AN ANALYSIS OF THE DETERMINANTS OF INWARD DIRECT INVESTMENT IN BRAZIL

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ABSTRACT

Foreign direct investment is an important that enables developing countries achieve greater and faster economic growth. The creation of FDI may alleviate developing countries from financing constraints and enable them to climb up the global ladders besides developed countries. This study aims to investigate the determinants of FDI in developing country Brazil during the period 1970-2010. Regression analysis will be applied to test the determinants that may impact the inflow of FDI to Brazil are market size, trade openness, inflation rates and two dummy variables, viz., the Bolivia-Brazil Pipeline and Sao Paulo Metro Line 5. In general, the findings indicate that market size, inflation rate and the Bolivia-Brazil Pipeline are significant and positive determinants of FDI in Brazil. While, trade openness and the Sao Paulo Metro Line 5 is not a positive determinant of FDI in comparison to the other variables. The findings of the study recommend that trade openness and Sao Paulo Metro Line 5 needs to be encouraged and managed better.

INTRODUCTION

Foreign direct investment (FDI) is seen as an important catalyst for developing countries in achieving greater and faster economic growth. FDI is defined by the IMF (1993), OECD and IMF (2000) as a long term investment by a foreign direct investor in an enterprise resident in an economy other than that in which the foreign direct investor is based. Those countries that wish to climb us the global ladder will need growth to get there. Countries that stagger in growth have insufficient foreign investments. Hence, growth will be slower for countries with low investment levels.

According to the World Bank Report (1997), there is empirical evidence, which suggest

that a dollar of FDI will raise the sum of domestic and foreign investment by more than a dollar. Therefore, FDI will complement rather than substitute for domestic investment.   Lall (1980) indicates that FDI is generally conducted by the multinational firms, concerned with having the goal of making profits.   Hence, the investments are usually well targeted at setting up a business that will ensure money is made and also jobs are created.   The profit that is created through FDI will contribute to corporate tax revenues.   Generally speaking, a successful foreign-owned firm will generate enough profits and tax revenue for the host country.

The amount of FDI in developing countries has grown dramatically over the years. This increasing amount of FDI inflows to developing countries indicates that foreign investors consider these host countries to be a profitable investment location.   According to the ASEAN (2007), in 2006 global FDI flows reached $1.2 trillion and there has been a continuing rise in FDI inflows to developing countries.   Through the process of globalization has boosted economic growth resulting in structural changes of the world economy.   Studies argue that BRIC (Brazil, Russsia, India and China) may emerge as a global economy in the near future.   OECD (2002) reports that countries with weaker economies consider FDI as the only key source of growth and economy modernization in the world today.

Chen and Chen (1998: 446) note, 'Weak firms have no place in the field of FDI.   FDI is envisaged as an expedition into unfamiliar and treacherous territory, where only the strongest survive.'   Foreign investors that undertake FDI to exploit a foreign market, which is of some appeal to the firm, in particular by supplying the domestic market of the host country.   Hence, such exploitation advantages exist in developing countries such as those of BRIC.

In the next 40 years, the combined economies of Brazil, Russia, India and China (BRIC) could be larger than the combined economies of the U.S., Japan, and the four largest European economies of Germany, France, Italy and the United Kingdom (G6) in US dollar terms.   The nations of BRIC have continued to increase their contribution to the ever globalizing markets providing 28% of the global growth expressed in US dollar terms and 55% in Purchasing Power Parity terms (O'Neill et al., 2005).   Their combined share of global trade is currently 15% annually since 2001. They consist 30% of world reserves and a threefold of FDI within their borders to 15% since 2000. As their productivity increases, their purchasing power will increase and contribute to their GDP growth.   Thus, BRIC will have the scale and trajectory to challenge today's major developed economies in terms of their impact on the global and competitive economy.

Research on the investment development path (Dunning, 1981 and Narula, 1996);

shows that FDI of the host country will change according to the stage of economic development. Accordingly, less developed countries tend to attract mostly resource-seeking and efficiency-seeking FDI in product markets or labor intensive production tasks.   As these developing countries develop and grow, they will improve their economies, technological infrastructures and technical skills of labor force, hence attracting FDI in value-added activities.   All countries in BRIC are subject to higher or lower degree in the investment development path.   The goal is to move up the investment development path to where the advanced countries lie.

