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Exploring FDI Determinants in Saudi Arabia Post-Adoption of New Calculation Methodology

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Abstract

This study endeavors to enrich the comprehension of the determinants underlying Foreign Direct Investment (FDI) inflows in Saudi Arabia while offering significant insights for policy formulation. Through the utilization of a novel methodology developed collaboratively by the Ministry of Investment of Saudi Arabia (MISA), the General Authority for Statistics (GASTAT), and the Saudi Central Bank (SAMA), which conforms to international standards, the study aims to attain heightened precision and inclusivity in the assessment of FDI inflows by using quarterly data spanning from 2012:Q1 to 2023:Q3. Drawing on economic theory and empirical evidence, this paper explores the impact of several factors influencing FDI inflows, including market potential, government expenditure, liquidity, financial development, inflation, infrastructure, natural resources, consumption, and trade openness. The findings reveal various relationships between these determinants and FDI inflows. Market potential, inflation as key drivers of FDI over both the short term and the long term, highlighting the importance of sustained economic growth and targeted public investments in infrastructure. Financial factors, such as liquidity and financial development, also influence FDI inflows. Infrastructure and natural resources play significant but varying roles in attracting FDI. Consumption and trade openness show mixed outcomes on FDI inflows, underscoring the need for a comprehensive approach to FDI promotion.

Keywords: FDI, ARDL, Saudi Arabia, GDP

JEL Codes: C22, F00, F21, F41

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1. Introduction

This research seeks to fill a significant gap in the current body of literature by being the first to utilize newly adapted Foreign Direct Investment (FDI) data in Saudi Arabia. More specifically, this study examines FDI inflows following the implementation of a new FDI calculation approach. Such an approach incorporates more accurate annual statistics derived from financial statements, replacing the previous methods that relied on estimated flow accumulations. This methodological refinement is expected to substantially improve the accuracy and reliability of FDI measurements, thereby providing deeper insights into the complexities of global investment trends. According to the Ministry of Investment, the stock of FDI in 2022 reached US$207 billion, positioning Saudi Arabia as the 10th-ranked economy among G20 countries in that year. FDI inflows surged to US$33 billion compared to the previous method's US$8 billion, representing a fourfold increase.

FDI inflows play a crucial part in fostering economic growth and infrastructure development, the creation of job opportunities, and technology and expert transfer into host countries, enhancing the economic sectors and competitiveness and thus achieving sustainable economic growth. Saudi Arabia has successfully attracted FDI thanks to a combination of factors. These include political stability, favorable incentives and enabling investment regulation, privatization initiatives, the growth of the private sector, membership in the World Trade Organization (WTO), and involvement in multiple bilateral and multilateral trade agreements. Furthermore, the presence of a fair legal system, a robust infrastructure, and access to cost-effective and skilled labor have further enticed foreign capital to invest in the country. Previous research has extensively investigated numerous variables proposed to explain the determinants of FDI. These variables stem from established hypotheses or theories of FDI, as well as empirical observations and intuitive reasoning.

The subsequent sections of this study are organized in the following manner: Section 2 offers an overview of the investment landscape in Saudi Arabia along with its historical evolution. In Section 3, we review both theoretical frameworks and empirical studies to explore the factors influencing FDI inflows. Section 4 delineates the novel contributions of this study to the extant body of literature. Following this, Section 5 outlines the data sources and methodological approach utilized for the analysis, presenting and discussing the empirical findings. Lastly, Section 6 wraps up this study by encapsulating the primary outcomes and offering recommendations based on the research findings.

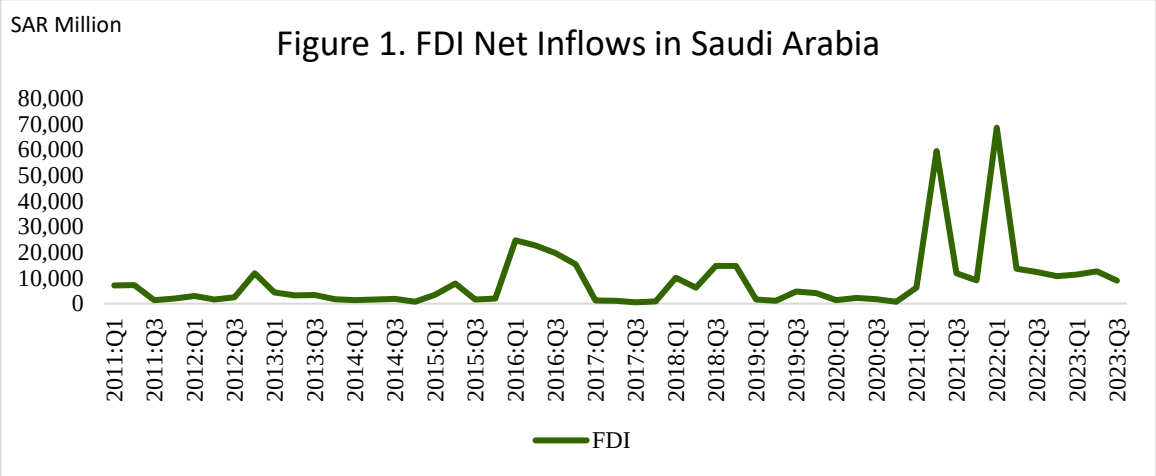
2. Investment Environment Within the Kingdom of Saudi Arabia.

