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# Capital outflow and unemployment: evidence from panel data

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The effect of moving capital abroad on the domestic labour market is ambiguous. We examine the relation between capital outflow and unemployment with the use of panel data techniques. The result shows that in developing countries, the outward direct investment is beneficial to employment and the effect of portfolio investment abroad on domestic employment is negative. However, the association between outward investment and employment is insignificant in industrial countries.

## I. Introduction

Capital globalization is regarded as an inevitable trend in the world. However, the effect of moving capital abroad on the domestic labour market is ambiguous. In this article, we will use panel data techniques to study this issue.

There are two main types of foreign investment: direct investment and portfolio investment. The impact of these two types of capital market integration on employment may be different. Eckel (2003) introduces physical capital mobility into a neoclassical trade model and finds that the unemployment will rise when capital is being exported. The reason is that capital exports reduce the supply of capital goods. Consequently, production costs increase so that firms have to downscale their activities to prevent losses. In Eckel's analysis, the capital is referred to as direct investment. So the outward direct investment, in theory, leads to the depression of employment in the investing country. The empirical studies of both Frank and Freeman (1978) and Glickman and Woodward (1989) find foreign direct investment (FDI) actually displaced workers in the US. However, some feel that FDI stabilizes employment at home and enables the investing firms to keep world

market share. For example, within US multinationals, Lipsey (1994) finds that those with higher shares of production overseas have higher employment at home relative to home production. This is because foreign production requires more employees in headquarters activities such as R&D and supervision. Within Swedish multinationals, Blomstrom *et al.* (1997) find that FDI will preserve unskilled jobs at home when more skill-intensive activities are allocated to the foreign country. In addition to the two opposing arguments mentioned above, Chen and Ku (2000) find FDI to be inconsequential to employment at home. It is an empirical study of Taiwan's manufacturers.

On the other hand, the effect of outward portfolio investment on domestic employment is debatable, too. Basu *et al.* (2001) find that optimal labour supply increases in response to an increase in the rate of return risk when the elasticity of intertemporal substitution is less than unity. Furthermore, Baxter and Jermann (1997) argue that with the returns of domestic human capital highly correlated to the returns of domestic marketable assets, it requires a reduction in the holding of domestic marketable assets for hedging purpose. The same conclusions are shown in Michaelides (2001) and Jermann (2002).

More recently, Harms and Hefeker (2003) have analysed how the distribution of random capital incomes affects employment on an imperfectly competitive labour market. They demonstrate that international portfolio diversification may have a positive effect on domestic employment. The reason is that with the returns of foreign investments negatively correlated with domestic labour demand shocks, the wage set by a monopoly union may be lower and hence reducing unemployment.

Since the effect of outward capital flow on domestic employment is indeterminate, we intend to construe this issue broadly. In this article, these two types of foreign investment are characterized by proxy variables. With the new evidence produced by the empirical result of these instruments, we expect to obtain more information on the correlation between capital outflow and unemployment.

## II. The Data and the Empirical Model

The data utilized in this study has been obtained from the International Financial Statistics (IFS) published by International Monetary Fund (IMF). Our dataset comprises annual data over the period 2000–2004 for a sample of 52 IMF member countries – 19 industrial and 33 developing.<sup>1</sup> To study the relation between outward investment and unemployment, we construct some proxy to measure the degree of capital outflow. First, the degree of the outward direct investment, denoted by FDI, is measured as the rate of direct investment abroad position to GDP. PORT denoting the degree of outward portfolio investment is measured as the rate of portfolio investment assets position to GDP.<sup>2</sup> The descriptive statistics are presented in Table 1.

We transform these variables to logarithmic forms and run the following regressions:

$$UN_{i,t} = \alpha_i + \beta \cdot FDI_{i,t} + \gamma \cdot PORT_{i,t} + u_{i,t} \quad (1)$$

$$UN_{i,t} = \alpha + \beta \cdot FDI_{i,t} + \gamma \cdot PORT_{i,t} + u_{i,t} \quad (2)$$

$$UN_i = \alpha + \beta \cdot FDI_i + \gamma \cdot PORT_i + u_i \quad (3)$$

where the underscored  $i$  represents country  $i$  and  $t$  time. UN is the unemployment rate and  $u$  is the disturbance term. These three regressions models all

<sup>1</sup> Those member countries with missing data over the empirical period are excluded from the sample.

<sup>2</sup> The position of direct investment abroad and portfolio investment assets which are measured in terms of US dollar are both items in international investment position of IFS. Gross domestic product (GDP) measured in terms of local currency is multiplied by the exchange rate to be consistent with the measurement of the numerator.

<sup>3</sup> The application of panel data, see Greene (2003).

