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TOWARDS TO NEW ILLUSTRATION OF RESOURCE CURSE: FDI CHANNEL EMPIRICAL EVIDENCE FROM GULF COOPERATION COUNCIL (GCC) COUNTRIES

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Abstract

This paper extends a high influential contribution by Poelhekke and Van der Ploeg (2013), on the new mechanism of natural resource curse which is FDI. Using panel data of FDI inflows (aggregate and disaggregate) for six oil dependent countries (GCC) during a period 1980-2013; our main findings are as follows. First, total FDI is negatively correlated with natural resources measured by oil prices constant 2000 in the long run and short term. This negative impact ranged between 0.21% and 0.41% if oil prices changed by one percent increase. Secondly, FDI in resource sector falls by around 0.44-0.47%, but non-resource FDI increased by about 0.21-0.29% when the interaction term between oil revenues and initial oil prices (1980) increases by 1%. These results are robust even after including other FDI determinants.

Keywords: FDI, Oil Prices, Natural Resource Curse, GCC Region, Panel Data

JEL: F21 Q35 Q33 C23 F13

1. Introduction

Since the pioneering work of Sachs and Warner (1995, 2001)the so-called Resource curse thesis, referring to the negative association between natural resources abundance and economic performance, has attracted significant attention. Endowment with natural resources seems to be a curse rather than a blessing for many countries.

A flood of studies has investigated the possible transmission channels of the harmful impact of the natural resources on economic growth. Among these explanations are Dutch disease (Corden and Neary, 1982), political regimes (Caselli and Michaels, 2009), social factors (Hodler, 2006), commodity price volatility (van der Ploeg and Poelhekke, 2009)and institutional quality (Mehlum *et al.* 2006a; 2006b).

This article investigates the main question that natural resources curse FDI in the Gulf Cooperation Council (GCC) countries. It contributes to this strand of literature, analysing FDI as the possible channel of the resource curse. Recent literature has observed that some resource abundant countries attract less FDI than resource-poor countries (Poelhekke and Van der Ploeg, 2010; 2013). Figure 1, illustrates the potential of the thesis. It graphs the trend of FDI-GDP ratio for two main groups, rich –resource countries (OPEC) and poor-resource countries (OECD). The graph shows that during 34 years, non-resource countries attract more FDI and outpace resource abundant countries, FDI as a share of GDP to resource-poor countries was two times

bigger than resource endowed states. These studies also noted that FDI inflows to resource-abundant countries concentrated on resource sectors such as oil, diamonds, gas or gold. Investing in these industries could generate unbalanced development in the host countries and tends not to create positive spill-over because these sectors are highly volatile in the prices which put host country in the risk. A more specific case is GCC countries, in Qatar resource FDI constitutes for more than 65% of total FDI, and FDI in there source sector in Saudi Arabia stands at about 70% of total FDI.

Our article is also related to the debate on the effect of natural resources and FDI volume and compensation. Since the seminal work of Poelhekke and van der Ploeg (2010; 2013) very few literature consider this additional channel (FDI) of the resource curse. For instance, (Asiedu, 2013) argues that natural resources can deter FDI inflows even after controlling for institutional quality. Asiedu (2013) justifies this adverse relationship as resource price fluctuations impact, which makes foreign capital to go to the non-resource sector, but this sector is less competitive in oil countries like GCC region. Therefore, FDI inflows decreased.

We contribute to this ongoing debate by emphasizing on the potential negative impact of natural resources on FDI in GCC countries (Oil-dependent countries) and analyse the possible mechanism of this adverse associating utilizing from the unique dataset. To the best of our knowledge, this article is among first studies that investigate the mechanism of FDI-natural resources curse using macro-level data for IFDI inflows and natural resources. Also, it is the first article discusses this issue in GCC countries.

