

GENDER EQUALITY IN THE LABOUR MARKET AND FOREIGN DIRECT INVESTMENT

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With Southeast Asia attracting more foreign direct investment than China in 2013, it is worth questioning what factors attract multinational corporations to this region. Cián Mc Leod investigates whether labour market gender equality has an impact on foreign direct investment in these countries. He uses a fixed effects model to control for unobserved cross-country factors and finds that labour market equality does have a positive effect on foreign direct investment. However, he fails to find a statistically significant effect after accounting for autocorrelation and heteroscedasticity.

Introduction

While the long-term benefits of encouraging intense capital flows is often highly questionable, foreign direct investment (FDI) is seen by many as a key method and avenue for development and growth. So much so that the Association of Southeast Asian Nations (ASEAN) has made the attraction and retention of FDI one of its primary objectives. Recently, it was calculated that the so-called ASEAN-5 (Indonesia, Malaysia, Philippines Singapore, and Thailand) received greater FDI inflows than China in 2013, receiving \$128.4 billion and \$117.6 billion respectively (Noble, 2014).

While it is generally accepted that factors such as trade openness and market growth affect the level of FDI inflows in these transitioning economies, questions remain as to the effect of labour market gender equality on the flows of foreign direct investment. Although attempts have been made to quantify the effect of FDI on gender equality, research is rather sparse on how a changing female labour participation rate affects foreign direct investment.

This paper begins by examining a selection of the past literature on FDI from both a gender perspective and a Southeast Asia perspective. It will then outline the structure and approach of the study undertaken before presenting the results of the study. Finally, extensions to the study will be discussed in the last section.

Literature Review

Literature on foreign direct investment from a gender-blind perspective is quite plentiful with many perspectives on its impact and determinants all over the globe. However, a growing body of research has emerged regarding the role of FDI on gender issues, although a narrower band of research has looked at it from the perspective of the effects of gender on FDI.

Elissa Braunstein (2006) provides a far-reaching summary of research carried out into the benefits, and often drawbacks, of employment by transnational corporations (TNCs) for females. However, research of this issue in developing countries has often been confined to small-scale studies. Braunstein conjectures that although there has been a positive correlation between women's employment conditions and FDI which has led to a short term improvement, the longer term impact of FDI is often not as positive, or indeterminable, as these industries develop further.

Baunstein (2006) maintains that where FDI inflows have been sizeable, such as in Southeast Asia, "there is strong evidence that the share of female employees in the labour-intensive, export-oriented assembly and manufacturing sector is high" (p. 14). Women also tend to be concentrated in these sectors, such as textiles and electronics, where there is pressure to keep costs low in the face of international competition. Traditionally, as women's wages are lower in these transitioning economies, employing a high proportion of female labour allows the TNC's product to be more competitive in an export market.

Sahoo (2006) and Sjöholm (2013) both discuss FDI from an Asian perspective tracking the changes of foreign direct investment in Southeast Asia and examining its determinants. Both find that potential market growth is a primary determinant of FDI inflows in the region as well as a skilled workforce. Sahoo discusses the importance of the degree of openness enjoyed by the Asian economies and the importance of not only exporting, but often importing, when corporations decide to invest in these countries. Textiles have played a central role in FDI in Southeast Asia. Sjöholm and Sahoo both track the composition of FDI throughout the last two decades. It is found that the textile industry sees the bulk of investment in the early years of FDI inflows while this fades away as FDI flows accumulate over time in the majority of cases.

Data

In an attempt to evaluate the impact of gender equality in the labour market on FDI flows in Southeast Asia, a panel dataset was selected as it allows for unobservable time-invariant factors to be controlled for. All data was obtained from the World Bank dataset. The panel consists of the eight of the nine ASEAN (Association of Southeast Asian Nations) members: Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam. Brunei was omitted from the sample due to the unavailability of data. The time period studied is

1990 to 2012 inclusive. It is worthwhile to note that this period covers the Asian financial crisis of 1997, and hence we include a dummy variable to control for this period.