Within Latin America, Brazil is ranked as the largest recipient of FDI (Foreign Investment Committee, 2011).   Foreign investors who are always on the search for new platforms for investing their funds with safety, need to search for nations that have the potential in the future to assure good returns on capital.   Countries that have the potential to positively grow in the future can ensure returns on capital.   This can potentially occur with developing countries as they are in the lower stage of the investment development path and have a vast amount of room for potential growth. BRIC as future economies can ensure foreign investors receive the positive returns on capital with high level of economic growth that is estimated to last for some decade to come.

In the near future, the nations of BRIC are becoming the dominant economies of the world. Brazil being one of the nations of BRIC shows its significance to the world.   Thus, it is worth examining Brazil as a host country for FDI.   It is also worthwhile to investigate whether the common determinants of FDI literature are entrenched in Brazil as the prospective FDI destination.

LITERATURE REVIEW
Foreign Direct Investment in Developing Countries and Brazil: Hausman and Fernandes-Arias (2003) indicate that developing countries have domestic savings, which are too low to even support the finance sufficient capital building.   FDI will act as a tool by alleviating financing constraints.   Capital will flow from one nation to another to earn a higher return where it is more productive, as well as to diversify risks. The potential impact of international capital movement through FDI will result in an increase in world output and welfare.

Developing countries now comprise a large portion of global FDI portraying the attractiveness and significance developing countries hold as prospective FDI destinations.   Foreign investors consider developing countries as a valuable destination that offers profits and this evident as the average yearly FDI flows are gradually increasing.

FDI inflow to developing countries of BRIC has been a significant destination over the past

years.   They are considered as important economies that have something to offer, as well as the potential to transform the world economy (Wilson et al., 2004).   The combined economies of Brazil, Russia, India and China (BRIC) are likely to become the largest global economic group and force by the middle of this century (O'Neill, Wilson, Purushothaman, Stupnytska, 2005).   BRIC is currently attracting more and more FDI inflow and is developing rapidly through the action of FDI. Brazil is generally open to and encourages foreign direct investment. Brazil remains the largest recipient of FDI in Latin America.

The World Investment Prospect Survey 2010-2012 shows that the four nations of BRIC as emerging markets have been ranked among the top five FDI destinations that are favorable to foreign investors (UNCTAD, 2010), and Brazil was ranked fourth as the most promising top priority destination for FDI to befall.

FDI has played an important role for the economy of Brazil and the country per se.   The inflow of FDI to Brazil is attracted by the big domestic market and liberalized economy through fair government policies.   With an economy estimated to be around $1.3 trillion, FDI is an important key in assisting the country's payment balance.

Prior to the World War II, FDI was concentrated in public utilities, which usually included transportation in primary goods, export, in banking and in manufacturing.   Post World War II, FDI in Brazil shifted towards manufacturing sector.   Thereafter, in the 1990s FDI had a dramatic course of change in Brazil with institutional and macroeconomic reforms to stimulate the flow of FDI to Brazil. These reforms included the real plan, privatization of state owned enterprise, and implementation of the Mercosur free trade area.   Through implementation of these reforms, it has been estimated that among the world's five hundred largest corporations, at least four hundred have FDI in Brazil (Baer and Rangel, 2001).   This has made Brazil a major source of investment location and emphasizes the importance of Brazil as a FDI destination.