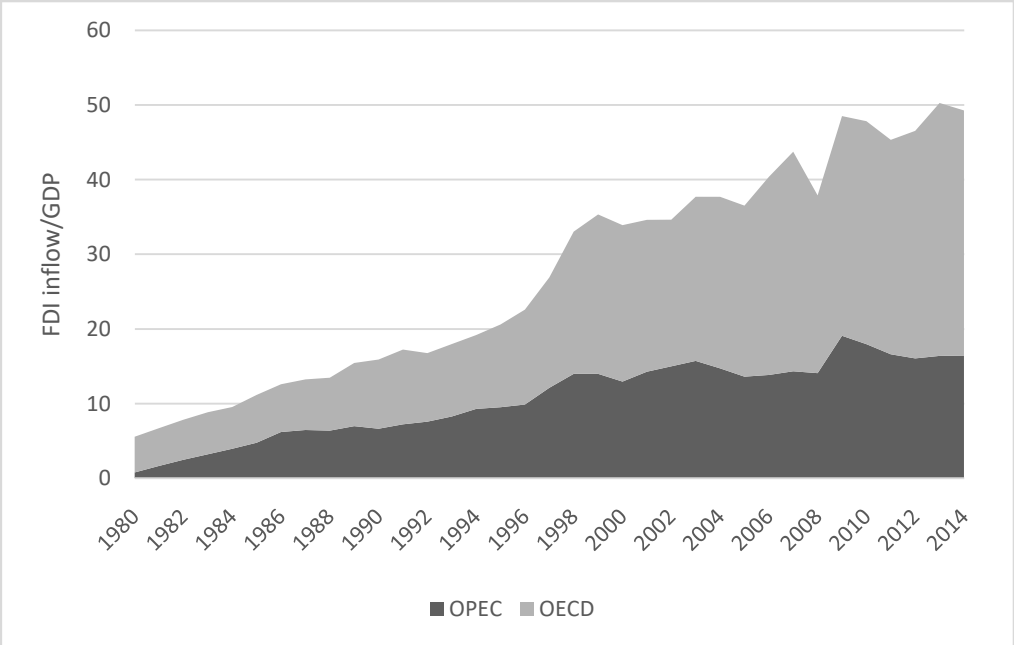

Figure 1. FDI inflows to Rich-Resource and Poor Resource Countries (1980-2014)
Source: Author's work based on UNCTAD data

2. Theoretical Determinants of Resource and Non-Resource FDI

Depending on Heckscher-Ohlin model, resource abundant economies attract FDI to resource sector but deter nonresource FDI. Our theoretical model starts from Poelhekke and van der Ploeg (2010) as follows:

Let us assume that there is three sectors of production in the economy: tradable, non-tradable and natural resource sector, and their production function are as follows:

Tradable given by:

$$Y^T=f(K^T,L^T) \quad (1)$$

Non-tradable given by:

$$Y^N=L^N \quad (2)$$

and Natural Resources given by:

$$Y^R=G(K^R,R) \quad (3)$$

Where: $K^T, L^T, L^N, K^R and\ R$ indicate capital and labour in traded goods production, labour in non-traded goods production, capital and subsoil assets used in natural resources production respectively. It is assumed that the production functions F and G exhibit constant returns. Also, prices of natural resources and traded goods, respectively, $q^* and p, w$ is the wage rate and interest rate is denoted by r^*. The interest rate and natural resource prices are based on world markets. Capital used in the traded and resources sectors is imported and can be considered as FDI.

Profit maximization with respected to labour needs: $p = w$ and marginal productivity of labour in the traded sector = the cost of labour. This means demand for labour is decreasing function of wage.

$$L^T = K^T \emptyset(p), \emptyset < 0. \quad (4)$$

Profit maximization with respect to capital required: Marginal productivity of capital in the traded sector = interest rate

$$F_k\big(1, \emptyset(p)\big) = r^* \quad (5)$$

and

$$q^* G_k(K^R, R) = r^* \quad (6)$$

This shows that capital in the resource sector decreases with the world interest rate and increases with world resources prices.

$$K^R = R\varphi(q^*/r^*), \ \ \varphi > 0 \quad (7)$$

Resource production is a proportion of resource abundance and a rise in the world prices of natural resources, that is:

$$Y^R = RG(\varphi(q^*/r^*),1) \quad (8)$$

Market clearing:

$$L = L^N + L^T \quad (9)$$

National income:

$$Y = F(1, \emptyset^*)K^T + p^*(L - \emptyset^* K^T) + q^* G(\varphi((q^*/r^*)R \equiv Y(R^+, L^+, \ {K^T}^+, {p^*}^+, {q^*}^+) \quad (10)$$

