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Does FDI Stimulate or Crowd Out Domestic Investment in Saudi Arabia?

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Abstract
The relation between foreign direct investment (FDI) and domestic investment has been the center of debate among economists in recent years. The existing literature has so far been in disagreement about the impact of FDI on domestic investment in developing countries. Saudi Arabia has focused efforts on liberalizing and attracting foreign investment over the last two decades, but its consequential effect on economic development remains a fertile area of research. Using three distinct econometric models, this research analyzes whether FDI stimulates domestic investment in Saudi Arabia in a complementary way or exert a crowding out effect over time. The results suggest that FDI and domestic investment are cointegrated in the long run and that FDI drives out domestic investment in most cases. Since most FDI flows have been to the service sector, important policy implications are offered at the end for better harnessing of FDI benefits and minimization of negative consequences.
Keywords: FDI, Domestic Investment, Crowding out, Saudi Arabia

1. Introduction

The long-standing tradition in economic theory has underscored the importance of foreign direct investment (FDI) in filling the saving gap, especially in developing countries. In the Solow Growth Model and the following Convergence Paradigm, for example, FDI would flow from the capital-rich industrial countries (the 'North') to the capital-scare developing countries (the 'South') because of the differential rate of returns on capital between the two categories. Assuming free capital mobility, the high rate of return in developing countries attracts FDI and therefore increases capital accumulation and stimulates aggregate investment and promotes economic growth in the South.

According to this logic, the developing South would grow faster than the North, and the continuous accumulation of capital in the South increases the overall capital stock and therefore reduces the rate of return on capital over time. On the other hand, the reverse takes place in the North, thereby bringing about a convergence of the rates of return between the North and the South and a steady state of capital stock in both regions.

Following these conventions, many empirical studies have validated these claims, while many others have contradicted them especially regarding the interaction of FDI with domestic investment. This mixed evidence on whether FDI stimulates or crowds out domestic investment has raised concerns in developing economies and has suggested that this effect could be country-specific, region-specific, or even industry-specific, leaving generalization an invalid proposition.

This research investigates the underlying effect of FDI on domestic investment in Saudi Arabia. As an oil-based economy and the largest market in the Middle East and North Africa region (MENA), Saudi Arabia has received significant amounts of FDI inflows, especially in the last fifteen years. To the moment of writing this work, the interaction between FDI and domestic investment in Saudi Arabia remains an under-developed area of research, and analyzing those dynamics have become of great significance given the recent policy initiatives towards greater private sector participation, liberalization of foreign investment, and economic diversification. Understanding the effect of FDI on domestic investment is important in helping policy markers put the right mix of policies that warrant a positive contribution of FDI to economic development in Saudi Arabia.

The rest of the paper is organized as follows: part 2 briefly provides an overview of FDI flows and policies in Saudi Arabia over the analysis period. Part 3 reviews the literature on the effect of FDI on domestic investment. In Part 4, the methodology and the data used are outlined, and the results are presented and discussed in Part 5. The paper then concludes with important remarks and policy implications in the last part.

2. Historical accounting of FDI inflows to Saudi Arabia

Saudi Arabia's FDI law permits foreigners to invest in all sectors of the economy, except for specific activities outlined in a 'negative list', currently include 3 industrial sectors and 13 service sectors (US Dept. of State, 2014). According to the same source, the list includes real estate in the holy cities, some sectors in printing and publishing, audiovisual and media services, land transportation excluding inter-city transport by train, and upstream petroleum. However, the government encourages investment in health, education, life science, information and communication technology, energy, as well as in the four 'Economic Cities' that are at various stages of development.

Foreign direct investment in Saudi Arabia scored 1.18 percent of GDP on average between 1971 and 2016.

However, the pattern of FDI has witnessed some volatility especially during the early period of analysis 1971-1985 and the last decade 2005- 2016 (Figure 1). According to Jeddah Chamber of Commerce (2015), the sectors that have attracted the maximum FDI in Saudi Arabia are construction and contracting, real estate, petrochemicals, transport, and trade. This suggests that most FDI has flown to the service sector, contrary to the common belief that FDI is energy-related in Saudi Arabia.

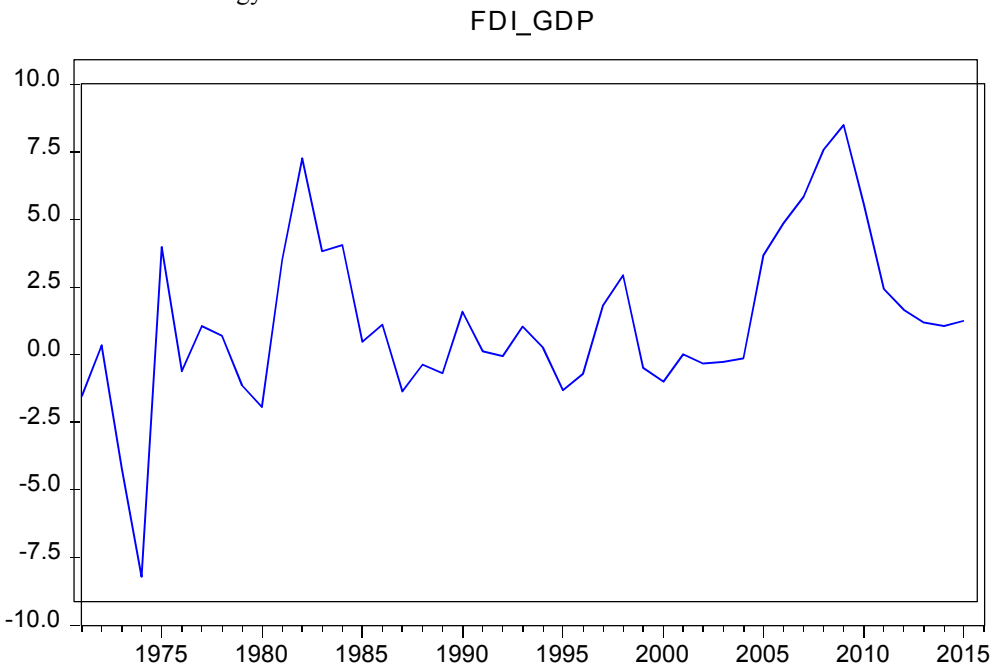

Figure 1: FDI as a percentage of GDP, 1971-2016

Generally, the US, Japan, France, Kuwait, and the UAE have been the home countries that contributed the most to FDI inflows to Saudi Arabia in recent years. The inflow of greenfield projects, however, has declined gradually (Jeddah Chamber of Commerce, 2015, JCC thereafter). While the real estate sector has attracted most FDI in greenfield projects in Saudi Arabia, the number of greenfield projects has decreased from 164 in 2011 to 87 during 2014 (JCC, 2015).