Literature of Foreign Direct Investment: The framework of FDI started with the works of Dunning's (1980) eclectic paradigm based on ownership, location and internationalization advantages. The eclectic paradigm is also known as the OLI advantages, which stands for Ownership, Location and Internationalization advantages.   These advantages best describe why and where foreign investors would perform FDI activities.
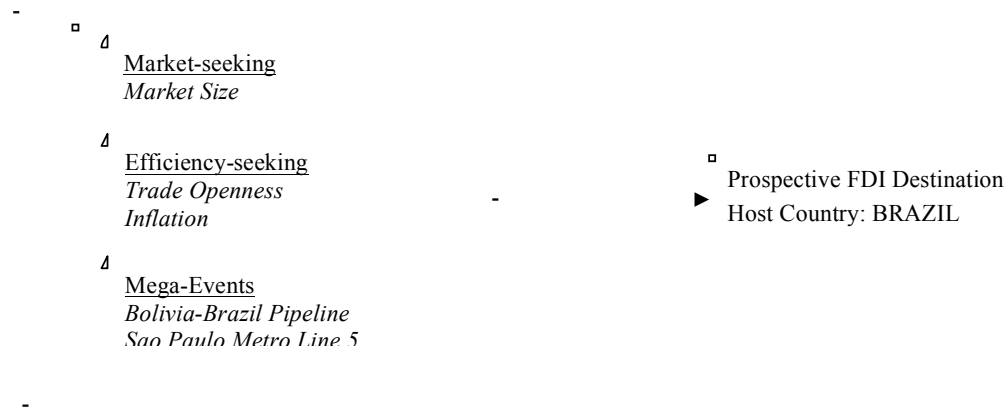
Ownership advantages explain why some foreign investors will go abroad to another location to engage in FDI and while others do not.   Location advantages explain why firms chose a particular foreign country as their prospective destination for FDI.   Internalization advantages

influence how the firm will conduct itself in the foreign country in order to exploit its ownership advantages internally rather than operating through the status of licensing.

From Dunning's eclectic paradigm (OLI advantages), three types of FDI entry strategies can be derived: market-seeking, efficiency-seeking and resource-seeking.   Foreign investors will choose their entry strategies based upon the OLI advantages they are pursuing.

Dunning (1992) suggested that market-seeking FDI is motivated by following customers and suppliers that have expanded overseas. Efficiency-seeking FDI is motivated by the advantages of economies of scale and scope of products or process achieved through lower cost structures. Resource-seeking FDI is motivated by seeking physical or human resources available cheaply in the local market.

Figure 1: Conceptual framework of the determinants of foreign direct investment

Market-seeking
Market Size

Efficiency-seeking
Trade Openness
Inflation

Prospective FDI Destination
Host Country: BRAZIL

Mega-Events
Bolivia-Brazil Pipeline
Sao Paulo Metro Line 5

Foreign investor will match their OLI advantages to the three types of FDI entry strategies. The particular OLI advantage pursued by the investor will be used to exploit the elements within the FDI entry strategies provided by the host countries.

Figure 1, shows the determinants variables within the FDI entry strategies that influence FDI inflows to Brazil in this research.   We classify these variables into five broad categories, viz., Market size, Trade Openness, Exchange rate and two Mega-Events: Bolivia-Brazil Pipeline and Sao Paulo Metro Line 5.   This is the framework for which foreign investors will follow when making their decision in FDI in our study.

Market Size Determinant of Foreign Direct Investment

Studies conducted over time show that there is a strong literature in the correlation between the size of the market in the host country and the FDI inflow that these host countries attract. FDI must justify the returns that are to be made through sales in the host country.   In order to achieve this, FDI will flow to countries that are large enough to support foreign investors in economies of scale for production.

Market size proxied by the level of GDP represents the market size and Trevino et al. (2002) found that GDP was a significant and positive indicator of FDI inflows within Latin America. UNCTAD (1994) concluded that the primary determinant of FDI was motivated by market size.

Larger market size offers greater opportunities to realize effectively economies of scale and presents greater business activities (Zhang, 2000b).   Large market size is often associated with large populations.   Large populations indicate there is a large consumer market or population to cater.   A large market size provides more opportunities for sales and also profits to the foreign investor, and therefore attracts FDI inwards (Wang and Swain, 1995).

Hypothesis 1. Market size is expected to be a significant and positive determinant of FDI inflow to host country Brazil.

Trade Openness Determinant of Foreign Direct Investment

Trade openness is the degree in which countries have capability to trade with other countries. Trade openness generally positively influences the export-oriented FDI inflow to an economy, as it indicated the ability to conduct trade (Gastanaga et al. 1998 and Asiedu, 2000).

If trade cannot be enhanced, it would mean the host country is not a feasible destination for FDI to take place because trade cannot go any further.   Countries that contain greater trade openness relatively outperformed their economy compared to the less opened countries or countries with low trade openness.