Where $Y_R = \frac{q^* Y^R}{R}$, $Y_L = p^*$, $Y_{K^T} = r^*$, $Y_{p^*} = L^N$ and Y_{q^*}=Y^R

Partial derivation:

$$Y_R = \frac{q^* Y^R}{R} > 0\,, Y_L = p^* > 0,\ Y_{K^T} = r^* > 0,\quad Y_{p^*} = L^N > 0, \text{and } Y_{q^*} = Y^R > 0$$

Expenditure function:

$$E(p), E^{'} > 0 \tag{11}$$

Tradable and non-tradable market equilibrium:

$$Y(R, L, K^T, p^*, q^*) = \mathrm{E}(p^*)u + r^*[K^T + \varphi(q^*/r^*)R] \tag{12}$$

$$Y(R, L, K^T, p^*, q^*) = \mathrm{E}(p^*)u \tag{13}$$

Where u is real consumption (Utility), E($p^*)u$ total consumer expenditure. Total differentiation of equations (57) and (58):

$$\mathrm{E}(p^*)du = p^* dL + (1 - \alpha^R) q^* Y^R \left[\frac{dR}{R} + \frac{dp^*}{q^*}\right] + [1 - \frac{\varepsilon^{YR}}{\alpha^R}]\, r^* K^R \frac{dq^*}{q^*} \tag{14}$$

$$\Rightarrow \quad U = U[R^+, L^+, q^{*+}]$$

$$\emptyset^* dK^T = (1 - \theta) dL - \frac{\theta}{p^*}(1 - \alpha^R) \left[\frac{dR}{R} + \frac{dp^*}{q^*}\right] + [1 - \frac{\varepsilon^{YR}}{\alpha^R}]\, r^* K^R \frac{dq^*}{q^*} \tag{15}$$

$$\Rightarrow \quad K^T = K^T[R^+, L^+, q^{*(-)}]$$

Where $0 < \theta \equiv \frac{p^* E^{'}}{E} < 1 : shareofnon - tradedgoodsinconsumption.\ 0 < \alpha^* \equiv \frac{r^* K^R}{q^* Y^R} < 1$: shar of capital in resource production. $\varepsilon^{YR} \equiv \frac{\varphi^{'} R}{Y^R} > 0$: the supply elasticity of natural resources output, the demand of capital in the resource sector is more elastic than resource output.

Equation (14) shows that a greater abundance of natural resources or labour (big $q^* RorL$) increases real consumption, especially if the share of capital and rents are high in resource sector and non-traded sector in consumption is high.

From equation (15), it can be seen that more labour supply attracts more non-resource FDI. Since resource production requires more labour force, more labour attracts more resource FDI. This labour force determines FDI as a result of abundance of labour rather than market potential.

Equations from (7) to (15) show that a higher value of natural resources attracts resource FDI, but deters non-resource FDI. More resources leads to reallocation of resources from the non-tradable sector to tradable sector. In addition, equation (59) indicates that high world prices of natural resources induce resource FDI.

2.1. Econometric Specification

This article estimates two different models. Departing from the impact of natural resources on aggregate FDI as follows:

$$FDI_{i,t} = \alpha_0 + \alpha_1 Nat_{i,t} + \alpha_2 q_{i,t} + \alpha_3 L_{i,t} + \alpha_4 X_{i,t} + \varepsilon_{i,t} \tag{16}$$

Then, this study adopts the Poelhekke and van der Ploeg (2010) model which suggests an econometric model for resources FDI and non-resource FDI as follows:

$$FDIR_{i,t} = \alpha_5 + \alpha_6 Nat_{i,t} + \alpha_7 q_{i,t} + \alpha_8 L_{i,t} + \alpha_9 X_{i,t} + \varepsilon_{i,t} \tag{17}$$

$$FDIN_{i,t}=\beta_0+\beta_1 Nat_{i,t}+\beta_2 q_{i,t}+\beta_3 L_{i,t}+\beta_4 X_{i,t}+\varepsilon_{i,t} \quad (18)$$

Where: $FDIR_{i,t}$, $FDIN_{i,t}$ are resource FDI and non-resource FDI respectively coming to country i at time t. $Nat_{i,t}$ refers to natural resource revenues of country i at time t, $q_{i,t}$ are world natural resources prices, $L_{i,t}$ is the labour force of country i at time t, $X_{i,t}$ indicates the vector of other variables in country i at time t (income per capita, institutional quality and trade openness) and $\varepsilon_{i,t}$ are errors terms of resource FDI and non-resource FDI.