On account of the low prices in recent years, Saudi Arabia has opened its stock market to foreign investors in June 2015. However, the level of FDI has not increased significantly since then. For example, FDI as a percentage of GDP during 2013 was 1.19 percent, whereas in 2015 FDI inflows scored 1.27 percent. While the global economic conditions play a role in this pattern, the modest financial market development and perhaps uncertainty about government policies may be the prime reasons for the limited FDI flows to the stock market in Saudi Arabia since its liberalization.

3. Literature Review

The empirical literature on the relation of FDI to domestic investment has provided rather conflicting findings. Jude (2014) empirically test the hypothesis of FDI led capital accumulation in Central and Eastern European countries. More precisely, the author investigates the relationship between FDI and local investment, using a sample of 10 CEEC countries over the period 1990-2010. The findings indicate that FDI crowds out domestic investment, while the effect decreases with time. The results also indicate that greenfield FDI may develop long run complementaries with domestic investment, while mergers and acquisitions do not prove any significant effect on domestic investment.

Tien (2014) analyzes the dynamic interaction between domestic investment, foreign direct investment, export and exchange rate in Vietnam for the period 1985–2015. The author uses Johansen cointegration approach to examine the long run relationship and the Granger causality in the context of the vector error correction model. The empirical findings reveal that domestic investment growth and export growth directionally cause FDI inflows growth while the direction from FDI inflows towards investment growth and export growth is not identified in that study.

Acar, Eriş, And Tekçe (2013) examine the relationship between FDI and domestic investment in the MENA region for the post-1980 period through panel data analysis. The analysis shows that FDI crowds out domestic investment in the region as a whole as well as in the oil-poor and oil-rich countries of the MENA. The authors argue that the channels of this crowding out effect may be manifold. If FDI is directed to existing projects through privatization and does not create "new" investment, crowding out may occur. FDI may also

crowd out domestic investment when MNCs enter sectors previously dominated by state-owned firms, which is quite relevant for the case of MENA, according to the researchers.

Tan and Tang (2016) empirically analyze the linkages among domestic investment, foreign direct investment (FDI), trade, interest rate and economic growth in the ASEAN-5 regions during the period 1970-2012. The Johansen-Juselius cointegration approach is applied to examine the long-run relationship and the Granger causality approach is used to evaluate the causal linkages among the variables. The results confirm the existence of long-term causal links between domestic investment and FDI for the ASEAN-5. The researchers suggest that collaboration of domestic and foreign investors is essential as the development of domestic firms contributes to further participation by multinational investors and enhancement of economic growth.

Aboye (2014) tests the influence of FDI on domestic investment in Ethiopia. The research used a time series data between 1975-2014 periods and Vector Error Correction Model (VECM) approach. Accordingly, the result shows that FDI crowds out private domestic investment in Ethiopia, but has a crowding in effect on public investment investment in the long run. However, in the short run it has no effect in both investments.

Driffield and Hughes (2003) test the extent to which domestic investment is stimulated, or crowded out by inward foreign direct investment. The paper develops a model of domestic investment, based on standard models drawn from macroeconomics and industrial economics. The paper then goes on to show that at a general level, the 'development' or agglomeration hypothesis is confirmed that domestic investment is stimulated by inward investment. However, there is also evidence that in certain regions, inward investment has crowded out domestic investment.

Amighini, McMillan, and Sanfilippo (2017) investigate whether inward FDI can stimulate domestic investment in developing countries by introducing a novel measure of FDI, based on industry-level data. The authors assess the differential impact of FDI on domestic investment according to the activities performed by MNEs abroad as well as the source of FDI. The results suggest a positive impact of FDI on domestic investment, if MNEs effectively engage in productive activities that can exert spillovers to the host economies, compared to trade-related activities that instead tend to remain enclaves without linkages to the domestic economy. Moreover, the authors find evidence of a more beneficial impact of foreign investors from advanced economies.

Farla, Crombrugghe, and Verspagen (2013) study the relationship between FDI and domestic investment levels. The authors argue that some of the contradicted evidence in the literature may be explained by the use of poor proxies for the true underlying variables and by questionable methodological choices. They argue that by using more appropriate proxies and statistical models, they conclude that FDI inflows contribute positively to domestic investment levels.

Bardesi (2016) evaluates the impact of FDI inflows on the economy of Saudi Arabia in general, and on the manufacturing sector in particular over the period 1968 to 2014, by using Ordinary Least Squares (OLS) method. The results showed positive significant impacts, but limited, of FDI on the manufacturing sector in Saudi Arabia during that period.

Wang (2010) examines the impact of inward Foreign Direct Investment (FDI) on host countries' domestic investment. Utilizing data from 50 countries over the period of 1970 to 2004, the author finds that inward FDI has a negative contemporaneous effect on domestic investment, while the cumulative effect of FDI over time tends to be positive. In addition, he separately studies FDI in Developed Countries (DCs) and Less Developed Countries (LDCs). The effect of contemporaneous FDI on domestic investment is negative in DCs, and the cumulative effect of FDI is neutral. Strong evidence suggests that the contemporaneous effect of FDI on domestic investment is neutral in LDCs, while the cumulative effect of FDI is positive.

Kamaly (2014) addresses the issue whether FDI crowds out or stimulate domestic investment. Using data on 16 emerging countries over a 30-year period, the empirical model is estimated as a system of equations where each equation represents a country. This system of equations is estimated using 3SLS to account for both the existence of contemporaneous errors among individual country equations as well as the endogeneity of FDI. Results show that FDI has a positive and significant effect on domestic investment (DI) in most cases. In most countries included in the sample, FDI has a neutral long-term effect on domestic investment. Crowding in or crowding out effect of FDI on DI is only found in a few countries.

Hooi and Wah (2010) examine the impact of FDI and domestic investment (DI) on economic growth respectively and whether FDI crowds in or crowds out domestic investment in Malaysia. The results are as follows; First, FDI, DI and economic growth are cointegrated in the long run. Second, FDI has positive impact on economic growth while DI negatively affect economic growth in the long-run. Third, an increase of FDI will bring positive impact to DI. In other words, FDI crowds in DI and there appears to be complementary effect from FDI to DI. Forth, there is one way causal relationship from DI and economic growth to FDI respectively in the short-run.

Ivanović (2015) investigates how foreign direct investment (FDI) affects domestic investment in the Republic of Croatia. In the empirical part; domestic gross fixed capital formation, changes in domestic stocks, net FDI and GDP growth rate was used as variables. Quarterly time series data ranging from the Q1 2001 to Q4

2014 were processed with the subset VAR (vector autoregressive) econometric model. The results shows that FDI has a negative influence on domestic investment in the Republic of Croatia with time lag.

