of 14 OECD countries over the period 1990-2010. Data limitations forced us to work with 14 OECD countries instead of all 34 OECD member countries. Table 1 presents the details of the dataset and the expected signs.

Table 1. Variables and Expected Signs

Variable Name	Data Source	Unit or Scale	Symbol	Expected Sign
Real average annual wage	OECD	2010 US\$	AW	
Real statutory annual minimum wage	OECD	2010 US\$	MW	
Labor income as a share of GDP	OECD	%	LIS	
FDI inward stock as a share of GDP	UNCTAD	%	FDI	+
Labor productivity (output per person employed)	TED	2010 US\$	LP	+
Openness [(Exports + Imports)/GDP]	WDI	%	OPEN	+/-
Employment rate	OECD	%	EMP	+

4. ANALYSIS

We run the model by using the panel ordinary least squares (OLS) with fixed effects. We correct standard errors with the White heteroscedasticity consistent standard errors method. According the estimation results of specification 1 (Table 2) in which we use the average annual wage as the dependent variable, all variables have the expected sign (positive) and they are statistically significant at conventional significance levels except the employment variable. Ceteris paribus, a 10 percentage-point increase in FDI leads to a 0.01 percent increase in average wage in the same year. Labor productivity variable has the biggest impact on average wage that a 10 percent increase in LP results in a 6.5 percent increase in average wage. For the openness variable, a 10 percentage-point increase leads to a 0.014 percent increase in average wage in the same year.

When we run model 1 by using the statutory annual minimum wage as the dependent variable, we get the following results for specification 1. All independent variables are estimated with the expected positive sign except the employment variable. The coefficient of FDI shows that a 10 percentage-point increase in FDI leads to a 0.004 percent increase in minimum wage in the same

year. It is statistically significant at the 10 percent significance level. Labor productivity has the biggest impact on minimum wage that a 10 percent increase in labor productivity results in a 8.3 percent increase in minimum wage. The coefficient of openness variable is not found as statistically significant, although it is positive.

When we run model 1 by using the labor income share as the dependent variable, we get the following results for specification 1. All independent variables have a positive sign and are statistically significant except the openness variable. *Ceteris paribus*, a 10 percentage-point increase in FDI leads to a 0.054 percentage-point increase in labor income share in the same year. Labor productivity variable has the biggest impact on labor income share as in the estimations with average and minimum wage that a 10 percent increase in labor productivity corresponds to a 8.1 percentage-point increase in labor income share. The coefficient of openness variable is found as negative and statistically insignificant. Finally, employment affects labor income share in a positive way that a 10 percentage-point increase in employment leads to a 0.019 percent increase in labor income share, which is statistically significant at the 10 percent significance level.

Specification 2 shows the estimation results with the lagged FDI variable. We chose to use only two lags with an ad-hoc lag approach in which including more than two lags generated inconsistent results. When we add the lagged values of FDI into the specification 2, the results remain almost the same for all variables except FDI. The inclusion of lagged FDI terms leads to a decline in the coefficient of the current FDI term. However, this decline is compensated by the positive coefficients of FDI(-1) and FDI(-2) variables which identifies that there is a positive distributed-lag effect of FDI on labor income. The cumulated effect of FDI on labor income measures grows over time. The implication of such a finding is that a full wage spillover effect of FDI would need some time for absorption and necessary labor market adjustments (Javorcik, 2004; Onaran and Stockhammer, 2008).

In sum, the estimation results of the model with two specifications show that an increase in FDI in year t increases the labor income measures. The lagged impact of FDI grows over time that both in the short and medium run the positive effect of FDI on the average wage level continues (Onaran and Stockhammer, 2009). The cumulative effect of FDI on the average wage and the minimum wage earners can be different in the current year (t) and the next year ($t+1$). However, at the end of two years ($t+2$), the size of the cumulative effect for the average and the

minimum wage earners is converging. It is 0.014 for the average wage earners and 0.012 for the minimum wage earners.

Table 2. Estimation Results of the Model

	Dependent: ln Average Wage		Dependent: ln Minimum Wage		Dependent: ln Labor Income Share	
	Specification 1	Specification 2	Specification 1	Specification 2	Specification 1	Specification 2
constant	2.8947*** (0.0000)	2.4379*** (0.0000)	0.1876*** (0.0000)	0.4845*** (0.0003)	-4.5758*** (0.0041)	-4.7058*** (0.0013)
FDI	0.0010*** (0.0008)	0.0004*** (0.0323)	0.0004* (0.0796)	0.0005** (0.0252)	0.0054*** (0.0002)	0.0014 (0.3552)
ln LP	0.6499*** (0.0000)	0.6969*** (0.0000)	0.8382*** (0.0000)	1.1308*** (0.0000)	0.8148*** (0.0000)	0.8286*** (0.0000)
OPEN	0.0014** (0.0364)	0.0002* (0.0602)	0.0007 (0.5296)	0.0005 (0.6926)	-0.0020 (0.2660)	-0.0048 (0.2101)
EMP	0.0007 (0.8699)	0.0003 (0.3906)	-0.0002 (0.5134)	-0.0001 (0.7222)	0.0019* (0.0654)	0.0017** (0.0458)
FDI(-1)		0.0004*** (0.0036)		0.0004** (0.0142)		0.0037* (0.0717)
FDI(-2)		0.0006*** (0.0000)		0.0003** (0.0226)		0.0037*** (0.0013)
F-statistic	1629*** (0.0000)	1740*** (0.0000)	887*** (0.0000)	800*** (0.0000)	17.404*** (0.0000)	17.680*** (0.0000)
Adj. R-sq.	0.9902	0.9925	0.9848	0.9864	0.5361	0.5956

Notes: p-values are in parentheses. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%.

5. CONCLUSIONS

The study examined the effect of FDI on labor income in OECD countries with a panel approach by using three labor income measures: the average annual wage, the statutory annual minimum wage and the labor income share. As discussed in the theory section, there are competing effects of FDI on labor income.

The regression analysis of panel data for 14 OECD countries over the 1990-2010 period reveal that FDI makes a contribution to labor income in OECD countries. Unlike the findings of several scholars (e.g. Stehrer and Woerz, 2009; Seguino, 2007) it is found that FDI does not hurt neither the average wage earners (skilled labor) nor the minimum wage earners (unskilled labor). Moreover, a small and statistically significant positive impact of FDI on labor income is identified. The cumulative effect of FDI on labor income is increasing over time. A first implication of this finding is that the effect of FDI on labor income would need

some time to be fully absorbed by the labor force. A second implication is that apart from other contributions of FDI to productivity level and economic growth, FDI helps labor in host the OECD countries by improving their payoff.

The regression results showed that the positive effect of FDI on labor income is unevenly distributed between the average and the minimum wage earners. Although FDI improves the minimum wage earners' labor income, it might make some negative effect on the relative wage. Due to a relatively smaller cumulative effect of FDI on the minimum wage earners, the minimum wage earners might feel that FDI harms their real income in fact it does not. In other words, labor force with some level of education (i.e. the average wage earners) might enjoy the benefit of FDI on their income to a higher extent. In this regard, labor training and education policies to increase the absorption capacity; and reforms to increase labor market efficiency would help disadvantaged workers. These policy measures not only would increase the marginal product of labor but also would improve labor-skills-match in labor markets.

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