The null hypothesis is that the effect of natural resources $\alpha_1 > 0$, and $|\alpha_6| < |\beta_1|$. These parameters reflect crowding out effect of FDI in resources sector.

3. Method of Analysis and Data

In the standard literature, the ratio of FDI to GDP is mostly used as a proxy of FDI (Dependent variable). Our independent variables are constrained by the availability of data. For instance, data for taxes, real wages are not available in developing countries, in particular, GCC countries. This may explain the scarcity of studies in this area.

To test the validity of FDI-Natural resources curse, this study focus on two main variables: FDI and natural resources, also consider some control variables. Our empirical analyses utilize panel data of 6 oil-dependent developing countries over the period 1980-2013. The descriptive statistics of the variables are reported in Table 1.

For natural resource proxy, we employ Oil prices constant 2000. It is worth mentioning that a high/low Oil-GDP/GDP ratio and Oilrents/GDP ratio indicates to thehigh/low diversification of the country. We hypothesize a negative relationship between natural resources and aggregate FDI. This argument based mainly on the puzzle of the source curse.

Our hypothesis relies on the idea that resource boom tends to make an appreciation of country's currency, as a result of that, non-tradable exports will be less competitive, by this means resource sector crowds out non-resource sectors regarding FDI (Poelhekke and Ploeg 2010;2013). Also, natural resources, especially, oil is more fluctuated which makes the country more vulnerable to external shocks. At the end of the day, FDI flies from oil sector to non-resource sector, but this non-resource sector is less competitive in the world market. This can be an additional channel of the source curse.

Firstly, we depart from analysing natural resource and total FDI relationship using Panel correction standard error(PCSE) because our sample is long panel data(T=34 greater than N=6). Hence, this method is more suited than POLS (Cameron and Trivedi 2010), We then apply fixed effects model (FE). The second part analyses the possible mechanism of crowding out using a unique dataset for FDI in resource and non-resource sector; these data have been collected from fdi intelligence. Table 1 reports descriptive statistics of used variables.

Table 1. Descriptive statistics

Variables	N	Mean	Standard Deviation
LogFDI	203	-2.77	1.63
Log trade openness	204	-0.34	1.73
Log oil price constant 2000	204	3.56	0.55
Inflation	204	2.77	3.50
LogLabour Force	204	6.82	1.12
Log GDPPERCAPITA	204	10.03	0.57
Corruption perception index	178	3.45	0.55
Political instability	178	2.68	1.64

4. Empirical Results

4.1. FDI and Natural Resources: Determinants of Aggregate FDI

After checking the stationarity of each variable using different panel unit root test[1]. Table (2) reports the results of a regression of FDI on natural resource proxy. The coefficient of natural resources (Oil prices)is negatively correlated with FDI inflows to GCC countries and these results also statistically significant.

Table (2) indicates to the adverse association between FDI and oil prices. FDI-GDP ratio decreased by 0.41% when oil prices increased by one percent at the level of 10%.

Furthermore, we find that usual determinant of FDI such as Labour Force and trade openness significantly attract FDI inflows while corruption and political stability in the host country deter it. High level of corruption mitigates the FDI inflows to GCC countries by 1%. This resulted continent with previous literature. In the same way, high political instability will depress foreign capital to GCC countries.

Additionally, the above results are confirmed when we use the fixed effects model. Because the Hausman test[2] strongly rejects (at 1%) the null hypothesis of an efficient of random effects model, we apply fixed effects model. This model also reduces potential omitted variables bias; mitigates the potential of multicollinearity by centring variables and helps to control for the unobserved with-in country (Bhattarai, 2015; Perez-Sebastian and Raveh, 2015).