Tang, Selvanathan and Selvanathan (2008) investigate the causal link between foreign direct investment (FDI), domestic investment and economic growth in China for the period 1988-2003. Towards this purpose, a multivariate VAR system with error correction model (ECM) and the innovation accounting (variance decomposition and impulse response function analysis) techniques were used. The results show that while there is a bi-directional causality between domestic investment and economic growth, there is only a single-directional causality from FDI to domestic investment and to economic growth. Rather than crowding out domestic investment, FDI is found to be complementary with domestic investment. Thus, FDI has not only assisted in overcoming shortage of capital, it has also stimulated economic growth through complementing domestic investment in China, according to the authors.

Ndikumana and Verick (2007) analyze the two-way linkages between FDI and domestic investment in Sub-Saharan Africa. The results suggest that firstly, FDI crowds in domestic investment, and secondly, countries will gain much from measures aimed at improving the domestic investment climate. Moreover, there are alternatives to resource endowments as a means of attracting foreign investment to non-resource rich countries as the author contended.

4. Methodology and Data

This research uses Vector Error Correction Model (VECM), Vector Autoregressive (VAR) Regressions, and OLS to explore the effect of FDI inflows on domestic investment in Saudi Arabia. The data used in this work are from the World Development Indicators (WDI) and the Saudi Arabian Monetary Agency (SAMA) database. The data used range from 1970 -2016 and described in Table (A1) in the Appendix.

The descriptive statistics of the original data are presented in Table (A2) in the Appendix. Prior to undertaking the analysis, unit root test are performed in Table (A3). There, the variables are non-stationary at the level, but become stationary with first differencing of the data. As such, the variables are I(1). Therefore the data were transformed into their first-differencing form. In addition, the Johansen cointegration test is conducted and the results indicate there are 5 cointegrating equations (Table A4), with the lag length determined based on the Hannan-Quinn information criterion.

4.1 Vector Error Correction Model (VECM)

Given the cointegration in the data, a VECM model was run to assess the impulse response functions of domestic investment as a result of innovations in FDI and other factors. The VECM assumes integrating vectors in the data (e.g., FDI and domestic investment) where the dynamics of domestic investment are directly cointegrated with the dynamics of the determining factors. In the VECM, all variables are endogenous, and, provided there is cointegration, they correct in the long-run (i.e., converge to a regression line or relationship) from short term deviations. For example, if domestic investment and FDI are cointegrated, they do not deviate continually from their long-run relationship.

The equation of the VECM system is specified as follows:

$$x = \varphi(L)\, xt + x't\, \delta + \varepsilon t \qquad (1)$$

where x = (DIt t , DFDI t ,DPscrdt t , DIlend t, DTrade t , Dreer t), φ(L) is the coefficient matrices for lag operators L, and δ is the cointegrating vectors capturing the long-run relation among the variables in the system.

4.2 Vector Autoregressive Model (VAR)

The second model used to analyze the relationship between FDI and domestic investment is the vector autoregressive model (VAR), which is specified in the following way:

$$DIt = \alpha 1 + \sum_{s=1}^{n} \delta 1\, DI\ t-s + \sum_{s=1}^{n} \delta 2\, DGrth\, t-s + \sum_{s=1}^{n} \delta 3\, DFDI\ t-s + \sum_{s=1}^{n} \delta 4\, DPscrdt\ t-s + \sum_{s=1}^{n} \delta 5\, DIlend\ t-s + \sum_{s=1}^{n} \delta 6\, DTrade\ t-s + \sum_{s=1}^{n} \delta 7\, Dgov\, t-s + \sum_{s=1}^{n} \delta 8\, Dreer\, t-s + U\, t \qquad (2)$$

$$DFDI\ t = \alpha 2 + \sum_{s=1}^{n} \lambda 1\, DFDI\ t-s + \sum_{s=1}^{n} \lambda 2\, DGrth\, t-s + \sum_{s=1}^{n} \lambda 3\, DI\ t-s + \sum_{s=1}^{n} \lambda 4\, DPscrdt\ t-s + \sum_{s=1}^{n} \lambda 5\, DIlend\ t-s + \sum_{s=1}^{n} \lambda 6\, DTrade\ t-s + \sum_{s=1}^{n} \lambda 7\, Dgov\, t-s + \sum_{s=1}^{n} \lambda 8\, Dreer\, t-s + U\, t \qquad (3)$$

$$DPscrd\ t = \alpha 3 + \sum_{s=1}^{n} \pi 1 DPscrd\ \ t-s + \sum_{s=1}^{n} \pi 2\ DGrth\ t-s + \sum_{s=1}^{n} \pi 3\ DFDI\ t-s + \sum_{s=1}^{n} \pi 4\ DI\ \ t-s + \sum_{s=1}^{n} \pi 5\ DIlend\ \ t-s + \sum_{s=1}^{n} \pi 6\ DTrade\ \ t-s + \sum_{s=1}^{n} \pi 7\ Dgov\ t-s + \sum_{s=1}^{n} \delta\pi\ Dreer\ t-s + U\ t \quad (4)$$

$$DTrade\ t = \alpha 4 + \sum_{s=1}^{n} \mu 1\ DTrade\ t-s + \sum_{s=1}^{n} \mu 2\ DGrth\ t-s + \sum_{s=1}^{n} \mu 3\ DFDI\ t-s + \sum_{s=1}^{n} \mu 4\ DPscrdt\ \ t-s + \sum_{s=1}^{n} \mu 5\ DIlend\ \ t-s + \sum_{s=1}^{n} \mu 6\ DI\ \ t-s + \sum_{s=1}^{n} \mu 7\ Dgov\ t-s + \sum_{s=1}^{n} \mu 8\ Dreer\ t-s + U\ t \quad (5)$$

$$DIlend\ t = \alpha 5 + \sum_{s=1}^{n} \varphi 1\ DIlend\ t-s + \sum_{s=1}^{n} \varphi 2\ DGrth\ t-s + \sum_{s=1}^{n} \varphi 3\ DFDI\ t-s + \sum_{s=1}^{n} \varphi 4\ DPscrdt\ \ t-s + \sum_{s=1}^{n} \varphi 5\ DI\ \ t-s + \sum_{s=1}^{n} \varphi 6\ DTrade\ \ t-s + \sum_{s=1}^{n} \varphi 7\ Dgov\ t-s + \sum_{s=1}^{n} \varphi 8\ Dreer\ t-s + U\ t \quad (6)$$

$$Dgov\ t = \alpha 6 + \sum_{s=1}^{n} \theta 1\ Dgov\ \ t-s + \sum_{s=1}^{n} \theta 2\ DGrth\ t-s + \sum_{s=1}^{n} \theta 3\ DFDI\ t-s + \sum_{s=1}^{n} \theta 4\ DPscrdt\ \ t-s + \sum_{s=1}^{n} \theta 5\ DIlend\ \ t-s + \sum_{s=1}^{n} \theta 6\ DTrade\ \ t-s + \sum_{s=1}^{n} \theta 7\ DI\ t-s + \sum_{s=1}^{n} \theta 8\ Dreer\ t-s + U\ t \quad (7)$$

