The impact of entry modes of Foreign Direct Investment towards unemployment: Evidence from Asian countries

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Keywords

Greenfield investment, Brownfield investment, foreign direct investment, unemployment, Fixed Effects Instrumental Variables

Abstract

This study attempts to examine the impact of entry modes of foreign direct investment (FDI) namely Greenfield investment and Brownfield investment towards unemployment in 25 Asian countries over the period of 2006 – 2015 (10 years) where the countries were divided into three groups: total, developing and developed Asian countries. The Breuch-Pagan Lagrange Multiplier test has been used to determine whether Ordinary Least Square or Fixed Effect-Instrumental Variables is appropriate for this study. In order to avoid the endogeneity problem that usually occurs in the panel data analysis, this study includes instrumental variables in the fixed effect estimators. The results depict mixed findings where both total and developed Asian countries are negatively significant between FDI and unemployment while both of the entry modes are insignificant. However, for the case of developing Asian countries, this study found insignificant and positive relationship between FDI and unemployment, while both entry modes of FDI are significant to reduce unemployment. Thus, this study concludes that the entry modes of FDI are significant to reduce unemployment in developing Asian countries compared to developed Asian countries.

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1.0 Introduction

Foreign direct investment is one of the fuels to the economic growth which it enhances private investment, encourage job creation, knowledge and technological labour skills transfer (Lloyd, 1996). The UNCTAD (2017) reported that the Asian region remains as the largest recipient of foreign direct investment in the world in 2017. Correspondingly, identifying the significance of foreign investors and also examining the effect of the foreign direct investment on the economy has become one of the major attractions for many parties. Basically, domestic investments and foreign investments are able to reduce the unemployment rate by creating more job opportunities in the host countries (Ndikumana & Verick, 2008).

According to OECD (2002), foreign direct investment inflow consists of two entry modes namely Greenfield investment and Brownfield investment. Greenfield investment is constructing or creating new businesses in the host countries and for Brownfield investment it consists of merging or buying an existing facility (acquisition). In simply meaning, both Greenfield investment and Brownfield investment are part of foreign direct investment. Moreover, foreign direct investments have been considered as being an important source towards the increase in internal market such as creating jobs. Foreign direct investment inflow can influence the economic growth positively by making contribution in reduction of unemployment rate. However, the impact of foreign direct investment towards unemployment can differ depending on the entry modes of foreign direct investment (Bayar & Sasmaz, 2017).

An earlier study conducted by Root (1987) mentioned that the development of a worldwide market strategy involves the selection of entry modes of foreign investment. The entry mode of foreign investment can be defined as a process of allowing the firms to enter their product, management or other resources into the targeted new host market (Root, 1987). Firms that enter into a new foreign market have to choose entry modes of foreign direct investment such as Greenfield, Brownfield investment and other modes that involve export either directly or through independent channels (Anderson & Gatignon, 1986).

In addition, theoretically, the Greenfield investment can contribute to job creation through the formation of new businesses whereas Brownfield investment can contribute through the transfer of knowledge and technology (Branstetter, 2006).

The remaining sections of this paper are organized as follows; 2.0 literature review relating to contra findings on causes by entry modes of FDI; 3.0 data and methodology adopted by this study; 4.0 discussion of the findings and lastly 5.0 conclusion and recommendation of this study.

2.0 Literature review

The increase of FDI inflow to a country has attracted the researcher to investigate the economic impacts of FDI inflow. In this context, previous researchers have focused on FDI-unemployment nexus and found that FDI reduces the unemployment rate by creating more job opportunities (Craigwell, 2006; Jayaraman & Singh, 2007; Balcerzak & Zurek, 2011; Lee, Pinn, Ching, & Kogid, 2011; Irpan, Saad, Nor, Noor, & Ibrahim, 2016). However, a few previous researchers found that FDI was not able to reduce unemployment due to the entry modes namely Greenfield investment and Brownfield investment (Mucuk & Dermirsel, 2013; Bayar, 2014; Bayar & Sasmaz, 2017).