Table 2. The impact of natural resources on FDI inflows in GCC countries (1980-2013)

Long run: log (FDI/GDP)	**PCSE**	**F.E**
Log(oil prices $ constant 2000)	**-0.413***	**-0.397****
	(0.224)	**(0.197)**
Inflation rate	-0.00863	-0.0283*
	(0.0198)	(0.0150)
Log(GDP Per Capita constant 2005)	-0.268*	1.545**
	(0.146)	(0.245)
Log (trade openess)	0.612***	0.659**
	(0.0719)	(0.140)
Log(labour Force)	0.604***	1.095***
	(0.113)	(0.188)
Political instability	-0.173**	-0.0276
	(0.0837)	(0.0553)
Corruption perception index	-1.074***	-0.0287
	(0.208)	(0.105)
Constant	-70.32*	-22.21**
	(36.88)	(2.701)
R-square	0.492	0.671
observarions	178	178
Short run: ∆log (FDI/GDP)		
∆Log(oil prices $ constant 2000)		**-0.637*****
		(0.124)
∆Inflation rate		-0.00963
		(0.00904)
∆Log(GDP Per Capita constant		-0.885***
2005)		(0.143)
∆Log (trade openness)		0.885***
		(0.0618)
∆Log(Labour Force)		1.418***
		(0.0951)
Constant		-0.0011
		(0.279)
R-square		0.622
observations		195

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

[1] See Appendix C.
[2] For more details see Bhattarai (2016).

Table 3. The impact of natural resources on FDI using instrumental variable estimator, annual data

Variables: Log(FDI/GDP)	Log(oil-prices $ constant 2000) Instrumental-variables estimator	Log(oil-prices $ constant 2000) Five years interval F.E	Log(oil-prices $ constant 2000) Five years interval GMM(One- step)	Log(oil-prices $ constant 2000) Five years interval GMM(two-steps)
Log(oil-prices $ constant 2000)	**-0.430** (0.198)**	**-0.78*** (0.236)**	**-0.79*** (0.302)**	**-0.82*** **
Log(GDP per capita constan 2005)	1.539*** (0.247)	0.80*** (0.484)	0.805*** (0.789)	2.23
Log (trade openness)	0.648*** (0.141)	0.94*** (0.237)	0. 79*** (0.307)	0.386
Log (Labour Force)	1.074*** (0.189)	1.32*** (0.203)	1.30*** (0.261)	1.806***
Political instability	-0.0335 (0.0556)			
Corruption perception index	-0.0543 (0.105)			
Constant	-23.42*** (2.817)	-16.78*** (4.99)		
R-squared (within)	0.65	0.29		
R-squared (Overall)	0.10			
Observations	172	42	36	36
Number of N	6	6	6	6
Number of instruments			34	34
AR(1) P-value		0.135	0.97	
AR(2) P-value			0.33	

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. We average the data within 5 years interval in order toapply GMM method.

Fixed effect results for FDI and natural resources are reported in Table 2. The coefficient for oil prices (2000 constant) indicating that a high dependence on natural resources reduces the firm's investment to the host country (GCC) in the long run, and short run. We find that FDI responses negatively to oil prices by 6.37%, 3.9% in the short term and long term respectively. However, labour force, trade opens and the economy size are facilitating foreign investment.

It is worth noting that these estimates could be biased by endogeneity. Using output-based measures (Oil-GDP) could be potentially endogenous; this motivates us to use the price-based measurement in the baseline specification. Thus, we adopted the instrumental variables (IV) approach and instrument it with the lagged oil prices (oil prices) $_{t-1}$ because it is exogenous. Its exogeneity can be clarified as follows; first, mineral rents in developing countries are usually extracted by foreign corporations bringing their production factors and technology which make resource rents are relatively independent of unobserved development. Second, the lagged value is arguably more exogenous in the following period (Acemoglu *et al.* 2005; Asiedu, 2013; Perez-Sebastian and Raveh, 2015). Results are reported in Table 3. They confirm that there is a negative and significant association between the natural resource and FDI. From the table, we can see that any volatility in oil prices will deter FDI inflows to GCC countries by -0.43% remaining other variables constant.

