Determinants of foreign direct investment in OECD member countries

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Abstract
Purpose – The aim of this paper is to get an insight into the potential determinants of foreign direct investment (FDI) for a panel of ten OECD member countries over the period of 1985-2009.

Design/methodology/approach – Granger causality tests have been implemented in the study to identify causalities, both in the short- and long-run, between FDI and the variables that emerge as significant determinants of FDI during the regression analysis.

Findings – The fixed effects estimation indicates that market size, labor cost and quality of infrastructure yield significant coefficients in relation to FDI for the panel of countries under study. A bi-directional short-run relationship is established between market size and labor costs in the short-run; whereas quality of infrastructure causes market size and labor costs in the short-run. For the long-run deviation of FDI from equilibrium, market size, labor costs and quality of infrastructure all bear the joint burden in the short-run to re-establish the equilibrium.

Practical implications – The research findings have a number of policy implications for the OECD countries in specific and other developed economies in general. Labor costs seem to affect the FDI decision on the part of investors; therefore, the countries with low labor costs are preferred by investors in order to reduce the cost of their business and products. Policies should be devised to reduce the labor costs and improve the quality of infrastructure in the country in order to attract more FDI into the economy and for quick adjustment purposes in case of shock to the system.

Originality/value – This paper investigates the relationship and significance of nine potential determinants of FDI in ten OECD member nations using panel data methods. The practices that are undertaken in developed and established economies are of vast significance to the economies that are in transition stages. The paper uncovers some important factors influencing FDI in the ten countries under study and provide a guide-map for other developed countries.

Keywords Foreign direct investment, Investment decision, Labor economics, Causality analysis, Direct investment, International investments

Paper type Research paper

1. Introduction
Foreign direct investment (FDI) plays a vital role in the economic growth and development of a country (Choe, 2003; Li and Liu, 2005). But this investment is dependent on the political, social and economic conditions of the host country. Therefore, an established body of literature has concentrated on finding the potential determinants
of FDI, which include labor cost, labor productivity, market size, natural resource intensity, external debt, political stability, quality of infrastructure, corruption practices, tax rates, openness, inflation, real effective exchange rate and many more. Using different techniques, researchers have estimated the significance of various determinants which have direct or indirect influence on the decision to invest in a country. Mixed evidence has been attained on a variety of determinants of FDI in various studies that have been carried out over the world. Some determinants have been significant for one country but not for the others. On the same lines, determinants have shown varied evidence when checked for significance over different regions of the globe.

From an investor’s point of view, some country risks are specific to an economy and need to be tactfully handled. Firms when trying to trim down the impact of these risks think of investment alternatives. This is done in order to amplify their returns and keep them consistent. One of the alternatives available to firms is to invest abroad in the shape of FDI. This helps the investing firms to diversify their risk and a country-specific shock may, then, prove insignificant because of being balanced out by a favorable opportunity in another economy. This, being the motive behind investing in other countries, stabilizes the risk and return relationship in the long-run. The eclectic paradigm\[1\] (Dunning, 1980) considers three variables (locational advantages, internalizational advantages and ownership advantages) in an effort to explain why different firms (MNCs) engage in foreign investment activities. In light of the aforementioned advantages of FDI, this study justifies its significance by providing an empirical analysis of the determinants of the FDI.

This paper investigates the relationship and significance of nine potential determinants of FDI in ten OECD member nations. The practices that are undertaken in developed and established economies are of vast significance to the economies that are in transition stages. FDI remains a significant explorable area for developing economies in order to boost up their growth capabilities and development. Through this study, variables that have strong impact on FDI for the ten relatively stronger economies are identified. Similar strategies may be adopted by emerging and developing countries in order to boost up their FDI, so that they can also enjoy the benefits of FDI in the short- and long-run.

2. Literature review
FDI has a lot of significant outcomes for the host country. It enhances capital, improves work environment and conditions, develops industries, creates jobs, develops new skills, introduces new techniques, brings innovation, etc. (Caves, 1974; Haddad and Harrison, 1993; Perez, 1997; Markusen and Venables, 1999).

Internalization theory (Buckley and Casson, 1976) demonstrates the idea that the multinational enterprises (MNE) manage/organize activities internally in order to build up firm-specific advantages. Firms indulge in internalization when the external market is imperfect or it is costly to produce through external sources. Rugman (1981) extended the internalization theory and also presented the idea that FDI takes place when the benefits of FDI exceed the incurred costs.