$$Dreer\ t = \alpha 7 + \sum_{s=1}^{n} \psi 1\ Dreer\ t-s + \sum_{s=1}^{n} \psi 2\ DGrth\ t-s + \sum_{s=1}^{n} \psi 3\ DFDI\ t-s + \sum_{s=1}^{n} \psi 4\ DPscrdt\ \ t-s + \sum_{s=1}^{n} \psi 5\ DIlend\ \ t-s + \sum_{s=1}^{n} \psi 6\ DTrade\ \ t-s + \sum_{s=1}^{n} \psi 7\ Dgov\ t-s + \sum_{s=1}^{n} \psi 8\ DI\ \ t-s + U\ t \quad (8)$$

$$DGrth\ t = \alpha 8 + \sum_{s=1}^{n} \Upsilon 1\ DGrth\ t-s + \sum_{s=1}^{n} \Upsilon 2\ DI\ \ t-s + \sum_{s=1}^{n} \Upsilon 3\ DFDI\ t-s + \sum_{s=1}^{n} \Upsilon 4\ DPscrdt\ \ t-s + \sum_{s=1}^{n} \Upsilon 5\ DIlend\ \ t-s + \sum_{s=1}^{n} \Upsilon 6\ DTrade\ \ t-s + \sum_{s=1}^{n} \Upsilon 7\ Dgov\ t-s + \sum_{s=1}^{n} \Upsilon 8\ Dreer\ t-s + U\ t \quad (9)$$

Where α1 – α8 are constants, and δ, λ, π, μ, ϕ, θ, ψ, $\boldsymbol{\Upsilon}$ are estimated parameters, Ut is the disturbance term, and the time series variables are first-differenced as follows:
DI = Domestic investment as percentage of GDP
DFDI= Foreign direct investment as percentage of GDP
DGrth= Growth rate of real GDP
DTrade= International Trade as percentage of GDP
Dpscdt= Private sector credit as percentage of GDP
Dilend= Lending interest rate in percentage
Dgov= Government spending as percentage of GDP
Dreer= Real effective exchange rate

4.3 Single Equation OLS Model

The third approach used in this research is single-equation OLS regressions relating domestic investment to a set of independent variables, including FDI, as follows:,

$$DI = \alpha + \beta \Delta xt + \varepsilon\ t \quad (10)$$

Where DI is the first difference of domestic investment as a percentage of GDP, x is a vector of independent time-varying variables, and ε is the error term. The full blown model is specified in the following way:

$$DI = \alpha + \beta\ DFDI + \pi\ Dilend + \delta\ Dgrth + \lambda\ DTrade + \mu\ DPscdt + \varphi\ Dgov + \phi\ Dreer \quad (11)$$

Where DI is domestic investment, DFDI is FDI, Dilend is the lending rate, Dgrth is the growth rate of GDP, DTrade is exports plus imports relative to GDP, DPsct is private sector credit,
Dgov is government spending, and Dreer is the real effective exchange rate.

5. Discussion of the Results

The 10-year accumulated responses of domestic investment to cholesky standard deviation of the variables using VECM analysis are presented in Figure (2). The impulse response of DI in Saudi Arabia to FDI shows a netural effect for the first three years following FDI shocks, but the impact turns negative thereafter for the remaining seven years. This suggests that FDI has a substitution effect on domestic investment rather than a complementary role, which means that FDI crowds out domestic investment in Saudi Arabia over the medium term following FDI innovations. This is indeed worrying since efforts in Saudi Arabia have been geared towards attracting and encouraging FDI, and this requires careful understanding of its economic implications.

The impulse response of the other factors in the VECM system show that shocks to private sector credit as well as international trade both stimulate domestic investment over the medium term following those shocks. The impact of the lending interest rate seems negligible and somewhat natural the first 3 years, only become slightly negative in the third year following interest rate innovations. Following that, it becomes positive until the 7th year when it turns again negative. The real effective exchange rate shows a negative impact on domestic investment throughout the analysis period. This suggests that a worsening of international competitiveness (higher values of the REER) discourages domestic investment in Saudi Arabia.

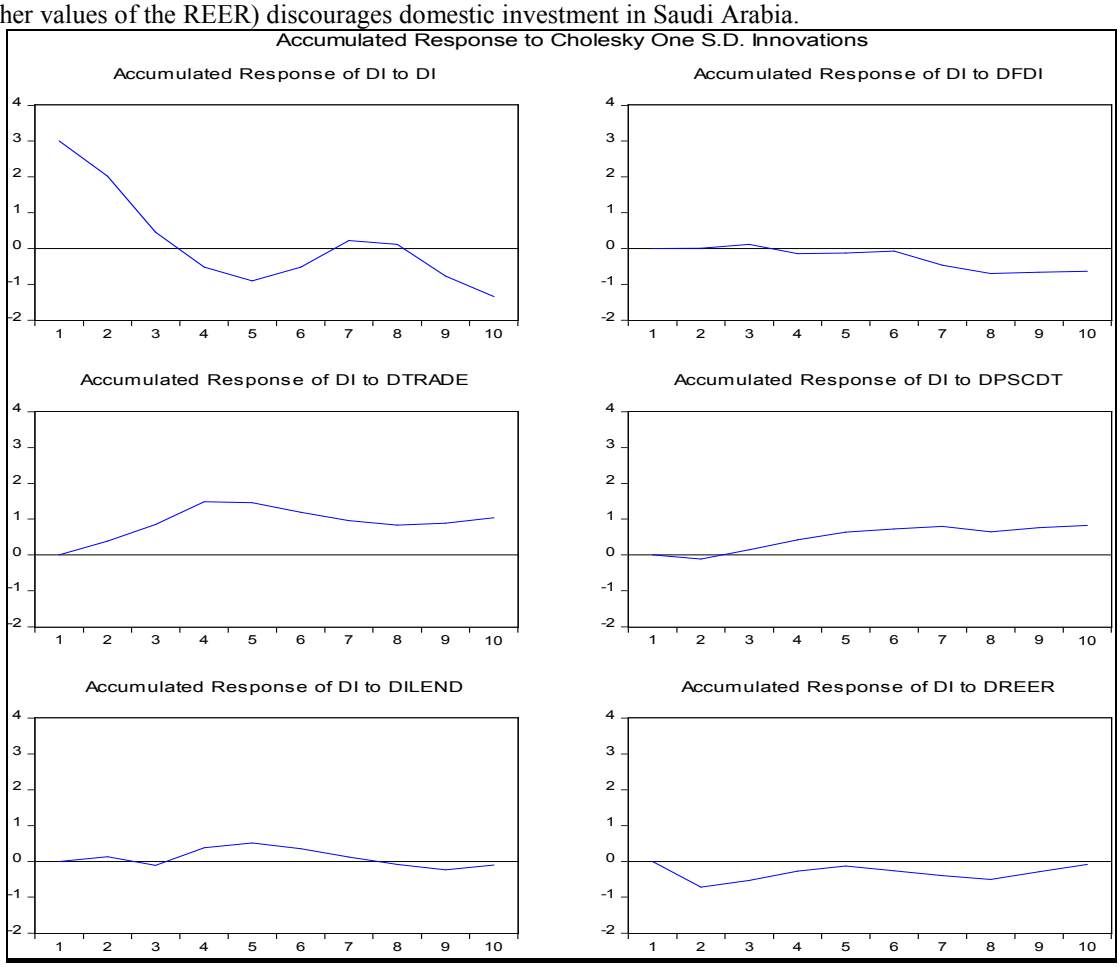

Figure 2: Impulse Responses of domestic investment to independent variables in the VECM