GMM approach is more appropriate to micro level data with somecross-sectional (N) larger than the time (T) (Ali, 2015; Huang and Temple, 2005) this may cause some problems in Macro-level data where T greater than N (Roodman, 2009). In order to overcome this problem, data can be averaged overThree, Five, ten time period like in (Acemoglu *et al.*2005; Islam, 1995). This technique mitigates the effect of measurement error, simplifies the specification of the dynamics of the model, and the estimation is not likely driven by co-movements at a very

short horizon.It is also allows entering long time periods data into smaller time periods in the same holding down the number of instruments (Huang and Temple, 2005). Table 5 reports the results of 5 year period data. One can see that there is a significant negative relationship between natural resources and FDI aggregate, adverse effect ranged between 0.78 and 0.82.

4.2. FDI and Natural Resources: Determinant of Sector FDI

So far, our estimation results in section 4.1. suggest that natural resources abundance deters aggregate FDI to the GCC countries; this section goes further ahead and investigates the mechanism of how natural resources discourage FDI volume.

In this section, we try to estimate the impact of natural resources on different FDIs (Resource and non-resource sectors).

Table 4. FDI in resource and non-resource sectors in GCC (Fixed Effect Model)

Variables	FDINR	FDIR	FDINR	FDIR
Log (oil.Rev * oil price (1980))	**0.292*** (0.0805)**	**-0.441** (0.177)**	**0.211** (0.0856)**	**-0.470** (0.195)**
Log (GDP Per Capita)			0.625	-0.733
			(0.396)	(0.902)
Log (labour Force)			0.433**	0.177
			(0.190)	(0.433)
Constant	0.675	6.617***	-8.140*	12.98
	(0.699)	(1.538)	(4.636)	(10.57)
Observations	65	65	65	65
R-squared	0.185	0.097	0.259	0.119
Number of N	6	6	6	6

Note: Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table 5. FDI in resource and non-resource sectors in GCC (Instrumental Variable estimator)

Variables	FDI-NR	FDIR
Log(oil.Rev *oil prices(1980))	**0.138* (0.0786)**	**-0.400** (0.173)**
Log(trade openness)	0.371***	-0.487*
	(0.125)	(0.257)
Log labour force	0.162	0.459
	(0.171)	(0.354)
Log GDP Per Capita	0.282	-0.194
	(0.328)	(0.664)
Constant	-2.425	5.338
	(3.915)	(7.751)
Observations	65	65
Number of N	6	6

Note: Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

As it can be seen from Table 4 using fixed effect model, the results show a negative association between natural resources and FDI in resource sector while it is positively correlated with FDI in the non-resource sector. FDI resource sector shrank by 0.44% when oil revenues increased by 1%, but FDI in other sectors increased by 0.29%. In order to control for heterogeneity and mitigates the impact of endogeneity problem, we use instrumental variable estimation column 2 in Table 5 shows that one percent increase in natural resources revenues generates 40% drop in resource-FDI whereas one percent increase in natural resource

revenues leads to 13% increase in FDI in non-resources sector. These estimations are still valid even after controlling for quality of institutions, GDP per capita and trade of openness. Also, to give the estimations more robustness we apply GMM approach, and the results still hold.

This negative association between FDI in the resource sector and oil revenues can be attributed to the impact of oil price volatility. This fluctuation makes the country more vulnerable to external shocks. In the same time, the latter sector in GCC countries is less competitive in the world market which encourages foreign investors to go to other countries.

5. Conclusions

Can oil price booms reduce FDI inflows? In the light of resource curse thesis, one might suspect the answer. This paper provides empirical evidence indicating that oil prices boom tend to mitigate the multinational firms to invest in oil- biased economies.

Our panel estimation model for the determinants of aggregate FDI and determinants of resources FDI in GCC countries suggests a strong adverse effect of natural resources abundance measured by oil prices on total FDI inflows and resource-FDI which confirmed our main hypothesis “Natural resource-FDI curse.”

First, for GCC countries, aggregate foreign direct investment falls by between 0.39-0.41% in the long run and around 0.21-0.29% in the short run if oil prices increase by one percent. Second, a resource discovery causes around 0.44% and 0.47% drop in resources FDI,however, induces about 0.21-0.29% increase in the non-resource FDI. Our findings are robust even after inclusion other FDI determinants and controlling for endogeneity issue.