The eclectic paradigm\[2\] (Dunning, 1980) provides an insight into the advantages that FDI has. Dunning (1980) discusses three sets of advantages that the firms have: locational advantages, internalizational advantages and ownership advantages.
Locational advantages relate to the country-specific advantages that the firm gains when investing abroad. These advantages may include low labor costs, a productive labor force, tax benefits, low tax rates, sound institutionalization and quality of infrastructure, etc. Internalizational advantages relate to the production kind of activities undertaken by the firm itself rather than licensing them to another party. Ownership advantages may include firm’s superiority over its competitors in terms of marketing practices or on the technological front.

Shatz and Venables (2000) mention two primary reasons to invest abroad: horizontal and vertical FDI. Horizontal (or market seeking) FDI is to serve the local market, whereas vertical (or efficiency seeking) FDI is to get low cost inputs. Artige and Nicolini (2005) identified the determinants of FDI for different European regions and found that the factors, on which FDI relied, varied from one region to the other.

FDI enhances economic growth significantly. Borensztein et al. (1998) and Li and Liu (2005) found significant positive relationship between FDI and growth, not only directly but also through its interaction with human capital. This signifies the importance of FDI in the development of the economy and also emphasizes the role of human capital as a mediator in the relationship between FDI and economic growth. De Mello (1999) studied the positive effects of FDI on the host country’s economic growth for samples of developing and developed countries. According to their analysis, in the long-run, this growth is dependent on the knowledge imparted from the investing country to the host country and the technology spillovers. Kemeny (2010) also established that FDI inflows put forth a positive influence on the technological upgrading, although the effect is conditioned by the host country’s social capability and income. So, the importance of FDI in knowledge transfer and the enhancement of skills of the host economy amplifies the significance of the FDI and its relevance in the policy formation. Similarly, Choe (2003) found bi-directional causality between economic growth and FDI using a sample of 80 countries. On the contrary, some studies have found no significant relationship between FDI and economic growth (Ericsson and Irandoust, 2001).

Dar et al. (2004) investigated the causality relationship between FDI, economic growth and various other determinants including unemployment, exchange rate, political stability, etc. for Pakistan. Through their analysis, they attained two-way causalities between most of the variables with theoretically anticipated relationships. Wong and Tang (2011) examined the relationship between inward FDI and employment (in manufacturing and services sector) in Singapore. They found long-run causality evidence running from employment to FDI inflows. This shows that the political environment of the host country, unemployment and exchange rate also cause the decision-making process regarding investment in an economy.

Investment conditions influence FDI decisions. Root and Ahmed (1979) and Schneider and Frey (1985) found, in their analysis of developing economies, that FDI is significantly affected by political instability. In the analysis of US firms’ data, Wheeler and Mody (1992) found that corruptive practices in the host country do not, significantly, impact the foreign investment decision. Wei (2000) found opposite results by getting a significant relationship between corruption and FDI. Rodrik (1996) identified government policy distortions, income growth and population as the three significant variables affecting FDI outflow decisions of the USA in 40 different countries.
during 1982-1989. Lahrèche-Révil (2006) found that high tax rates have negative impact on FDI inflows in a country. Kucera (2001) examined the relationship between manufacturing wage costs and FDI for a sample of 127 countries using cross-sectional analysis. The results were more on the expected side, with more stable environments attracting larger FDI.

Cushman (1985) provides a firm-level model related to their international investment indicating the relevance of trade, exchange rate and other financing options provided. The empirical analysis indicates an increase in FDI for an increase in the home currency. Hatem (1997), in a survey of MNC’s managers and international experts, identified rankings of 13 key FDI criteria; on a scale of 0 (not important) to 5 (very important). Political and social stability, quality of labor and labor costs ranked fourth, fifth and ninth in the survey, respectively.

Treviño and Mixon (2004) studied strategic factors affecting FDI decisions by MNE for seven Latin American countries over a period of 1988-1999. They presented the view that in order to enhance the foreign investment inflow into the country, increase prominence must be placed on institutional reforms. Also MNEs should invest in countries where institutional distance between home and host country environments is not wide.

Bende-Nabende and Ford (1998) worked on the locational determinants of FDI in the short- and the long-run. They categorized their analysis into cost-related, investment environment improving and various other macroeconomic factors. They concluded that the European investment, in the short-run, responded to the macroeconomic factors in Thailand’s manufacturing sector; whereas in the long-run, it depended mostly on the investment environment improving factors.