According to Williamson (1975), the degree of trade openness indicates the degree of efficiency in investments.   This will provide an outlook on the degree of comparative advantage held by the host country in which the foreign investor is undertaking FDI.   FDI is usually a long term commitment in a country and firms will not be interested if openness is not visible in trade, as this will represent a business environment with uncertainty.   A more open trade framework will allocate more efficiency of the FDI by allocating foreign investors to the areas that have comparative advantage in trade (Balasubramanyam et al. 1996).

Hypothesis 2. Trade openness is expected to be a significant and positive determinant of FDI inflow to host country Brazil.

Inflation Determinant of Foreign Direct Investment

Hooks (2003) states that inflation is evaluated by the percentage change in general price index.   A high rate of inflation would mean lower returns on FDI for the foreign investor.   This also represents that the country has macroeconomic instability where the government may have certain budget problems (Schneider and Frey 1985).   The country has a weak economic condition and has poor management in the economy.   According to Trevino and Mixon (2004), increasing inflation signals an economy with internal instability with unstable monetary policy.   Hence, FDI inflow will have a decreasing effect.

Countries with high inflation generally require higher rates of return to compensate for the higher risk associated with inflation that is present within the country.   FDI is motivated by investment efficiency and this is generally affected by the condition in degree of inflation (Bengoa and Sachez-Robles, 2003).   Inflation needs to be stable in order to encourage greater FDI.

Hypothesis 3. Inflation is expected to be a significant and positive determinant of FDI inflow to host country Brazil.

Impact of Mega-Event towards Foreign Direct Investment: Roche (2000) states that mega-events are large-scale cultural events that may appear as commercial or sporting, which have a dramatic character, mass popular appeal and internationally significant.   They may provide visibility to a host county and may stimulate global demand for the country's exports and trade.

Mega-events have significant consequences for the host country, in which they occur. According to Hiller (2000) stated that mega-events to a certain extent will have effect on social, political, cultural and economic levels.   These mega-events may come in the form of both positive and negative effects towards the country holding that particular mega-events (Collins, Jones, and Munday, 2009).

Our study will identify if certain non sporting mega-events in Brazil will have positive significant impacts upon FDI.

Establishment of the Boliva-Brazil Pipeline

The Bolivia-Brazil pipeline was completed in June 1999, consisting of 3,150 kilometers long connecting from Santa Cruz in Bolivia to Porto Alegre in Southern Brazil.   It is the longest natural gas pipeline in South America.   The natural gas pipeline will connect the market of seven states in Brazil.

Natural gas market is forecasted to grow in all countries, including Brazil. Worldwide generation of natural gas increased from 3.9 trillion kilowatt-hours in 2007 and is expected to increase to 6.8 trillion kilowatt-hours in 2035 (Energy Information Administration, 2010).   The rapid developments of surrounding resources and infrastructure will increase the demand for energy. Natural gas is fuel efficient and flexible, as it can be generated in a few minutes rather than the hours it takes for coal to be burned and other sources of generating capacities.

Construction of the pipeline was directed to boost the use of natural gas and help the economy grow.   More business opportunities and networks can be leveraged for FDI through the growth of natural gas, since natural gas does not need to be loaded onto ships for transport into Brazil. **Hypothesis 4.** The opening of Bolivia-Brazil Pipeline is expected to be a significant and positive effect on FDI inflow to host country Brazil.

Establishment of the Sao Paulo Metro Line 5
The Sao Paulo Metro Line 5 was completed in October 2002, and the metro line is represented by the color lilac (Companhia do Metropolitano de São Paulo – Metrô, 2011).   At the moment the line covers seven districts in Brazil.

The Sao Paulo Metro Line 5 will improve traffic flow in Sao Paulo, which is the largest city in Brazil and other parts of the metropolitan area.   With the metro, it is expected that many people will leave their vehicles at home.   This in return will reduce congestion on the roads and improve the quality of air. Line 5 will also attempt to integrate and improve the southern and southwestern areas of Sao Paulo with central parts of the metropolis where much of the low income populations reside (Railway Technology, 2011).