The second model used to evaluate the effect of FDI on domestic investment is the Vector Autoregressive (VAR) model (equations 2-9). The results of the accumulated impulse responses in the VAR system are presented in Figure 3. Quite evidently, FDI is shown to drive out domestic investment consistently and contemporaneously throughout the 10 year period following FDI shocks. This result confirms the findings of the VECM and adds yet further doubt regarding the role of FDI in relation to domestic investment.

The results of the other factors in the VAR system are mostly consistent with those of the VECM. The impulse responses of international trade and private sector credit show a positive effect on domestic investment consistently following the shocks of those variables. However, while the response of domestic investment to international trade diminishes over time, the response to private sector credit remains sustained throughout the 10-year period following the shock. The effect of the lending rate on domestic investment is negative until the 4th year following interest rate innovations. The finding on the REER indicate that a worsening of competiveness in Saudi Arabia reduces domestic investment starting from the 3rd year following the shock. However, the impacts of the REER and the lending rate are rather marginal compared to the other factors of the

system.

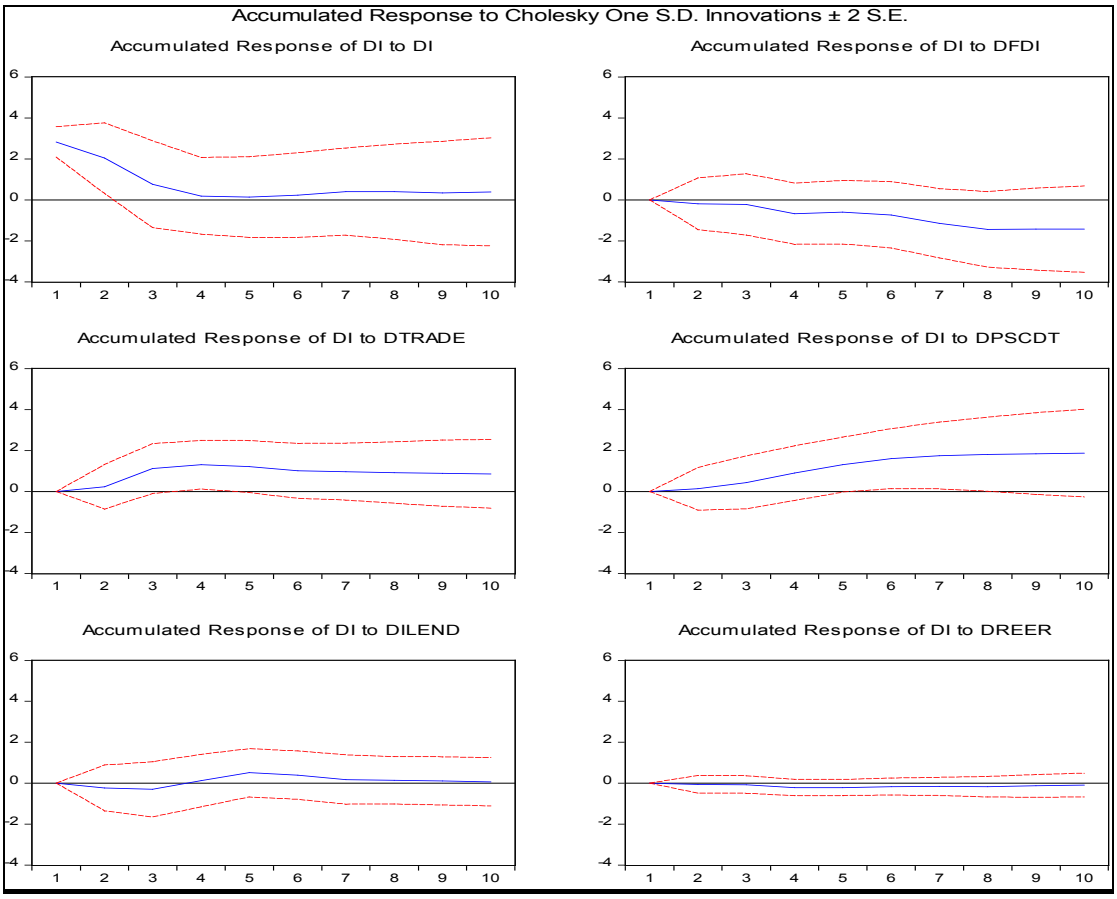

Figure 3: Impulse responses of investment to independent variables in the VAR model

The residuals of the VAR model are shown in Figure A2 and indicate an appropriate smoothness and distribution around zero.

The VAR model is also expanded to control for the influence of other factors (government spending and economic growth) on domestic investment. The results are consistently a crowding out effect of FDI. This result is found robust to alternative specifications. The impulse response of domestic investment to a shock in government spending is positive until the 4th year when it starts subsiding marginally. Economic growth shocks are shown to drive domestic investment positively especially over the medium term following the 3rd year.