In his work on the effect of market size on the FDI in manufacturing sector, Resmini (2000) found that the Central and Eastern European countries with larger populations catch the attention of more investors and induce higher FDI than the countries having smaller populations.

Froot and Stein (1991) studied the effect the exchange rate valuation on FDI. They concluded that, within an inadequate capital market model, the host countries with weaker currencies attract more FDI because of depreciation effects which make the asset of the home country more expensive than the ones in the host country. Klein and Rosengren (1994) also confirmed, for samples of US FDI, that exchange rate depreciation have a positive impact on FDI. Some studies have also found insignificant results for the relationship between exchange rate and FDI inflows (Bayoumi and Lipworth, 1998; Kiyota and Urata, 2004). Balasubramanyam et al. (1996) found that FDI impacted more strongly in countries having export promotion policies rather than the ones having import substitution policies.

Infrastructure also plays an essential role in the decision related to FDI in a country. Coughlin et al. (1991) identified a positive relation between a wide-spread transportation infrastructure and FDI. For a sample of Chinese regions, Cheng and Kwan (2000) also found similar results. Wheeler and Mody (1992), however, discriminated the relationship between FDI and infrastructure quality. They concluded that infrastructure quality mattered for developing countries seeking investment from the USA, whereas it was relatively insignificant for developed countries because of already available developed-infrastructures.
3. Methodology and data

3.1 Data
Annual time-series cross-sectional (panel) data has been used in this study for a period of 1985-2009. The countries[3] under study are Australia, Belgium, Canada, France, Italy, Japan, Norway, Spain, the UK and the USA. Potential determinants of FDI incorporated into the analysis of this paper include market size, labor cost[4], labor productivity[5], corporate tax rate, trade openness[6], political stability, real effective exchange rate, inflation and quality of infrastructure. Data for FDI, market size (GDP per capita), trade openness, real effective exchange rate, inflation and quality of infrastructure (proxied by telephone lines per 100 people) was obtained from the World Bank’s World Development Indicators (WDI) online portal; whereas the data for labor cost and labor productivity was acquired from OECD Statistics Portal[7]. Political stability and corporate tax rate data was obtained from Polity IV and KPMG’s Corporate Tax Rate Surveys[8] respectively. Descriptive statistics for the variables are reported in Table I.

3.2 Methodology
Panel fixed effects (FE) model[9] is estimated for the panel of countries under study and significant determinants of FDI are identified. The specification equation is as follows:

\[ \text{FDI} = \alpha + \beta_1(\text{Market Size}) + \beta_2(\text{Labor Cost}) + \beta_3(\text{Labor Productivity}) \\
+ \beta_4(\text{Corporate Tax Rate}) + \beta_5(\text{Trade Openness}) \\
+ \beta_6(\text{Political Stability}) + \beta_7(\text{Real Effective Exchange Rate}) \\
+ \beta_8(\text{Inflation}) + \beta_9(\text{Quality of Infrastructure}) + \varepsilon_t \]  

Co-integration tests are run for these significant variables and are checked for causality (short- and long-run) with FDI using error correction mechanism (ECM). As a pre-requisite for co-integration, panel unit root tests[10] are conducted to check if the series under consideration are I(1). Co-integration[11] is checked using the following specification[12]:

\[ \text{FDI}_{xt} = \alpha_x + \delta_t + \beta_x \text{Size}_{xt} + \gamma_x \text{LCost}_{xt} + \lambda_x \text{Infra}_{xt} + \eta_xt \]  

\[ \text{Size}_{xt} = \alpha_x + \delta_t + \beta_x \text{FDI}_{xt} + \gamma_x \text{LCost}_{xt} + \lambda_x \text{Infra}_{xt} + \mu_xt \]  

\[ \text{LCost}_{xt} = \alpha_x + \delta_t + \beta_x \text{FDI}_{xt} + \gamma_x \text{Size}_{xt} + \lambda_x \text{Infra}_{xt} + \nu_xt \]  

\[ \text{Infra}_{xt} = \alpha_x + \delta_t + \beta_x \text{FDI}_{xt} + \gamma_x \text{Size}_{xt} + \lambda_x \text{LCost}_{xt} + \rho_xt \]  