Conversely, Chaudhuri & Mukhopadhyay (2014) concluded that the FDI has the potential to ease the unemployment for both skilled and unskilled labour in developing countries. While, Irpan et al (2016) used Autoregressive distributed lag (ARDL) and found significant long run relationship between FDI and unemployment in Malaysia from the period of 1980 to 2012. Additionally, a recent study by Amarendra & Oscar (2018) implemented the dynamic panel data specific system (GMM) estimator to address the endogeneity problem in Mexico from the year 2005 to 2015 and concluded that FDI reduced the unemployment rate.

However a study by Aktar, Demirci, & Ozturk (2009), found that in Turkey, foreign direct investment did not reduce unemployment due to the entry modes of foreign direct investment when using the Vector Autoregressive System (VAR) technique which included other factors; export, unemployment and gross domestic product (GDP) for the period of 2000 till 2007. Moreover, similar results by Saray (2011) in Turkey found that there was no long run relationship between foreign direct investment was unable to reduce unemployment.

A study by Hisarciklilar, Gultekin-Karakas & Asici (2014) implemented the Generalized Methods of Moments (GMM) for dynamic panel data analysis in 10 sectors and 9 manufacturing sub-sectors for the year of 2000 until 2007. Their study found that foreign direct investment did not increase employment or did not decrease the unemployment rate in Turkey due to the impact of entry modes of foreign direct investment as the country was not attracted to the Greenfield investment in the 21st Century compared to other host countries.

Similar studies done by Mucuk & Demirsel (2013) found mixed findings in 7 developing countries from 1981 until 2009 when their results using the Dynamic Ordinary Least Squares (DOLS) estimates presented that two out of seven samples of the developing countries were found to have a significantly positive relationship and a significantly negative relationship with unemployment. However, the remaining four countries were found to be insignificant due to the entry modes of foreign direct investment that mainly consist of Brownfield investment inflow during that period of data.

Another study conducted by Bayar (2014) found a positive relationship between foreign dirent investment and unemployment in Turkey for the 1st quarter of 2000 till 4th quarter of 2014 by using the Auto Regressive Distributive Lag (ARDL) method due to the flow of Brownfield investment which was unable to generate employment.

In addition, a recent study by Bayar & Sasmaz (2017), found a positive relationship between foreign direct investment and unemployment in the long run but a negative relationship between domestic investments on unemployment in 21 emerging economies which consisted of developed and developing countries over the period of 1994-2014 with the similar reason stated above.

These contra findings between inflow of foreign direct investment and unemployment (positive relationship) are due to the entry modes of foreign direct investment; Greenfield investment and Brownfield investment. Thus, this study intends to investigate further in this area on the impact of entry modes of foreign direct investment towards unemployment in both of developed and developing Asian countries.

3.0 Data and methodology

In this study, the empirical estimation used static panel data regression method and the instrumental variable (IV) estimation due to a potential problem of heteroskedasticity and endogeneity that may occur with the FDI variables in the model which implies that the Ordinary Least Square (OLS) regressions are bias. In this study, the estimation is made by panel data based in Asia which were separated into 3 groups (25 countries of total Asian countries, 15 countries of developing Asian countries, 10 countries of developed Asian countries) for the period of 10 years from 2006 to 2015. All data are gathered from the World Bank Development indicator and UNCTAD Statistics with yearly basis. Logarithmic transformation of data has been done to meet the assumptions that variables are approximately linear with normal distribution.

This study followed the recommendation of a recent study by Bayar & Sasmaz (2017) where they found inconsistency with the overall trend in related literatures as a large number of past empirical literature were negatively impacted between foreign direct investment with unemployment. It was suggested that investigations were to be conducted separately to determine the impact of both Brownfield investments and Greenfield investments on unemployment. Thus, this study presents that both of the entry modes of foreign direct investment; Greenfield investment and Brownfield investment, are negatively significant towards unemployment in developing Asian countries.