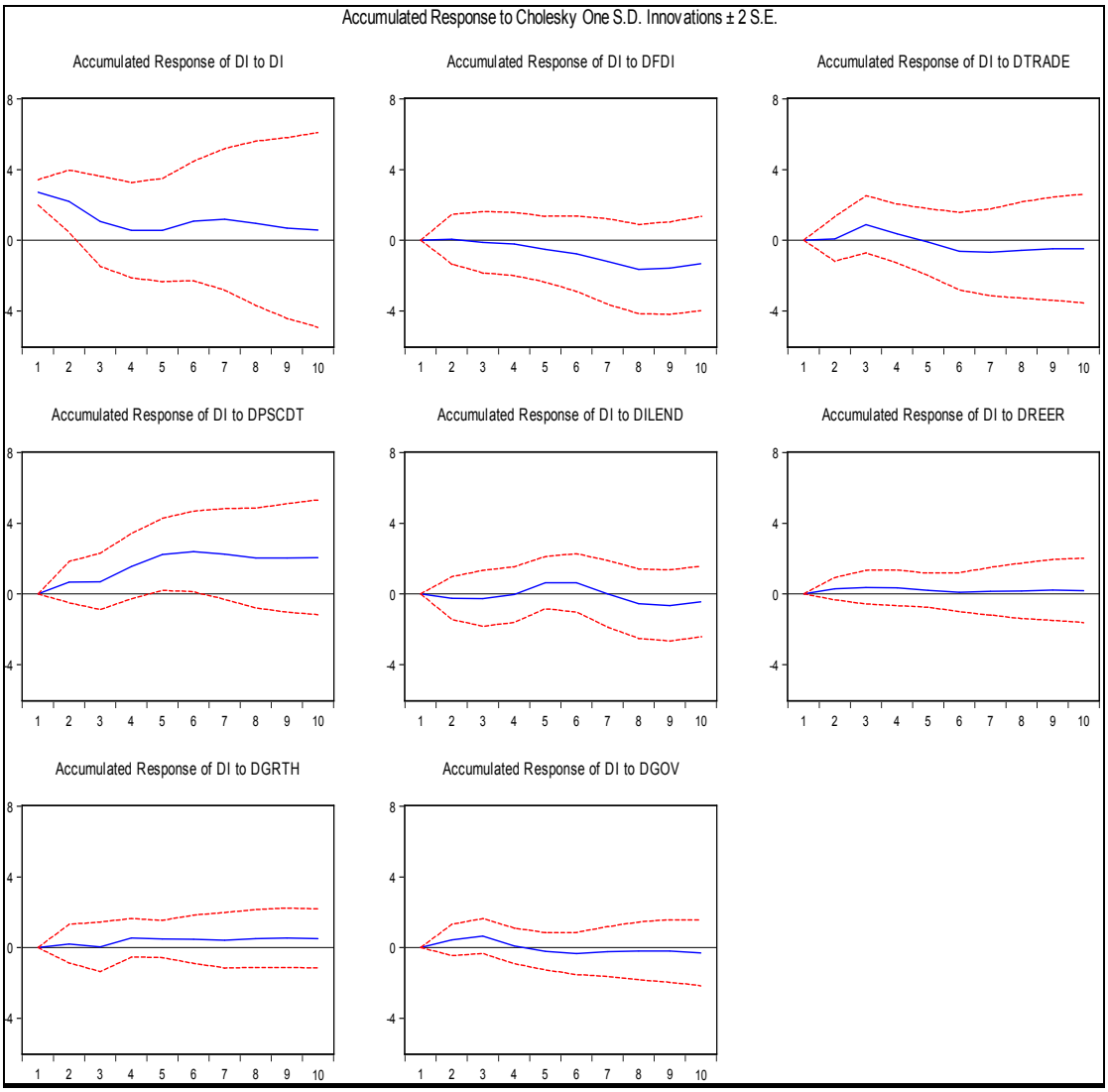

Figure 4: Impulse responses of investment to independent variables in the expanded VAR model

Lastly, OLS regressions are performed using first-differenced data (equation 11). Various regressions were performed to reach the benchmark regression with the best fit and predictability. To avoid heteroskedacitiy, the OLS regressions use White-consistent standard errors.

The results of the OLS regressions appear in Table 1. Seven different model specifications are used to reach robust results and relate them to the findings of the VECM and VAR models. In each of the model specifications, the appropriate diagnostic tests were conducted to ensure the validity of the estimates. These include Durbin Wastson (DW) test for serial correlation, F-wald (F) test for joint significance, and analysis of the residuals (RES). The regressions are then compared in terms of goodness of fit, DW, F, and RES.

Table (1): Single equation regressions
Dependent Variable: Domestic Investment

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-0.490 (0.382)	-0.493 (0.362)	0.116- (0.829)	0.452- (0.415)	0384 (0.465)	0.094- (0.848)	0.823- (0.185)
DFDI	0.280 (0.350)	0.278 (0.357)	-0.056 (0.863)	0.350 (0.238)	0.799 (0.035)*	0.511 (0.270)	0.405 (0.245)
Dilend	-0.732 (0.023)**	-0.733 (0.022)**		-0.684 (0.035)**	-0.638 (0.127)	-0439 (0.341)	-0.522 (0.141)
Dpscrdt	0.589 (0.002)***	0.592 (0.000)***	0.615 (0.000)***	0.554 (0.002)**		0.319 (0.036)**	0.596 (0.005)***
Dtrade	0.286 (0.059)*	0.287 (0.054)*	0.245 (0.113)	0.276 (0.056)*	0.101 (0.444)		0.271 (0.100)
Dgov	0.007 (0.965)		0.163 (0.456)	-0.001 (0.992)	0.228 (0.283)	0.024 (0.901)	0.027 (0.883)
Dgrth	0.788 (0.371)	0.078 (0.353)	0.053 (0.609)		-0.019 (0.865)	0.037 (0.660)	-0.012 (0.880)
Dreer	0.108 (0.027)**	0.108 (0.025)**	0.100 (0.038)**	0.096 (0.040)**	0.110 (0.044)**	0.100 (0.033)**	
Adjusted R2	0.49	0.51	0.35	0.49	0.24	0.31	0.37
DW	1.66	1.66	1.72	1.72	1.72	1.67	1.19
F-test	5.05	6.14	4.09	5.89	2.59	3.33	3.94
Obs.	31	31	35	31	31	31	31

Note. The symbols ***, **, * denote the significance at the levels 1, 5, and 10 percent, respectively. P-values appear in parentheses with White heteroscedasticity consistent standard errors.

In all the model specifications, FDI appear to have an insignificant effect on domestic investment, when controlling for other variables. This confirms doubts about the feasibility of existing FDI enterprises that have been engaged in trade and service activities. Regression 2 appear to outperform the other regressions in terms of properties and therefore is considered the benchmark model. There, as well as in other regressions, only four factors appear to drive domestic investment significantly; the lending rate, private sector credit, international trade and openness, as well as the real effective exchange rate. Of these factors, the lending rate appears to be the most significant factor affecting domestic investment followed by private sector credit. A one percent increase in the lending rate affect domestic investment negatively by 0.7 percent in the benchmark model, whereas a one percent increase in private sector credit leads to 0.59 percent increase in domestic investment.

The results also show that international trade increases domestic investment; a one percent increase in international trade translates into a 0.28 percent increase in domestic investment. Lastly, the real effective exchange rate is surprisingly positively associated with domestic investment here; a one percent increase in the REER leads to a 0.10 percent increase in investment. This finding is rather puzzling because the increase in REER implies worsening competitiveness (either stronger currency or higher relative domestic prices compared to international prices, or both). This result is inconsistent with those of the VECM and the VAR model, and therefore cannot be a reliable estimate.

The variables in the benchmark regression (2) explain more than 51 percent of the variation in domestic investment in Saudi Arabia, and the joint significance score is the highest compared to other regressions. The model passes the autocorrelation test and the residuals are shown to be smooth and reverting around zero.