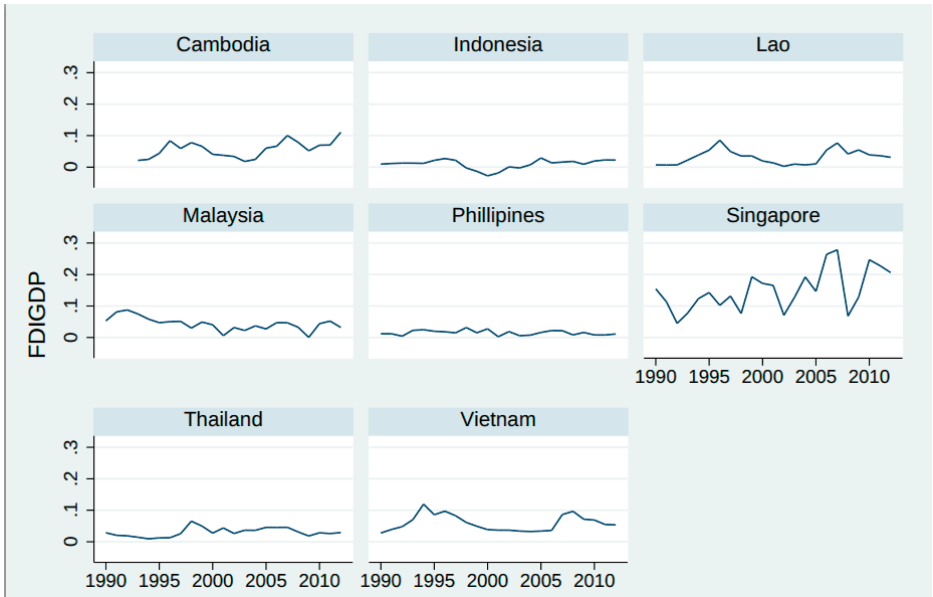


Figure 1: FDI as a percentage of GDP in ASEAN nations from 1990 to 2012.

The response variable chosen is the net inflow of foreign direct investment as a percentage of GDP (FDIGDP). Expressing this as a percentage of GDP allows us to control for the market size. This follows the consensus of the bulk of FDI literature. To model the main explanatory variable, gender equality in the labour market, the female labour participation rate was used. The World Bank define this as the percentage of the adult (aged 15 or over) female population who are economically active. A voice and accountability indicator from the World Bank's World Governance Indicators was used to account for differing institutional qualities.

The explanatory variable matrix that was used in the analysis also consists of a number of other explanatory variables to control for the traditional determinants of FDI. The growth rate of GDP is used to control for the market growth prospects. Trade is a constructed explanatory variable and equals the sum of imports and exports scaled by GDP. Exchange rate is the local currency unit relative to the US dollar and is computed as an annual average based on monthly data. All of these apart from the exchange rate are expected to have positive coefficients to account for their positive impact on FDI. Summary statistics of these variables are contained below in table 0.

Variable	Country	Minimum	Mean	Maximum
FDI/GDP	Between	.0096949	.0495617	.1502341
	Within	-.0557255		.1777549
Trade	Between	.5728862	1.371858	3.656125
	Within	.8080634		2.156736
GDP growth	Between	.0391992	.0590394	.0774416
	Within	-.1236815		.1432906
LNExchange	Between	.4487043	5.370455	9.530422
	Within	3.444321		6.458273
Female Participation Rate	Between	.4361739	.6138478	.7844348
	Within	.5826304		.7085
WGI Index	Between	17.46559	34.52253	69.99588
	Within	42.01125		92.5275

Table 0: Summary statistics for variables used in the model.

Empirical Approach

Firstly, a pooled OLS regression was applied to equation 1 to obtain a benchmark for the study. This results in no distinctions between the different countries in the sample and is of course subject to abundant errors. However, it still provides a suitable starting point in this study and has been used as benchmarks in similar pieces of work.

$$(1) \text{ FDI/GDP}_{t,i} = \beta_0 + \beta_1 \text{ FDI/GDP}_{t-1,i} + \beta_2 \text{ FDI/GDP}_{t-2,i} + \beta_3 \text{ Trade}_{t,i} + \beta_4 \text{ GDPgr}_{t,i} + \beta_5 \text{ LNExchange}_{t,i} \\ + \beta_6 \text{ FemalePartic}_{t-1,i} + \beta_7 \text{ AsianCrisis} + \mu_{t,i}$$

Female participation rate is included as an explanatory variable lagged one period. Early on in this study, it was found that it is the lagged participation rate which has statistically significant effects on the net inflow of FDI. This is consistent with other author's, work such as Anyanwu (2012), who find that decisions on FDI are often made in advance based on previous years' data. AsianCrisis is an indicator value to control for the effects of the Asian financial crisis of 1997.

Panel data estimation methods were then applied to the study's data. Both fixed and random effects estimation was used. A Hausman test produced a chi-squared value of 8.49 and a corresponding p-value of 0.29 meaning that we cannot reject the null hypothesis that the difference in coefficients is not systematic. As a result, fixed effects estimation was utilised due to the allowance of correlation between the unobserved effect and the explanatory variables.