3.1 Regression model

The impact of all explanatory variables on unemployment in the 3 groups of countries in Asia use the following static regression model based on Hisarciklilar, Gultekin-Karakas & Asici (2014) and Bayar & Sasmaz (2017);

$$lgUN_{it} = \beta \alpha_{it} + \beta_1 lgGI_{it} + \beta_2 lgBROW_{it} + \beta_3 lgFDI_{it} + \beta_4 lgDI_{it} + \beta_5 lgGDP_{it} + \beta_6 lgINF_{it} + \beta_7 lgEXR_{it} + \beta_8 lgM2_{it} + \epsilon_{it}$$
(1)

where UN represents the dependent variable, which is unemployment rate (percentage of total labor force). The independent variables consist of the entry modes of foreign direct investment which are Greenfield Investment (GI) and Brownfield Investment (BROW) whereas the Greenfield foreign direct investment is reflected in number of projects (Millions of dollars in US) and for Brownfield investment is reflected as mergers by seller and acquisitions by purchase (Value of net cross-border in Millions of dollars in US), inflow on foreign direct investment (FDI) is in percentage of GDP and domestic investment (DI) is Gross Capital Formation in percentage of GDP. The other controlled variables are inflation (INF) in annual percentage, exchange rate (EXR) is Local Currency Unit per US\$, period average, gross domestic product (GDP) in annual percentage change and money supply (M2) in current Local Currency Unit.

3.2 Variance Inflation Factors (VIF)

The Variance Inflation Factors method is to detect the multicollinearity problem in the value of variance in the model where the variance value will increase due to collinearity. According to Wooldridge (2000), variance can be shown as follows:

$$VIF(i) = 1/(1 - R^2)$$
(2)

The higher the value of VIF, the greater the finding of i that indicates the model suffers with multicollinearity. According to Montgomery, Peck, & Vining (2001), the value of VIF should be less than 5 or 10 to prove that the regression model does not suffer with multicollinearity.

3.3 Breuch-Pagan Lagrange Multiplier (BPLM) test

The Breuch-Pagan Lagrange Multiplier test is to perform the estimation of the variance in model estimator to determine whether the data can be pooled by Ordinary Least Square (OLS) Model or used the Random Effects (RE) / Fixed Effect (FE) estimator. According to Gujarati and Porter (2009), the BPLM test is more general than others' tests for detection of autocorrelation. The regression is shown below:

$$e_t = a_i + \beta_2 X 1_t + \beta_3 X 2_t + C_{1et-1} + C_{1et-2} + \dots + Cke_{t-k} + v_t$$
(3)

Breusch and Pagan (1979), developed the Lagrange Multiplier test with the null hypothesis that the regression model has no panel effect and for the alternative hypothesis it is stated that the regression model has panel effect.

Sargan (1975) and Hansen (1982) developed a test called Sargan-Hansen test which is a test of Fixed Effect (FE) versus Random Effect (RE) to test over-identifying restriction. The FE estimator used the orthogonally conditions where the regressors are uncorrelated with the error from panel data $E(X_{it}|\varepsilon_{it}) = 0$. The RE estimator used the additional orthogonally conditions where the regressors are uncorrelated with the group-specific error, $E(X_{it}|U_{it}) = 0$.

The Sargan Hansen test reported by *xtoverid* straightforwardly extends to heteroskedastic and cluster-robust versions and it is guaranteed always to generate a non-negative test statistic.

3.5 Fixed - Effect Instrumental Variable (FE-IV)

Instrumental variables methods are the founded method to overcome the measurement of the occurrence of error problems in the explanatory variables (Angrist & Alan, 2001).

The instrumental variables estimator for β is

$$\hat{\beta}_{IV} = (X'P_Z X)^{-1} X' P Z_y$$
where $P_z = Z(Z'Z)^{-1} Z'$
(4)
(5)

If the omitted instrumental variables' numbers are larger than the number of endogenous regressors (L > K) then the instrumental variables estimator is called over-identified.

4.0 Findings

This study estimates the impact of entry modes of foreign direct investment on unemployment in developing Asian countries and developed Asian countries. The Ordinary Least Square panel data analysis was used for developed countries and Fixed-Effect Instrumental Variables (FE-IV) for developing countries with the Equation (1) to control the statistical problems as there exist potential biases that usually occur in the panel analysis such as endogeneity, heteroscedasticity and autocorrelation. The results of this study are presented in Table 1 which consists of developing Asian countries, developed Asian countries and total Asian countries which is a combination of developing and developed Asian countries data set. For the developing Asian countries, the Sargen-Hansen Statistic test results rejected the null hypothesis thus the fixed effect (FE) estimator will be used.

Empirical results from table 1 reveal that all these foreign direct investment and domestic investment affect differently on unemployment in total Asian countries, developing Asian countries, developed Asian countries and do not suffer from multicollinearity problem (mean VIF below 5). Both of the total Asian countries and developed Asian countries failed to reject the null hypothesis of BPLM test with the p-value of chi-square 1.000 which makes the regression model able to use pooled OLS there appears to be no reason to proceed with the Hausman test.