The financial funding approach for infrastructure projects can be achieved domestically and through FDI.   Good technology and expertise will follow with the opening of mega projects rather through conventional methods. This will reduce the cost of production of mega projects that can be completed expeditiously while quality will be maintained.
Hypothesis 5. The opening of Sao Paulo Metro Line 5 is expected to be a significant and positive effect on FDI inflow to host country Brazil.

METHODOLOGY
Our study will use regression analysis from the econometric computer package E-Views to examine whether the determinants of FDI are driving FDI inflows into Brazil.   A regression will be

performed on the dependent variable, which is FDI, with a set of independent variables.

This will demonstrate whether there is significance between the independent variables on FDI. The independent variable FDI is known to be the determinant of FDI towards host country Brazil.   The five dependent variables, which are market size, trade openness and inflation rate along with two mega-events (dummy variables) are used as the determinants of FDI towards Brazil.

The data are gathered from The Bank of Brazil, The World Bank, United Nations Conference of Trade Development statistics (UNCTAD) and the International Monetary Fund (IMF).   The data used in our study will be collected from the period 1970 to 2010.   The independent variables consist of a total of forty-one observations.   The data units for the variables are denominated in US dollars with a unit of US million.

The equation is the multiple regression model that is used to analyze and test to see which of the independent variables of β_1 to β_5 is the most significant determinant of FDI inflow to Brazil:

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} \qquad (1)$$
$$+ \beta_4 D_{1t} + \beta_5 D_{2t} + \mu_t$$

Where:

Y_t : FDI of country,

t : period t,

β_0 : The constant number of the multiple regression,

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$: The coefficients of X_{1t}, X_{2t}, X_{3t}, D_{1t}, D_{2t},

X_{1t} : GDP of Brazil at period t,

X_{2t} : Trade openness of Brazil at period t,

X_{3t} : Inflation rate of Brazil at period t,

D_{1t} : Opening of Bolivia- Brazil Pipeline at period t,

D_{2t} : Opening of Sao Paulo Metro Line 5 at period t,

u_t : Random error of Brazil μ at period t.

The sequence of analysis using the regression model will start off with raw data collected from the data sources.   Second, to identify the degree of correlation between the market size, trade openness and exchange rate will be tested using multicollinearity.   Third, any error in the regression model will be identified using White's General heteroscedasticity test.   Fourth, autocorrelation will test if there is any correlation within the periods of the time series data.   Lastly, the degree of significance of the independent variable on FDI towards Brazil will be tested by using the ordinary least squares method.

The independent variables and mega-events are based on time-series data.   The dependent

variable FDI represents annual country-wise inflow of Brazil FDI.

EMPIRICAL RESULTS

The ordinary least squares (OLS) uses the sample data to describe the relationship between the observed set of data.   OLS will indicate which of the following independent variable of X_{1t}, X_{2t}, X_{3t}, D_{1t}, D_{2t} has a stronger relationship with Y_t, which is the dependent variable FDI.

Table 1, presents the results from the OLS and shows that the value of R-squared is 0.903745 and adjusted R-squared is 0.889995, which are all greater than 0.5 significance level.   Meanwhile, the F-statistic value is 65.72383 containing a level of significance at 0.00.   This indicates that the multiple regression characterizes a model of goodness of fit.

Ordinary Least Squares and GDP

The coefficient of real GDP is 0.022557 and significant at a level of 1%, showing 9.442686 level of significance to the t-statistic.   Consequently, a one unit (one millions US dollar) change in real GDP would bring around 0.022557 in FDI inflow to Brazil.

Table 1: Regression result of the ordinary least squares

Dependent Variable: Foreign Direct Investment (Y_t)				
Independent Variable	Estimated Coefficients	Standard Error	t-Statistics	P-value
Intercept (C)	-6610.558	5301.230	-1.246986	0.2207
Real GDP (X_{1t})	0.022557	0.002389	9.442686	0.0000[***]
Trade Openness (X_{2t})	27142.27	33399.58	0.812653	0.4219
Inflation Rate (X_{3t})	-3.299278	1.188801	-2.775298	0.0088[**]
Bolivia-Brazil Pipeline (D_{1t})	16228.00	3126.601	5.190300	0.0000[***]
Sao Paulo Metro Line 5 (D_{2t})	-15302.95	3524.034	-4.342452	0.0001[***]

Number of Observation: 41
F-Value: 65.72383
P-Value: 0.000000
R^2: 0.903745
Adjusted R^2: 0.889995
Durbin-Watson: 2.023491

Note: The triple asterisks mark coefficient significant at level of 1%, double asterisks mark coefficients significant at a level of 5%, and single asterisk mark coefficients significant at a level of 5%, and single asterisks mark coefficients significant at a level of 10%.