Fixed effects estimation allows us to control for unobserved effects across coun-

tries. The implementation of fixed effects estimation allows for us to control for certain cultural differences across the countries. Du, Lao and Tao (2012) demonstrate that investors' cultural preferences, and the difference between their home and the host culture, affect the location and level of foreign direct investment.

$$(2) FDI/GDP_{t,i} = \beta_1 FDI/GDP_{t-1,i} + \beta_2 Trade_{t,i} + \beta_3 GDPgr_{t,i} + \beta_4 FemalePartic_{t-1,i} + \beta_5^T IdTime + \alpha_{t,i} + \varepsilon_{t,i}$$

Where β_5^T is a vector of coefficients, and $idTime$ is a vector of indicator variables for each, bar one to avoid collinearity, year. Equation 1 was selected after multiple specifications were tested at early stages of this study.

It is also possible that the β_4 is capturing the effect of improved institutions within the country. For this reason a separate specification, equation 3, including the World Governmental Index was analysed to control for the effect of improved institutions on FDI. This would eliminate the possibility that β_4 is only capturing the effects of improved institutions.

$$(3) FDI/GDP_{t,i} = \beta_1 FDI/GDP_{t-1,i} + \beta_2 Trade_{t,i} + \beta_3 GDPgr_{t,i} + \beta_4 FemalePartic_{t-1,i} + \beta_5^T IdTime + \beta_6 WGI_{t-1,i} + \alpha_{t,i} + \varepsilon_{t,i}$$

Results

Table 1, outlines the preliminary results of this study using a pooled OLS method on equation one specified above. The log of the local currency unit to US dollar exchange rate is highly insignificant with a p-value of 0.37. This is not completely unexpected as the explanatory variable here is the annual nominal exchange rate from 1990 to 2012. FDI is likely to depend only on the real exchange rate, data of which was difficult to collect for this panel.

Data on various other explanatory variables was also collected and analysed for variable selection. Variables such as education levels, proxies for infrastructure and tax levels were all eliminated during a top-down variable selection process. This was not as expected as a traditional school of thought would be that all of the aforementioned factors would have a significant impact on the inflow of FDI.

FDI/GDP _{t,i}	Pooled OLS
Number of observations	170
FDI/GDP _{t-1,i}	.437797*** (.0775023)
FDI/GDP _{t-2,i}	-.0575343 (.0774785)
Trade _{t,i}	.0286949*** (.00497)
GDPgr _{t,i}	.2323027*** (.0633037)
LNExchange	.0008984 (.0010004)
FemalePartic _{t-1,i}	.0454093** (.0216071)
AsianCrisis	.0109077 (.0075239)
Constant	-.0557067*** (.0132806)
Adjusted R ²	0.7406
F _{7,162} {Prob>F}	69.94 {0.000}

Table 1: Regression results for equation (1). Standard errors for each coefficient shown in parenthesis.

FDI/GDP _{t,i}	Fixed Effects	Robust Fixed Effects
Number of observations	172	172
Number of groups	8	8
FDI/GDP _{t-1,i}	.3118243*** (.0803756)	.3118243* (.1382869)
Trade _{t,i}	.2239939*** (.0811084)	.2239939 (.1523432)
GDPgr _{t,i}	.0241627** (.0117865)	.0241627 (.0139636)
FemalePartic _{t-1,i}	.295896** (.1217873)	.295896 (.2781084)
Constant	-.2031*** (.0771341)	-.2031 (.196796)
R ² (Within)	0.3986	0.3986
F _{25,139} {Prob>F}	3.69 {0.0000}	.

Table 2: Regression results for equation (2). Standard errors for each coefficient shown in parenthesis.

The main method in this study is fixed effects regression. For this analysis, the second lag of FDI was removed as the model is already dynamically complete and exchange rate was also removed due to its low explanatory power.

Looking at the fixed effects results in Table 2, as expected all coefficients were positive implying that an increase in these factors would increase the inflows of FDI in the region. Interestingly, all coefficients are also significant at either a five or one percent significance level. A one percentage point increase in trade would imply a 0.22 percentage point increase in the level of FDI as a percentage of GDP. Similarly, a one percentage point increase in GDP growth rate would imply a 0.02 percentage point increase in FDI as a percentage of GDP. The significance of the lagged female participation rate on FDI is noteworthy, implying that a percentage point increase in the female participation rate would increase FDI by 0.29 of a percentage point. An F-test rejected the null hypothesis that the coefficient vector for the time variables, β_5 was zero.