<table>
<thead>
<tr>
<th>Variables</th>
<th>Obs.</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign direct investment (FDI)</td>
<td>250</td>
<td>2.934</td>
<td>7.514</td>
<td>-8.248</td>
<td>92.499</td>
</tr>
<tr>
<td>Market size (Size)</td>
<td>250</td>
<td>10.028</td>
<td>0.328</td>
<td>9.128</td>
<td>10.643</td>
</tr>
<tr>
<td>Labor cost (LCost)</td>
<td>250</td>
<td>4.458</td>
<td>0.209</td>
<td>3.734</td>
<td>4.879</td>
</tr>
<tr>
<td>Labor productivity (LProd)</td>
<td>250</td>
<td>4.158</td>
<td>1.596</td>
<td>2.701</td>
<td>8.492</td>
</tr>
<tr>
<td>Corporate tax rate (Tax)</td>
<td>250</td>
<td>3.639</td>
<td>0.179</td>
<td>3.332</td>
<td>4.057</td>
</tr>
<tr>
<td>Trade openness (Open)</td>
<td>250</td>
<td>3.869</td>
<td>0.539</td>
<td>2.773</td>
<td>5.139</td>
</tr>
<tr>
<td>Political stability (Pol)</td>
<td>250</td>
<td>9.824</td>
<td>0.475</td>
<td>8.000</td>
<td>10.000</td>
</tr>
<tr>
<td>Real effective exchange rate (REER)</td>
<td>250</td>
<td>4.578</td>
<td>0.098</td>
<td>4.334</td>
<td>4.914</td>
</tr>
<tr>
<td>Inflation (Inflat)</td>
<td>250</td>
<td>2.907</td>
<td>2.005</td>
<td>-1.347</td>
<td>9.476</td>
</tr>
<tr>
<td>Quality of infrastructure (Infra)</td>
<td>250</td>
<td>3.865</td>
<td>0.186</td>
<td>3.191</td>
<td>4.223</td>
</tr>
</tbody>
</table>

Table I. Descriptive statistics
where:

- $FDI_{xt}$, $Size_{xt}$, $LCost_{xt}$ and $Infra_{xt}$ represent foreign direct investment, market size, labor cost and quality of infrastructure respectively.

- $x$ represents the countries in the panel.

- $t$ represents the time period.

- $\alpha_x$ represents the country-specific effects.

- $\delta_t$ represents the deterministic time trends.

- $\eta_{xt}$, $\mu_{xt}$, $v_{xt}$ and $\rho_{xt}$ are the estimated residuals from equations (2) to (5) respectively.

Panel co-integration tests, if showing co-integration evidence, are followed by the short and long causality determination using error correction technique. Residuals from equations (2) to (5) are calculated and entered in an error correction model (on the right side of the equation) specified[12] as:

\[
\Delta FDI_{x,t} = \alpha_{1x} + \sum_{l=1}^{h} \delta_{11x,t} \Delta FDI_{x,t-l} + \sum_{l=1}^{h} \delta_{12x,t} \Delta Size_{x,t-l} + \sum_{l=1}^{h} \delta_{13x,t} \Delta LCost_{x,t-l} \\
+ \sum_{l=1}^{h} \delta_{14x,t} \Delta Infra_{x,t-l} + \gamma_{1x} \eta_{x,t-1} + \theta_{1x,t}
\]

\[
\Delta Size_{x,t} = \alpha_{2x} + \sum_{l=1}^{h} \delta_{21x,t} \Delta FDI_{x,t-l} + \sum_{l=1}^{h} \delta_{22x,t} \Delta Size_{x,t-l} + \sum_{l=1}^{h} \delta_{23x,t} \Delta LCost_{x,t-l} \\
+ \sum_{l=1}^{h} \delta_{24x,t} \Delta Infra_{x,t-l} + \gamma_{2x} \mu_{x,t-1} + \theta_{2x,t}
\]

\[
\Delta LCost_{x,t} = \alpha_{3x} + \sum_{l=1}^{h} \delta_{31x,t} \Delta FDI_{x,t-l} + \sum_{l=1}^{h} \delta_{32x,t} \Delta Size_{x,t-l} + \sum_{l=1}^{h} \delta_{33x,t} \Delta LCost_{x,t-l} \\
+ \sum_{l=1}^{h} \delta_{34x,t} \Delta Infra_{x,t-l} + \gamma_{3x} v_{x,t-1} + \theta_{3x,t}
\]