6. Concluding remarks and policy implications

Saudi Arabia has consistently pursed liberalization policies to attract and promote FDI over the last two decades. Empirical studies provide mixed evidence on the relation between FDI and domestic investment, especially in developing countries. This research undertakes empirical analysis to evaluate the short run and medium term effect of FDI on domestic investment in Saudi Arabia.

Using three distinct empirical models, this work provides evidence supporting the crowding-out hypothesis of FDI against domestic investment, notwithstanding some cases where the impact of FDI was statistically insignificant. Since FDI to Saudi Arabia has flown mostly to the service sector, this suggests that FDI exert a substitution effect on domestic service providers. In particular, the sectors of construction and contracting, real estate, petrochemicals, transport, and trade are losing the competition over the years to foreign investors.

The results of this research prompt an immediate revision of FDI policies and an evaluation of existing foreign investments and their relation to economic development. In addition, there needs to be a fresh look at other countries experiences and how there were able to harness the benefits of FDI. As such, important new

policy measures are crucial to encourage productive FDI that engages in production, exportation, innovation, and technology transfer and employment creation domestically, thereby creating complementarities with domestic industries. This should provide a viable alternative to the existing trade related and service oriented FDI that currently drains domestic resources without adding any significant value to the domestic economy.

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Table A1: Description of the data used and the sources

Variable	Source of Data
Foreign direct investment, net inflows to Saudi Arabia in percentage of GDP – (DFDI)	World Development Indicators (WDI)
Gross fixed capital formation in percentage of GDP - (DI)	World Development Indicators (WDI)
Growth of real Gross Domestic Product - (Dgrth)	World Development Indicators (WDI)
Government spending in percentage of GDP - (Dgov)	World Development Indicators (WDI)
3-month interest rate (Dilend)	Saudi Arabian Monetary Agency (SAMA) Database
Real effective exchange rate index - (Dreer)	Saudi Arabian Monetary Agency (SAMA) Database
International Trade in percentage of GDP - (Dtrade)	World Development Indicators (WDI)
Domestic credit to the private sector in percentage of GDP - (Dpscdt)	World Development Indicators (WDI)

Table A2: Descriptive Statistics of the Variables

	FDI	GOV	GRTH	I	ILEND	PSCRDT	REER	TRADE
Mean	1.186745	23.85920	4.866667	23.65114	4.706061	21.78873	136.6944	78.05081
Median	0.692643	24.36155	5.000000	22.21516	4.910000	20.91362	121.5000	76.13822
Maximum	8.496352	35.22252	23.00000	36.28784	10.76000	56.63245	245.0000	120.6194
Minimum	-8.218787	8.431545	-10.00000	13.40517	0.690000	2.750595	94.00000	56.47418
Std. Dev.	3.058539	6.288541	6.920326	5.604148	2.948522	13.50055	48.50144	12.65136
Skewness	0.059912	-0.240785	0.633097	0.551308	0.135079	0.395236	1.455666	0.711643
Kurtosis	4.300301	2.613770	4.063922	2.382376	1.886582	2.425447	3.587195	4.047925
Jarque-Bera	3.197140	0.714530	5.128457	2.994795	1.804941	1.790546	13.23098	5.857289
Probability	0.202185	0.699587	0.076979	0.223712	0.405566	0.408496	0.001339	0.053469
Sum	53.40354	1073.664	219.0000	1064.301	155.3000	980.4929	4921.000	3512.286
Sum Sq. Dev.	411.6051	1740.013	2107.200	1381.885	278.2010	8019.654	82333.64	7042.507
Observations	45	45	45	45	33	45	36	45

Table A3: Unit Root Tests

Method	Statistic	Prob.**
ADF - Fisher Chi-square	34.6052	0.0045
ADF - Choi Z-stat	-2.10883	0.0175

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Intermediate ADF test results UNTITLED

Series	Prob.	Lag	Max Lag	Obs
FDI	0.0107	0	9	44
GOV	0.2741	0	9	44
I	0.1458	1	9	43
GRTH	0.0052	0	9	44
ILEND	0.4068	1	7	30
REER	0.1191	0	8	35
TRADE	0.2864	1	9	43
PSCRDT	0.9944	0	9	44

Method	Statistic	Prob.**
ADF - Fisher Chi-square	209.651	0.0000
ADF - Choi Z-stat	-12.3850	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Intermediate ADF test results D(UNTITLED)

Series	Prob.	Lag	Max Lag	Obs
D(FDI)	0.0000	0	9	43
D(GOV)	0.0000	0	9	43
D(I)	0.0001	1	9	42
D(GRTH)	0.0000	0	9	43
D(ILEND)	0.0004	3	6	27
D(REER)	0.0676	0	8	34
D(TRADE)	0.0000	0	9	43
D(PSCRDT)	0.0001	0	9	43

Table A4: Johansen cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.966115	305.2289	159.5297	0.0000
At most 1 *	0.870408	203.6855	125.6154	0.0000
At most 2 *	0.820781	142.3845	95.75366	0.0000
At most 3 *	0.743639	90.81009	69.81889	0.0004
At most 4 *	0.651709	49.97504	47.85613	0.0312
At most 5	0.326337	18.33354	29.79707	0.5415
At most 6	0.194264	6.482778	15.49471	0.6384
At most 7	9.34E-05	0.002801	3.841466	0.9552

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.966115	101.5434	52.36261	0.0000
At most 1 *	0.870408	61.30102	46.23142	0.0007
At most 2 *	0.820781	51.57440	40.07757	0.0017
At most 3 *	0.743639	40.83505	33.87687	0.0063
At most 4 *	0.651709	31.64150	27.58434	0.0142
At most 5	0.326337	11.85077	21.13162	0.5625
At most 6	0.194264	6.479977	14.26460	0.5524
At most 7	9.34E-05	0.002801	3.841466	0.9552