**Table 1. Descriptive statistics, 2001–2004**

	Full sample	Industrial countries	Developing countries
Unemployment (%)			
Mean	10.28627	7.20526	12.06018
Maximum	61.92000	15.90000	61.92000
Minimum	1.20000	1.90000	1.20000
SD	6.98002	3.13397	7.91509
FDI (%)			
Mean	22.36028	38.31347	13.17511
Maximum	242.55843	134.30838	242.55843
Minimum	0.00010	0.84247	0.00010
SD	39.24587	30.69413	40.74483
Port (%)			
Mean	56.56531	92.85687	35.67016
Maximum	3159.98047	3159.98047	1697.04285
Minimum	0.00001	1.23191	0.00001
SD	238.21195	321.97212	170.27894

assume there are common slopes  $(\beta, \gamma)$  but are different in the setting of intercept. Equation 1, called fixed effects model, assumes each country has its own intercept  $(\alpha_i)$ . If the disturbance term  $u_{i,t}$  is assumed to be independently and identically distributed, the appropriate estimation is Ordinary Least Square (OLS). However, if the disturbance term is not independently distributed, we use maximum-likelihood estimation for the correction of first order serial correlation. Equation 2, called random effects model, assumes a single intercept  $(\alpha)$  and the differential intercepts are merged with disturbance term. The assumption about the disturbance term is  $u_{i,t} = \alpha_i + \varepsilon_{i,t}$ . The country-specific random element  $\alpha_i$  is similar to  $\varepsilon_{i,t}$ , except that for each country, there is a single draw that enters the regression identically in each period. Because of the heteroscedasticity of disturbances, GLS is applied to obtain an asymptotically efficient estimator. Equation 3, called between model, specifies the same relationship between the individual means. This regression could be estimated consistently by OLS.<sup>3</sup>

## III. Empirical Result

These regressions are estimated by TSP 4.5. By the classification of IMF, we divide the full sample

**Table 2. Panel regression**

	Fixed effects OLS	Random effects GLS	Between OLS	Fixed effects AR(1): ML
Full sample (number of observations: 260)				
Constant		2.1259 (0.0853)*	2.1504 (0.0982)*	
FDI	-0.0153 (0.0127)	-0.0237 (0.0120)*	-0.0912 (0.0383)*	-0.0148 (0.0112)
PORT	0.0204 (0.0107)**	0.0227 (0.0103)*	0.0569 (0.0401)	0.0191 (0.0091)*
Rho				0.4039 (0.0704)*
Hausman test: $\chi^2 = 3.9095$ , $P$ -value = 0.1416				
Industrial countries (number of observations: 95)				
Constant		1.7275 (0.1532)*	1.9844 (0.4719)*	
FDI	0.0750 (0.0546)	0.0640 (0.0522)	-0.0247 (0.2036)	0.0359 (0.0320)
PORT	-0.0184 (0.0404)	-0.0159 (0.0394)	-0.0076 (0.2042)	-0.0069 (0.0237)
Rho				0.6112 (0.0953)*
Hausman test: $\chi^2 = 0.5819$ , $P$ -value = 0.7475				
Developing countries (number of observation: 195)				
Constant		2.2737 (0.1123)*	2.2479 (0.1174)*	
FDI	-0.0220 (0.0123)**	-0.0255 (0.0118)*	-0.0723 (0.0430)**	-0.0215 (0.0112)**
PORT	0.0213 (0.0106)*	0.0250 (0.0103)*	0.0907 (0.0468)**	0.0205 (0.0095)*
Rho				0.2397 (0.0957)*
Hausman test: $\chi^2 = 2.4283$ , $P$ -value = 0.2970				

Notes: SEs are given in parentheses.

\*Indicates significance at 5% statistical level.

\*\*Indicates significance at 10% statistical level.

countries into industrial and developing. Table 2 represents the results of the regressions models.

As can be observed from Table 2, for the full sample, FDI is negatively correlated with the unemployment rate and PORT is positively correlated with the unemployment rate. These relations are both significant in random effects model. For the case of developing countries subsample, the same relations between capital outflow and unemployment in each regression model are still significant. However, for the case of industrial countries subsample, the coefficient on FDI turns positive and the coefficient on PORT turns negative. But the coefficients are statistically insignificant. The  $F$ -statistics for testing the joint significance of the country effects in random effects model are 86.894 in full sample, 39.435 in industrial countries subsample and 113.25 in developing countries subsample. The evidence is strongly in favour of a country-specific effect in the data.