\[
\Delta Infra_{x,t} = \alpha_{4x} + \sum_{l=1}^{h} \delta_{41x,t} \Delta FDI_{x,t-l} + \sum_{l=1}^{h} \delta_{42x,t} \Delta Size_{x,t-l} + \sum_{l=1}^{h} \delta_{43x,t} \Delta LCost_{x,t-l} \\
+ \sum_{l=1}^{h} \delta_{44x,t} \Delta Infra_{x,t-l} + \gamma_{4x} \rho_{x,t-1} + \theta_{4x,t}
\]
where:

- \( \Delta \) the difference operator.
- \( FDI_{x,t}, \text{Size}_{x,t}, \text{LCost}_{x,t} \) and \( \text{Infra}_{x,t} \) foreign direct investment, market size, labor cost and quality of infrastructure respectively, for country \( x \) at time \( t \).
- \( \theta \) the serially uncorrelated error term with zero mean.
- \( \gamma_x \) the adjustment speed and \( k \) represents the lag length.

Long-run causality between the variables is checked by the significance of the error correction terms for equations (6)-(9). For short-term causality, significance of the coefficients of explanatory terms is checked. To determine strong causality, joint tests are applied on the four equations for the coefficients of explanatory and the respective error correction terms.

### 4. Empirical results and discussion

#### 4.1 Panel FE estimation results

FE regression is run for the panel of countries under study to check for those determinants of FDI that yield significant coefficients. The estimation results are reported in Table II.

The results indicate that market size (Size), labor cost (LCost) and quality of infrastructure (Infra) yielded significant coefficients for their relationships with FDI. This shows that the size of the market, labor costs prevailing in the country and the quality of infrastructure in the country influence the investors’ decision regarding their investment decision. Relevance of market size and infrastructure in the FDI decisions is consistent with the findings of Resmini (2000) and Joseph and Arromdee (1991) respectively. The results of this study contradict the findings of Wheeler and Mody (1992) who argued that quality of infrastructure is insignificant for developed countries.

<table>
<thead>
<tr>
<th>Variables</th>
<th>( \beta(i) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>22.61 (1.88)*</td>
</tr>
<tr>
<td>LCost</td>
<td>-6.99 (-2.23)**</td>
</tr>
<tr>
<td>LProd</td>
<td>-0.98 (-0.09)</td>
</tr>
<tr>
<td>Tax</td>
<td>5.09 (1.02)</td>
</tr>
<tr>
<td>Open</td>
<td>-5.11 (-0.88)</td>
</tr>
<tr>
<td>Pol</td>
<td>-1.64 (-1.19)</td>
</tr>
<tr>
<td>REER</td>
<td>-11.53 (-1.56)</td>
</tr>
<tr>
<td>Inflat</td>
<td>0.58 (1.6)</td>
</tr>
<tr>
<td>Infra</td>
<td>12.67 (2.65)**</td>
</tr>
<tr>
<td>Constant</td>
<td>-168.97 (-1.85)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.38</td>
</tr>
<tr>
<td>Durbin-Watson stat.</td>
<td>1.3</td>
</tr>
</tbody>
</table>

**Notes:** Significant at: *10, **5 and ***1 percent levels; FDI is the dependent variable; FE model was specified based on Hausman test.

Table II. Panel FE model estimates
The negative coefficient of labor costs indicates that reduced labor costs contribute towards enhanced FDI into the economy. This impact of labor costs on FDI is consistent with the findings of Kucera (2001). Unlike Schneider and Frey (1985), we do not find any significant relationship between political stability and FDI. Similarly, our analysis did not find significant impact of tax rates on FDI inflows in the country as found by Lahre`che-Re´ vil (2006) or the impact of exchange rate on FDI inflows as indicated by Klein and Rosengren (1994). Our result for the insignificance of relationship between exchange rate and FDI is consistent with the findings of Bayoumi and Lipworth (1998) and Kiyota and Urata (2004).

Based on these results, the variables with significant coefficients (Size, LCost and Infra) were tested for causality relationship with FDI in the short- and long-run.

4.2 Unit root tests
The results of the panel unit root tests conducted for the four variables (FDI, Size, LCost and Infra) are presented in Table III.