The result from the OLS indicates that GDP is a positive determinant of FDI inflow to Brazil. Lankes and Venables (1996) and Sahoo (2006) found FDI to be a positive and significant determinant of FDI and this is clearly evident in our study. Increasing GDP that is market size will positively increase FDI flows to Brazil.   Foreign investors will have greater direct market to consumers and producers demand in the country.   Foreign investors through FDI are directed to serve the market rather than exporting the product from its home country to the host country (Culem, 1998; Pain and Lansbury, 1997).   Hence, the bigger the market size the more attractive a country is for investors to undertake FDI.   This can be expected if the domestic market is expanded, as it would create more opportunities for FDI to take place in Brazil.

Ordinary Least Squares and Trade Openness

The coefficient of trade openness is 27142.27 showing 0.812653 level of significance to the t-statistics.   Trade openness is not a positive determinant of FDI inflows to Brazil.   Foreign investors taking part in FDI will not consider trade openness as an important decision factor. Although trade openness indicated the ability to operate without any high degree trade barriers with markets available for the investor to choose from does not necessarily mean trade barriers are tight. Insignificant trade barriers could be partly due to the relatively well integrated and close trade links already inherited within the country.

The economy may also not have been fully aligned to allow investments to stimulate satisfactory growth (Igudia, 2004).   The cause could be due to factors such as inability to formulate investments demanded by foreigners, friendly policy, reliance on primary products for export, institutional and structural imbalances or a weak infrastructural base (Aluko, 2004).   Consequently, trade openness may not pursue the needs or wants of foreign investors.   Foreign investors will not take trade openness into account during FDI.   The empirical results show that trade openness is not a positive FDI determinant in this study.

Ordinary Least Squares and Inflation

The coefficient of inflation rate is -3.299278% and significant at a level of 5% showing -2.775298 level of significance to the t-statistic.   Consequently, low levels of inflation rate will influence FDI positively.   That is a 1% increase in inflation rate would decrease to about -3.299278% of FDI inflow to Brazil.   A high rate of inflation is a hazard towards competitiveness and exports brining market distortions and economic instability (Fischer, 1993).   The findings indicate that the economic environment or monetary policy in the country is disciplined and foreign investors need not worry about high risks of fluctuating prices.

According to Shamsuddin (1994) and Nath (2004) findings show that inflation has a negative effect on FDI are the same as the empirical results in our study showing the effect of inflation on FDI inflows is significant with a negative effect.   Foreign investors do not have to worry on spending more money, time and energy to adjust to the rising price level.   Bengoa and Sachez-Robles (2003) show that FDI is motivated by investment efficiency and the degree of inflation can affect the degree of FDI received.   Thus, inflation rate is a positive FDI determinant in this study.

Ordinary Least Squares and Bolivia-Brazil Pipeline

The coefficient of Bolivia-Brazil Pipeline is 16228.00 and significant at a level of 1%, showing 5.190300 level of significance to the t-statistic.   Energy Information Administration (2011) asserts that demand for natural gas will increase in Brazil.   The result presented in this study indicates that there is a great potential for this to happen.   The pipeline stimulates the country's economic position, providing visibility to foreign investors ensuring them that there is FDI opportunities in the energy sector as well as other business sectors.   Investors do not have to worry about any instability in doing business as the power sector is secure enough for FDI to take place. Shamsuddin (1994) found availability of energy in the recipient country an important determinant in FDI and this shows to be significant in this findings of this study.   Nevertheless, business can be performed at a cheaper cost, as the cost of importing natural gas into Brazil has been removed.   Thus, the Bolivia-Brazil Pipeline is a positive and significant determinant of FDI in Brazil.