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

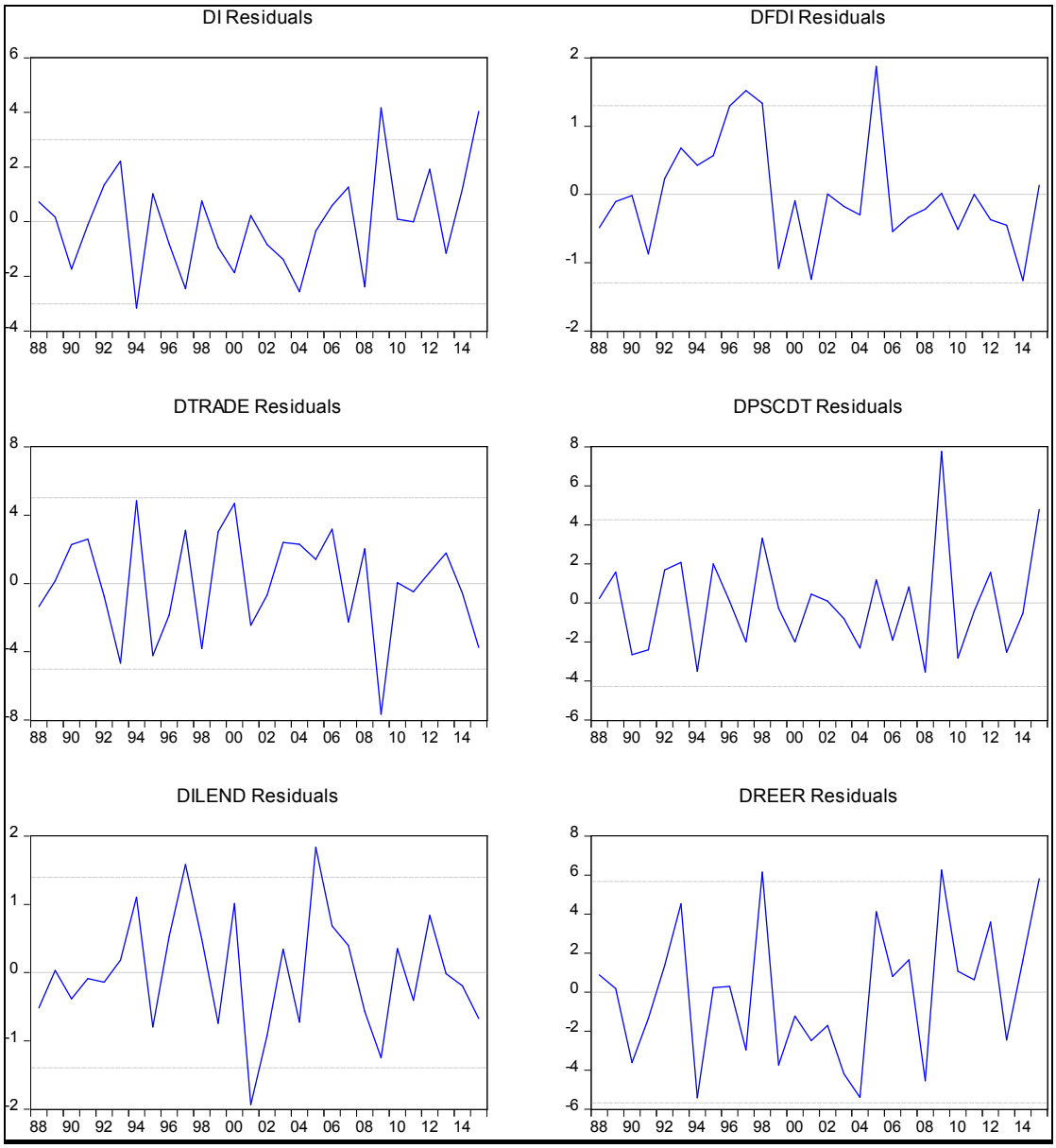

Figure A1: Normality of the Residuals of the VECM estimates

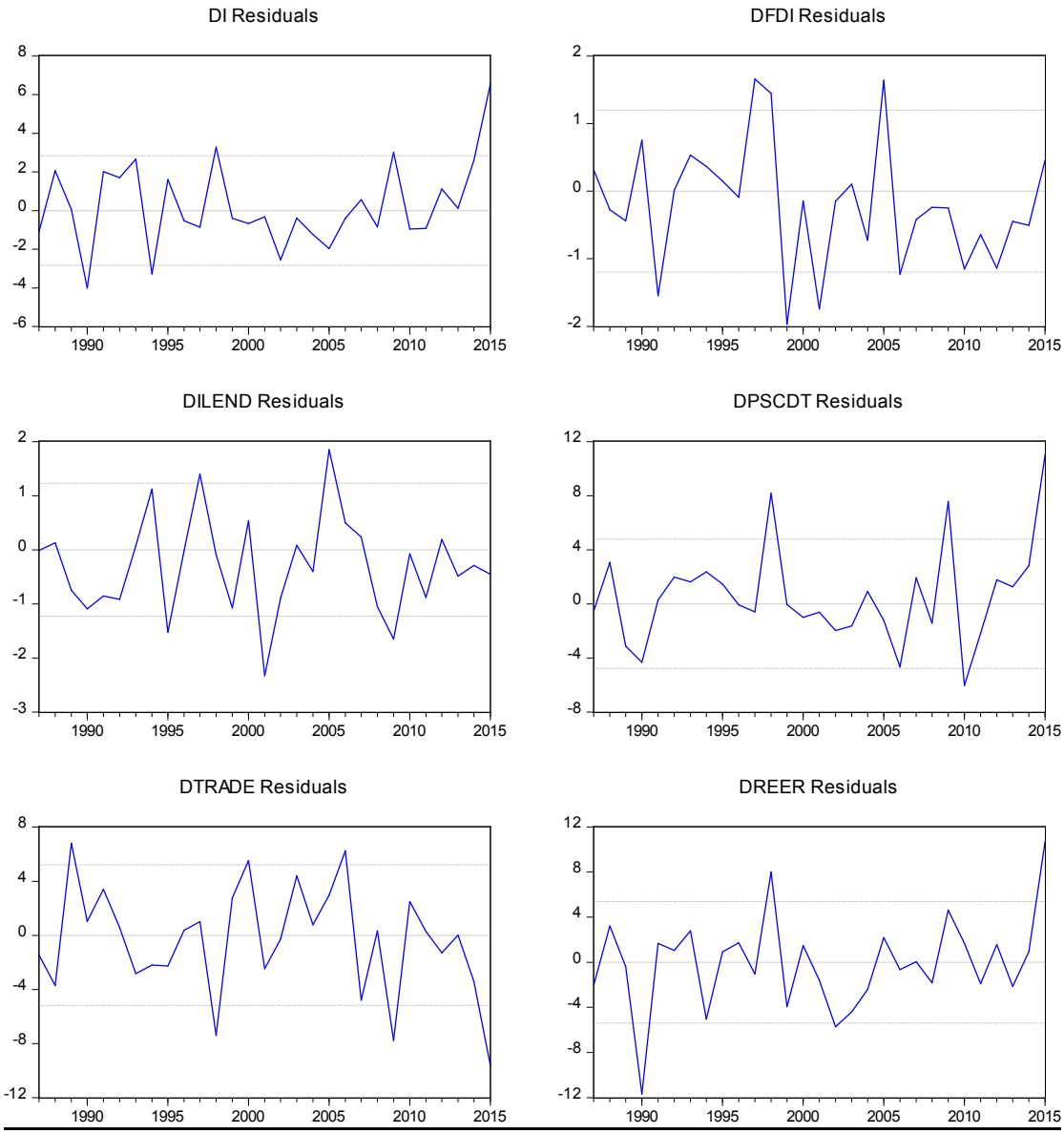

Figure A2: Normality of the Residuals of the VAR estimates