Table 2 also presents the result of Hausman specification test which is used to test for orthogonality of the random effects and the regressors. Under the null hypothesis of no correlation, random effects models cannot be rejected in these three regressions. Therefore, our conclusion is based on the results of random effects models. The outward direct investment is beneficial to employment and the effect of portfolio investment abroad on domestic

employment is negative for the case of developing countries subsample. The result about the impact of FDI on employment is more similar to the conclusion of Lispey (1994) and Blomstrom *et al.* (1997). And from the proposition of Harms and Hefeker (2003), the returns of portfolio investment abroad may be positively correlated with labour demand shocks in developing countries. On the other hand, for the case of industrial countries subsample, the empirical results suggest the signs of estimated coefficients on FDI and PORT are contrary to that of the case of developing countries subsample. And the association between outward investment and unemployment is weak. One potential explanation of these results is that for industrial countries, the FDI and the returns of outward portfolio investment are unrelated to domestic employment or there may have been some other factors to link these variables.

A problem with the regressions reported in Table 2 is they ignore other variables that could explain unemployment. To address this issue, we include a set of control variables including the log level of GDP and price (CPI).<sup>4</sup> We present the results of regressions with additional controls in Table 3. For the case of developing countries subsample, price level has negative and significant effect on unemployment. It is known as Phillips curve which indicates the negative relation between inflation rate and

<sup>4</sup> GDP measured in terms of local currency is multiplied by the exchange rate so as to be measured consistently in US dollar for every country.

**Table 3. Panel regression with control variables**

	Fixed effects OLS	Random effects GLS	Between OLS	Fixed effects AR(1): ML
<b>Full sample</b>				
Constant		2.3850 (0.2872)*	1.3622 (2.5795)	
FDI	-0.0147 (0.0128)	-0.0217 (0.0120)**	-0.0876 (0.0373)*	-0.0126 (0.0113)
PORT	0.0236 (0.0108)*	0.0254 (0.0104)*	0.0707 (0.0419)**	0.0228 (0.0091)*
GDP	-0.0203 (0.0248)	0.0161 (0.0193)	0.0727 (0.0327)*	-0.0124 (0.0195)
PRICE	-0.0868 (0.0510)**	-0.0827 (0.0503)**	0.0418 (0.5334)	-0.1258 (0.0451)*
Rho				0.4276 (0.0691)*
<b>Industrial countries</b>				
Constant		0.3370 (2.5394)	-26.0538 (29.8370)	
FDI	0.2957 (0.1342)*	0.0401 (0.0704)	-0.1614 (0.2216)	0.2055 (0.1087)
PORT	-0.0177 (0.0407)	-0.0186 (0.0396)	0.0894 (0.2286)	-0.0039 (0.0238)
GDP	0.2386 (0.1325)**	-0.0241 (0.0504)	-0.0724 (0.0604)	0.1793 (0.7939)
PRICE	-1.2742 (0.9427)	0.3549 (0.5983)	6.1590 (6.3786)	-1.0966 (0.7939)
Rho				0.5975 (0.0981)*
<b>Developing countries</b>				
Constant		2.4214 (0.3224)*	2.2229 (2.7288)	
FDI	-0.0196 (0.0123)	-0.0243 (0.0117)*	-0.0700 (0.0398)**	-0.0177 (0.0112)
PORT	0.0258 (0.0108)*	0.0278 (0.0104)*	0.1008 (0.0449)*	0.0257 (0.0096)*
GDP	-0.0202 (0.0337)	0.0343 (0.0243)	0.1022 (0.0380)*	-0.0159 (0.0298)
PRICE	-0.0891 (0.0481)**	-0.0895 (0.0476)**	-0.1694 (0.5592)	-0.1145 (0.0444)*
Rho				0.2773 (0.0945)*

Notes: SEs are given in parentheses.

\*Indicates significance at 5% statistical level.

\*\*Indicates significance at 10% statistical level.

unemployment rate. GDP is positively related to unemployment in the developing countries. However, the additional control variables are insignificant for the case of industrial countries subsample. The conclusion about the relations between outward investment and unemployment is similar to that in Table 2. In summary, the main findings of our article are not robust to the introduction of other control variables.

#### IV. Conclusion

The empirical evidence of the 33 developing countries panel data found in this article confirms that the outward direct investment will stimulate the domestic employment and the degree of portfolio investment abroad and unemployment rate is positively correlated. Whereas, in the industrial countries, the association between outward investment and unemployment is weak and the sign is contrary to that of the case of developing countries subsample. Therefore, the link between outward investment and domestic employment is not clear in industrial countries. A related but alternative interpretation of our result is that, in developing countries, the relation

between outward investment and employment is stronger than in industrial countries. In future work, we plan to find other indicators to measure the degree of outward investment which would allow us to explore this issue in more detail.

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