FDI/GDP _{it}	Fixed Effects	Robust Fixed Effects
Number of observations	172	172
Number of groups	8	8
FDI/GDP _{t-1,1}	.3043924*** (.0802415)	.3043924* (.1479191)
Trade _{it}	.0183852 (.012416)	.0183852* (.0093334)
GDPgr _{it}	.2360797*** (.0812431)	.2360797 (.1598837)
FemalePartic _{t-1,i}	.2559412** (.1244962)	.2559412 (.2385256)
WorldGovIndex _{it}	.0002236 (.0001562)	.0002236 (.0002105)
Constant	-.189151** (.0777023)	-.189151 (.1715336)
R ² (Within)	0.4074	0.4074
F _{26,138} {Prob>F}	3.65 {0.0000}	.

Table 3: Regression results for equation (3). Standard errors for each coefficient shown in parenthesis.

Table 3 outlines the results of the fixed effects estimation of equation three. The purpose of this estimation was to control for institutional differences and their effects on FDI as it may be possible that the coefficients on female participation rate is capturing these improved institutions. As we can see from the second column, despite the inclusion of increases in institutional index, female participation rate still has a statistically non-zero effect on foreign direct investment.

Validation of Results

While the fixed effects results reported in table two are interesting, it is important to ensure that these results are indeed valid and are not misleading due to incorrect standard errors. While a number of checks were carried out, those testing for heteroscedasticity and autocorrelation are of merit.

A modified Wald test for groupwise heteroskedasticity rejected the null hypothesis that $\sigma_i^2 = \sigma^2$ for all observations with a p-value (Prob > χ^2) of 0.000 suggesting that heteroscedasticity could be a problem in this panel. This is perhaps not too surprising in itself considering that the period covered by this study, 1990 to 2012, covers the Asian financial crisis of 1997, the dot-com bubble of 2000, and the onset of the world financial crisis in late 2007 and early 2008. All of these events have possible effects on FDI flows and, ultimately, the volatility of these flows.

One of the assumptions required is that of no serial correlation. The Wooldridge test for autocorrelation in panel data was conducted. A χ^2 value of 246.12, and a corresponding p-value of 0.0000, clearly rejects the null hypothesis of no autocorrelation in the panel.

As a result of these findings, it can be ascertained, with a high degree of certainty that the original reported standard errors were false leading to the overstating of significance of these results. Hence, it was decided to repeat the fixed effects estimation again, this time requesting robust standard errors correcting for eight clusters in the country identity.

Requesting robust standard errors leads to perhaps a truer statement of significance of the results. In table 2, under robust fixed effects estimation, we can see that only the lag of FDI is significant at a ten percent level. In table 3, similarly under robust fixed effects estimation, it is trade and again the lag of FDI that is significant at likewise a ten percent level.

More importantly, robust standard errors means that we cannot exclude the possibility that the coefficient on female participation rate is statistically zero; both in equation two, and in equation three where we control for improvements in a country's institutions.

Possible Extensions to This Study

Using fixed effects estimation to analyse the effects of labour force participation rate on FDI allows us to control for unobserved effects that do not change over time. This means that we can control for cultural effects on the decision to invest in a country. However, it may be interesting to estimate the aforementioned effect using a gravity model. Gravity models have been used in literature on FDI, but not to analyse the effect of gender equality in the labour market. The use of a gravitational model may allow us to model these effects more accurately.

A possible extension of this study would be to look at different measurements of gender equality in the labour market. Although female labour force participation rate is frequently used as a measure of gender equality, one could also look at the gender wage gap or other similar measures. It may also be possible to collect better data on the female participation rate. It is likely that, in these transitioning economies, the female participation rate may be underreported due to the prevalence of casual employment.

Conclusion

This study attempted to address the impact of female labour force participation on foreign direct investment inflows in Southeast Asian nations. Despite the significant level of literature on FDI and its determinants, minimal attention has been focussed on the effect of gender equality in the labour market on the level of FDI flows. With Southeast Asia receiving a high level of FDI in female intensive sectors such as technology and textiles, it is interesting to examine whether a higher level of female participation increases the flows.

Using a fixed effects model to control for unobserved effects across countries, determinants of foreign direct investment were estimated. Variables such as GDP growth rate and trade were controlled for and proved to have positive influences as expected. Under fixed effects, female labour market participation rate was found to have a positive impact on FDI and was significant at a five per cent level. However, after controlling for detected autocorrelation and heteroscedasticity within the panel by correcting the standard errors through robust fixed effects estimation, the possibility of female labour market participation rate being statistically zero cannot be excluded. Despite strong qualitative references to the demand for female employment by multinational corporations in this region, it appears that an increased female labour market participation rate does not affect the flows of foreign direct investment in Southeast Asia.

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