All the variables for the panel are non-stationary at level. Therefore, all the variables are first differenced and then again checked for stationarity. The results of the four tests indicate that all the variables are stationary at $I(1)$ or in other words, integrated of order one.

4.3 Co-integration test
The results of Pedroni (2004) and Kao (1999) co-integration tests are reported in Tables IV and V.

From the two tables, it is clear that the null hypothesis of no integration between the variables can be rejected against the alternative hypothesis of the presence

<table>
<thead>
<tr>
<th>Variables</th>
<th>Levin, Lin and Chu</th>
<th>Im, Pesaran and Shin</th>
<th>Fisher-ADF</th>
<th>Fisher-PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>$FDI$</td>
<td>-1.09</td>
<td>-1.64</td>
<td>-0.21</td>
<td>-1.23</td>
</tr>
<tr>
<td>$Size$</td>
<td>5.64</td>
<td>3.79</td>
<td>4.08</td>
<td>4.84</td>
</tr>
<tr>
<td>$LCost$</td>
<td>-1.93*</td>
<td>1.23</td>
<td>1.34</td>
<td>0.74</td>
</tr>
<tr>
<td>$Infra$</td>
<td>2.41</td>
<td>7.33</td>
<td>7.01</td>
<td>9.20</td>
</tr>
<tr>
<td>$\Delta FDI$</td>
<td>-1.96*</td>
<td>-10.77**</td>
<td>-9.58**</td>
<td>-15.96**</td>
</tr>
<tr>
<td>$\Delta Size$</td>
<td>-5.01**</td>
<td>-4.83**</td>
<td>-4.04**</td>
<td>-3.51**</td>
</tr>
<tr>
<td>$\Delta LCost$</td>
<td>-1.73*</td>
<td>-2.70**</td>
<td>-2.83**</td>
<td>-2.85**</td>
</tr>
<tr>
<td>$\Delta Infra$</td>
<td>-4.82**</td>
<td>-5.47**</td>
<td>-4.74**</td>
<td>-5.77**</td>
</tr>
</tbody>
</table>

Table III. Panel unit root test results  
**Note:** Significant at: *5 and **1 percent levels

<table>
<thead>
<tr>
<th>Trend</th>
<th>Panel v</th>
<th>Panel $\rho$</th>
<th>Panel PP</th>
<th>Panel ADF</th>
<th>Group $\rho$</th>
<th>Group PP</th>
<th>Group ADF</th>
</tr>
</thead>
<tbody>
<tr>
<td>No deterministic trend</td>
<td>0.06</td>
<td>-0.62</td>
<td>-3.79***</td>
<td>-4.73***</td>
<td>-0.25</td>
<td>-7.74***</td>
<td>-6.66***</td>
</tr>
<tr>
<td>Deterministic intercept and trend</td>
<td>-1.84*</td>
<td>1.48</td>
<td>-3.16***</td>
<td>-6.42***</td>
<td>1.72*</td>
<td>-6.97***</td>
<td>-7.92***</td>
</tr>
</tbody>
</table>

Table IV. Pedroni panel co-integration test results  
**Notes:** Significant at: *10, **5 and ***1 percent levels; FDI is the dependent variable
of co-integrating relationship between the variables. This indicates the expected presence of Granger causality between the variables.

4.4 Causality testing
Short- and long-term causalities are determined using ECM. Table VI presents the results of causality analysis for the panel of countries under study for equations (6)-(9).

For equation (6), there is no evidence of short-run causality relationship between the variables. However, the significance of the long-run ECT coefficient indicates that for the convergece of FDI from equilibrium position, the four variables interact to re-establish the equilibrium status. The strong form causality indicates significant statistics for the three variables (market size, labor costs and quality of infrastructure) causing FDI; indicating the short-run adjustments of the three variables for long-run deviation of FDI from equilibrium following a shock to the system. From the evidence obtained as a result of the causality estimation from equation (6), it is clear that market size, labor costs and quality of infrastructure all relate to the FDI in the OECD countries. Also, if FDI deviates from the equilibrium position due to some sort of shock to the system, countries with greater market size, low labor costs and improved quality of infrastructure will re-establish their positions more quickly.

Labor costs and quality of infrastructure cause market size in the short-run for equation (7). Strong form causality evidence reports the presence of causality for the two of the explanatory variables (labor cost and quality of infrastructure) causing market size. This indicates that labor costs and quality of infrastructure bear the burden of short-run adjustment following a shock to the system.