However, for the case of developing Asian countries, the null hypothesis of BPLM test is rejected and hence, the Hausman test has to be performed. Although the Hausman test does not show a p-value, this study proceeds with the Sargen-Hansen (over-identifying restriction) test to determine whether to use the Fixed Effects (FE) or Random Effects (RE) estimator. The Sargen-Hansen test in developing countries shows that the p-value of chi-square is less than 0.05 indicating that the null hypothesis of this test is rejected and Fixed Effects (FE) estimator is an appropriate estimator for the regression model for this study.

For the developing Asian countries, Table 1 illustrates the results of fixed effect-instrumental variable (FE-IV) estimator. The null hypothesis of BPLM test is rejected and the Hausman test needs to be performed. Although, the Hausman test does not show a p-value the Sargen-Hansen (over-identifying restriction) test was performed to determine whether to use the Fixed Effect (FE) or Random Effect (RE) estimator. The results of Sargan Hansen statistic test shows that the p-value is less than 0.05 indicating that the fixed effect (FE) estimator is appropriate for this study.

Table 1: The regression analysis results for total, developed and developing Asian countries. (Dependent variables: unemployment)

	Developing Asian	Developed Asian	Total Asian countries
	countries	countries	
lgBROW	-0.0488639***	-0.0066796	-0.0115929
	(0.0176576)	(0.0055669)	(0.0069197)
lgGI	-0.0601158 **	0.0114499	0.0212081
	(0.0304274)	(0.008487)	(0.0189893)
lgFDI	0.0080750	-0.0065803***	-0.0363913***
0	(0.0556713)	(0.0023359)	(0.0167911)
lgDI	-0.4007701*	-0.0040898	-0.5983881***
	(0.227362)	(0.0033316)	(0.1792966)
lgGDP	0.0245557	-0.0053648**	0.0368273
-	(0.0271059)	(0.0026815)	(0.0248027)
lgEXR	-0.3057254	-0.0061083	-0.0133375*

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	(0.2350733)	(0.0051145)	(0.0071675)
lgM2	0.2617197	0.2351258**	0.4293530
0	(0.2338436)	(0.1072722)	(0.2929062)
lgINF	0.0022895	-0.0008864	-0.0089589
C	(0.0182319)	(0.0093118)	(0.0185062)
Constant	2.1476420	-0.0791753	-0.1433092
	(0.2995074)	(0.0829856)	(0.1256582)
No. observations	150	100	250
R-squared	0.1154	0.2276	0.1310
Adjusted R-squared	0.0592	0.1513	0.0988
F-statistic	0.0000	0.0000	0.0002
Mean VIF	1.50	1.32	1.51
Breuch-Pagan Lagrange	0.0000	1.0000	1.0000
Multiplier (p-value)			
Autocorrelation	0.0000	0.1420	0.9008
(p-value)			
Heteroscedasticity (p-	0.0000	0.0000	0.0000
value)			
Sargen-Hansen Statistic	0.000	N/A	N/A
(p-value)			

Notes: The results above show the analysis of OLS with adjustment of robust/cluster robust standard errors for total and developed Asian countries, Fixed Effect Estimate with the instrumented variables (FE-IV) for developing Asian countries. The value in the parentheses are standard errors. ***, **, and * show significant levels at 0.01, 0.05, and 0.1 level, respectively.

The results show that the FDI has an insignificant positive correlation with UN with the coefficient of 0.008 indicating that an increase of FDI with 1 percent point will increase the UN of 0.008%. As previous studies found there is a positive relationship between foreign direct investment and unemployment due to the entry modes of foreign direct investment; Greenfield investment and Brownfield investment (Aktar et al., 2009; Hisarciklilar et al., 2014; Bayar, 2014 and Bayar & Sasmaz, 2017).

The Brownfield investment has a highly negative significance with 1% significant level on unemployment and the coefficient of 0.048 indicating that 1 percent point increase of FDI will decrease 0.048% of UN. The Greenfield investment is negatively significant with 5% significant level on unemployment showing that an increase of FDI with 1% point will decrease 0.06% on UN. Additionally, the results also present that domestic investment (DI) shows a negatively significant relationship with 10% of significant level as an increase of 1%-point DI will decrease UN by 0.40%. In this case, both of the entry modes of FDI are found to be contributing to the reduction of unemployment in developing Asian countries.