Ordinary Least Squares and Sao Paulo Metro Line 5

The coefficient of Sao Paulo Metro Line 5 is -6610.558 and significant at a level of 1%, showing -4.342452 level of significance to the t-statistic.   This represents that the completion of the metro has not positively impacted FDI in Brazil, but is not a determinant of FDI in Brazil.   Foreign investors may feel that greater accessibility to conduct business efficiently has not reached up to its potential.   Foreign investors have the opportunity to set up business freely in different locations due to the greater accessibility, but the different locations may not be able to be exploited due to the accessibility not reaching its potential.   Hence, business opportunities in Brazil have not been exploited through FDI.   The empirical result shows that the metro indeed increase value in Brazil, but it is not reaching the demand of the investor.   Foreign investors do not consider the metro an important factor in the FDI decision making.   Thus, the Sao Paulo Metro Line 5 is not a positive FDI determinant of FDI in this study.

CONCLUSIONS AND IMPLICATIONS

The results from the hypotheses testing show that FDI in Brazil comes mainly from market-seeking. Foreign investors are motivated by market-seeking behavior when conducting FDI in

Brazil.   This indicates that investors will base their decision making upon market-seeking objectives. The test result for H1, H3 and H4 are fully supported indicating that the null hypothesis has been rejected and the expected hypothesis is positive.   On the other hand, H2 and H5 are not supported, this indicates that the null hypothesis has not been rejected and the expected hypothesis is positive.

The government of Brazil could also raise GDP through fiscal policies.   That is the government could increase government expenditures, as this will raise aggregate demand and consumption, which will result in an increase in GDP attracting FDI.   The force behind foreign investor activity in developing countries is the access to the market to consumer and producer demand in that location, thus larger host country market size will result in larger FDI.   This suggests H1 is a positive determinant in FDI flow to Brazil and is supported by the empirical results.

Trade openness is not a positive FDI determinant for Brazil.   One of the possible explanations could be that Brazil only began trade reforms in the 1990s. In the 1970s, Brazil like other developing countries such as India and China was considered as one of the most closed economies with less integration in trade, which made Brazil contain the fifth smallest trade share. Other explanations could be that trade openness is not entirely present in all areas of business. Barriers or tariffs are usually imposed on non-tradable sectors where products must be produced and sold within the domestic economy, which may restrict FDI.

Inflation rate is a positive and third most important FDI determinant for Brazil.   The macroeconomic environment in Brazil is stable where the government is able to balance its budget and the central bank of Brazil is able to run a suitable monetary policy.   This environment has produced the opportunity for foreign investors to gain an appropriate return on FDI.   The government should maintain the monetary policy in Brazil to contain inflation, as this will allow investors to continue with FDI and produce more. Maintaining inflation will bring investment efficiency motivating foreign investors to invest (Bengoa and Sanchez-Robles, 2003). This suggests H3 is a positive determinant in FDI flow to Brazil and is supported by the empirical results.

Bolivia-Brazil Pipeline is the second most important FDI determinant for Brazil. Construction of the pipeline has shown to benefit the country.   This implies that market for natural gas pipeline is positive.   Expanding the pipeline to other major cities in Brazil will stimulate business opportunities.   This will allow FDI to expand to different areas within Brazil; as a result it will provide job opportunities and stimulate growth in suburban areas.   This has the potential to occur, as the Energy Information Administration (2011) presented that natural gas will become an attractive energy source for industries.   This suggests H4 is a positive determinant in FDI flow to

Brazil and the empirical results supports that the development of the pipeline shows to be of importance.

Sao Paulo Metro Line 5 is the last hypothesis and has a negative relationship with FDI. However, it is not highly important in foreign investor's FDI decision even though it is a form of growth for the country.   Hence, the metro is viewed neutrally in FDI decision making. International Bank for Reconstruction and Development (2010) states that the Sao Paulo Metro Line 5 is under construction for expansion to improve mobility and should be completed by 2013.   Further expansion on the metro can bring greater accessibility or greater access point.   World Bank Project Database-brazil (2010) indicates that there is a growing demand for the need of a metro system, thus there is still some potential for the metro to anticipate FDI. The empirical evidence does not support H5 and this suggests that investors prefer to engage in FDI in locations with greater accessibility.

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