For equation (8), market size and quality of infrastructure cause labor costs in the short-run. There is also evidence of long-run relationship between the four variables. Strong form of causality indicates the presence of causality relationship for market size and quality of infrastructure impacting labor costs. This means that enhanced market size and better infrastructure yield to reduced labor costs and in case of shock to the

<table>
<thead>
<tr>
<th>ADF test statistics</th>
<th>Table V. Kao panel co-integration test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_0$: no co-integration</td>
<td>$-4.90^*$</td>
</tr>
<tr>
<td>Notes: Significant at: *1 percent level; FDI is the dependent variable</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of causation (independent variables)</th>
<th>Table VI. Panel causality test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Short-run</td>
</tr>
<tr>
<td></td>
<td>$\Delta FDI$</td>
</tr>
<tr>
<td>$\Delta FDI$</td>
<td>0.12</td>
</tr>
<tr>
<td>$\Delta Size$</td>
<td>0.24</td>
</tr>
<tr>
<td>$\Delta LCost$</td>
<td>0.0001</td>
</tr>
<tr>
<td>$\Delta Infra$</td>
<td>0.84</td>
</tr>
<tr>
<td>Notes: Significant at: *10, **5 and ***1 percent levels; $^a$ECT represents the coefficient of the error correction terms; Wald $F$-statistics are reported</td>
<td></td>
</tr>
</tbody>
</table>
system impacting labor costs, countries with greater market size and better infrastructure adjust quickly. No causality evidence is obtained in the case of equation (9).

5. Conclusion
The purpose of this study was to get an insight into the potential determinants of FDI for a panel of ten OECD member countries. These countries include Australia, Belgium, Canada, France, Italy, Japan, Norway, Spain, the UK and the USA. For a list of nine potential determinants having significance in prior literature, panel FE regression is run in order to search for the variables that significantly contributed to the FDI. After the determination of significant factors for the panel of countries, these variables were tested for Granger causality with FDI.

Our FE estimation indicate that market size, labor cost and quality of infrastructure yield significant coefficients in relation to FDI for the panel of countries under study. These significant variables were then tested for causality relationship with FDI, both in the short- and long-run.

A bi-directional short-run relationship is estimated between market size and labor costs in the short-run; whereas quality of infrastructure causes market size and labor costs in the short-run. In the long-run, the estimates for FDI and labor costs yield significant coefficients indicating the interaction of the four variables in case of a shock to the system resulting in the deviation of FDI and labor costs from equilibrium positions. Also for the long-run deviation of FDI from equilibrium, market size, labor costs and quality of infrastructure all bear the joint burden in the short-run to re-establish the equilibrium.

Our research findings have a number of policy implications for the OECD countries in specific and other developed economies in general. Labor costs seem to affect the FDI decision on the part of investors; therefore, the countries with low labor costs are preferred by investors in order to reduce the cost of their business and products. Policies should be devised to reduce the labor costs and improve the quality of infrastructure in the country in order to attract more FDI into the economy and for quick adjustment purposes in case of shock to the system.

Future research directions include a panel data analysis over a wide range of countries to identify significant determinants of FDI. Also, variables like natural resource intensity and market integration may also turn up to be significant determinants of FDI.

Notes
1. The main motive behind the eclectic theory was to avoid the drawbacks and potential defects in various isolated theories of international economies; and to provide a cohesive approach in this regard.
2. Also known as the OLI model.
3. Countries were selected keeping in mind the availability of data for the countries.
5. Labour productivity growth in the total economy.
6. Openness = (Imports + Exports)/GDP.
7. www.stats.oecd.org
8. For corporate tax rate data ranging from 1985 to 1992, we used data from the book The Indirect Side of Direct Investment – Multinational Company Finance and Taxation (Mintz and Weichenrieder, 2010).
9. Fixed effects model was used on the basis of the results of Hausman test.

10. Levin et al. (2002) and Im et al. (2003) are performed. As additional checks, Fisher – ADF and Fisher – PP tests proposed by Maddala and Wu (1999) are also performed.

11. Pedroni (2004) co-integration test is used, which allows for the variation of co-integration vector across different panel sections. Kao (1999) panel co-integration test is also performed for robustness purposes.

12. We include market size, labor costs and quality of infrastructure in the specification because these three variables emerged as significant variables in the FE estimation.

References


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