Furthermore, the results of developed Asian countries show the FDI is negative and significant at 1% level on UN with the coefficient of 0.0065 showing that 1% point of increase in FDI will decrease UN by 0.0065%. Palat (2011) also shared similar results in his study on the impact of foreign direct investment on unemployment in Japan. The result indicated that both of the entry modes were found to be insignificant where GI was insignificant with a positive relationship and for the BROW it was insignificant with a negative relationship. In addition, DI are was insignificant with a negative relationship against UN findings. These results contrast to Malley & Moutos (2001), where where they found a significant yet negative relationship against UN.

In total Asian countries, the results show that the coefficient of the FDI and DI are significantly and negatively correlated with UN. The results stated a strong negative relationship between FDI and UN

with the p-value of 0.010 or 1% significant level. This indicates that a 1% increase in FDI will lead the reduction of 0.048% in unemployment. The result is aligned with the finding by Craigwell (2006) who found a negative and significant correlation in the investigation on the impact of foreign direct investment and employment in 20 English and Dutch-Speaking Caribbean that consist of developed and developing countries. Additionally, for both of the entry modes GI and BROW are insignificant where GI had an insignificant and positive relationship with UN and for BROW it is found insignificant but with negative relationship towards UN.

5.0 Conclusion and recommendation

This study has examined the impact of entry modes of foreign direct investment on unemployment in Asian countries where the countries were divided into 3 groups of countries; total Asian countries, developing Asian countries and developed Asian countries. The main objective of this study is to investigate further the impacts of the entry modes of foreign direct investment on unemployment in these three groups of Asian countries. The results reveal only developing Asian countries that has an inflow of foreign direct investment (FDI) cannot reduce unemployment as there are interference with the entry modes of FDI which are Greenfield investment and Brownfield investment. For both of the total Asian countries and developed Asian countries, the results correlate with previous studies as the inflow of foreign direct investment can reduce unemployment. The results of this study suggest that the inflow of foreign direct investment does have an influence in reducing unemployment due to the presence of entry modes of foreign direct investment; Greenfield investment and Brownfield investment in developing countries. It also can be concluded that developed Asian countries whose FDI and Gross Domestic Product (GDP) are able to reduce unemployment as the output depends on the amount of labour used in the process of production where the increase in GDP indicates lowering unemployment rates.

In a nutshell, for the practical implication, it is suggested that the movement of inflow of foreign direct investment should be revised as the inflow of foreign direct investment consists of Greenfield and Brownfield investment to cure unemployment issues in Asian countries. Specifically, for developing Asian countries, domestic investment and entry modes (Greenfield and Brownfield investment) of FDI can be used while for developed Asian countries, this study suggests attracting more FDI and other entry modes such as foreign technology and knowledge transfer to overcome or reduce unemployment issues.

Saray (2011) claimed that acquisition is preferred for positive employment effects in developed countries while for developing countries labour-intensive technologies are more preferred for unemployment solution whereas the job creation of foreign investments depend on whether it is capital or labour intensive.

Based on the empirical analysis conducted in this paper, it is concluded that developing Asian countries are based on labour intensive where the entry modes of FDI (Greenfield and Brownfield investment) creates more job opportunities and reduce unemployment. In the case of developed Asian countries, it is based on capital intensive where these entry modes of FDI are insignificant and do not really contribute to job opportunities and are unable to reduce unemployment compared to developing Asian countries.

6.0 Appendices

Table 2: List of countries used in this study which are divided into two categories and for Total Asian countries is sum all of the two categories.

Developing Asia countries	Developed Asia countries	
Cambodia	Bahrain	
China	Hong Kong, China	
India	Israel	
Indonesia	Japan	
Jordan	Korea, Republic of	
Kazakhstan	Macao, China	
Malaysia	Oman	
Mongolia	Saudi Arabia	
Philippines	Singapore	
Russian Federation	United Arab Emirates	
Sri Lanka		
Thailand		
Turkey		
Ukraine		
Viet Nam		

Source: UNCTAD (2017)

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