These results have an important implantation for countries in MENA region, many of these countries are in dire need of FDI (Ali, 2015) and their economies dominated by oil exports (Marotta and de Melo, 2012). It would be better for countries which looking for income diversification to take FDI policy that distributes FDI into different sectors. Future work would benefit from using resource price volatility to address the question of how price volatility impacts on FDI composition and causes crowding out effect.

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Appendix A: Definition of Variables and Data Sources

Variable	Source
FDI inflow stock	UNCTAD
Openness to trade	World Bank
Labour Force	UNCATD
Oil prices 2000	Ross, Michael L, 2013, "Oil and Gas Data, 1932-2011", http://hdl.handle.net/1902.1/20369, Harvard Dataverse, V2
GDP per capita constant 2005	UNCTAD
Inflation rate	World Bank
Corruption perception index	ICRG
Political instability	ICRG
Resource FDI	fDi intelligence, Financial times dataset
Non-resource FDI	fDiintelligence, Financial times dataset
FDI in primary sector	fDi intelligence, Financial times dataset
FDI in manufacturing sector	fDiintelligence, Financial times dataset
FDI in service sector	fDi intelligence, Financial times dataset

Appendix B: Panel Unit Root test

Variable	LLC	IPS	ADF	PP
∆log(FDI/GDP)	-1.76***	-5.61***	53.88***	117.37***
∆log(Oil-prices, 2000)	-7.18***	-7.28***	72.24***	125.88***
∆log(Trade openness)	-5.35***	-7.28***	71.20***	120.00***
∆log(Labour force)	-1.93***	-2.91***	28.30***	17.52***
∆log(GDP per capita)	-5.03***	-5.69***	57.43***	67.08***
∆Log(Political Instability)	-4.48***	-4.89***	46.68***	71.34***
∆Log(Corruption)	-5.57***	-4.10***	35.14***	66.20***

Note:** p<0.01, ** p<0.05, * p<0.1
Source: Eviews8 output

Appendix C: Panel Co-integration Test

Kao Residual Co-integration Test		
ADF	t-Statistic	Prob.
	-2.760492	0.0029

Notes: Sample: 1980 2013; Included observations: 204; Null Hypothesis: No co-integration; Trend assumption: No deterministic trend; User-specified lag length: 1; Newey-West automatic bandwidth selection and Bartlett kernel.

Johansen Fisher Panel Co-integration Test				
No. of CE(s)	**(from trace test)**	**Prob.**	**(from max-eigen test)**	**Prob.**
None	247.9	0.0000	121.6	0.0000
At most 1	154.2	0.0000	67.38	0.0000
At most 2	95.63	0.0000	38.19	0.0001
At most 3	64.09	0.0000	31.41	0.0017
At most 4	40.58	0.0001	24.48	0.0175
At most 5	27.57	0.0064	19.16	0.0847
At most 6	28.04	0.0055	28.04	0.0055

Note: *Probabilities are computed using asymptotic Chi-square distribution. Sample: 1980 2013 Included observations: 204 Trend assumption: Linear deterministic trend Lags interval (in first differences): 1 1 Unrestricted Co-integration Rank Test (Trace and Maximum Eigenvalue) Hypothesized, Fisher Stat.*, Fisher Stat.*

Kao Residual Co-integration Test		
ADF	t-Statistic	Prob.
	-1.744175	0.0406

Notes: Sample: 1980 2013; Included observations: 204; Null Hypothesis: No cointegration; Trend assumption: No deterministic trend; User-specified lag length: 1; Newey-West automatic bandwidth selection and Bartlett kernel

Johansen Fisher Panel Cointegration Test				
Hypothesized No. of CE(s)	**Fisher Stat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	270.2	0.0000	117.0	0.0000
At most 1	188.1	0.0000	71.26	0.0000
At most 2	128.3	0.0000	60.74	0.0000
At most 3	76.94	0.0000	46.38	0.0000
At most 4	40.49	0.0001	27.19	0.0072
At most 5	24.64	0.0166	17.42	0.1345
At most 6	24.92	0.0152	24.92	0.0152

Note:* Probabilities are computed using asymptotic Chi-square distribution. Sample: 1980 2013; Included observations: 204; Trend assumption: Linear deterministic trend; Lags interval (in first differences): 1 1; Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue).
Source: Eviews8, output