Saudi Arabia's geographical location, which serves as a nexus for three continents and hosts the largest port in the Red Sea, significantly contributes to its appeal for FDI. This advantageous position promotes international trade and connectivity, with the Red Sea port alone accounting for a substantial 80% share of maritime traffic in the Red Sea (Narbone and Widdershoven 2021). Furthermore, Saudi Arabia has made notable strides in improving its investment ecosystem through the implementation of Vision 2030. This strategic plan targets a rise in FDI to 5.7% of GDP, an increase the private sector's share from 40% to 65% of GDP, and positioning of Saudi Arabia as the 15th largest economy globally by 2030.

Various programs and initiatives have been instrumental in enhancing FDI and attracting greater international investments. As per the report on Foreign Direct Investment in Saudi Arabia issued by the Ministry of Investment in January 2024, the country is ranked 10th for FDI net inflow and 16th for FDI stock among G20 countries. The report highlights a 21% annual growth in FDI net inflow, reaching SAR 105 billion in 2022 (as seen in Figure 1). Notably, the transportation and storage, manufacturing, wholesale and retail trade and repair of motor vehicles and motorcycles, and mining and quarrying sectors were the primary recipients of FDI in Saudi Arabia in 2022. Collectively, these sectors attracted US$

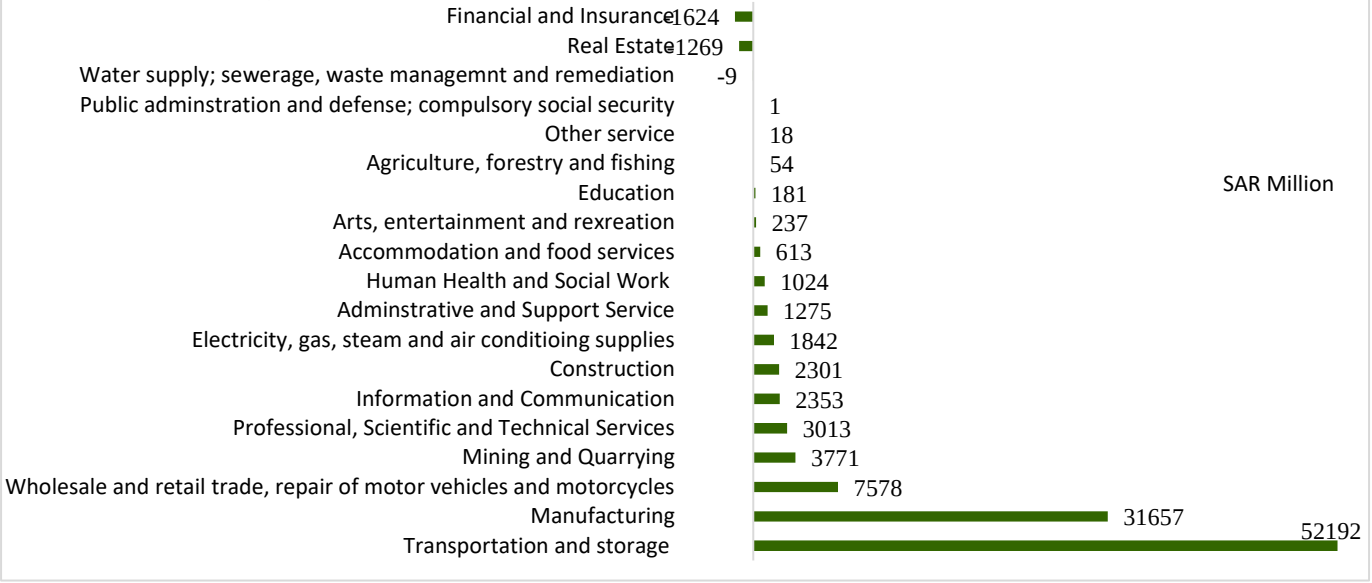
25.47 billion in net FDI, accounting for approximately 90.5% of the total net inflow of FDI by economic activities.

Moreover, Saudi Arabia has recently launched its inaugural Special Integrated Logistics Zone, presenting a suite of incentives designed to appeal to investors, including those with full foreign ownership privileges. Notably, the initiative boasts a generous 50-year tax exemption for investors. Moreover, it extends value-added tax (VAT) advantages to investors involved in servicing and assembly activities. As part of its commitment to facilitating investment, Saudi Arabia has established the Saudi Investment Promotion Authority in collaboration with the Ministry of Investment. This entity is charged with soliciting feedback and formulating recommendations for legislation, procedures, and guidelines to streamline the investment process (UNCTAD, 2023).



Source: General Authority for Statistics (GASTAT)

Figure 2. FDI Net Inflows Distribution across Sectors in 2022



Source: Saudi Arabia Foreign Direct Investment Report - January 2024, Ministry of Investment

3. Literature Review

3.1 Theoretical Background

FDI embodies a multifaceted phenomenon intricately connected with diverse economic theories, each proffering unique insights into the motivations, determinants, and consequences of cross-border investment.

Among the prominent theories dealing with FDI inflows is the Eclectic approach, often termed the OLI framework, pioneered by John Dunning (Dunning, 1980). This framework posits that firms engage in FDI based on three primary advantages, namely ownership-specific, location-specific, and internalization advantages. Ownership advantages encompass firm-specific assets or capabilities, while location advantages relate to the attractiveness of host countries in terms of market size, resource availability, and regulatory environment. Internalization advantages, on the other hand, stem from the desire to retain control over valuable assets or operations within the firm's organizational boundaries.

On another side, the Market Imperfections Theories, including the market power theory, internalization theory, and transaction cost theory, offer complementary perspectives by highlighting the role of imperfect markets in driving FDI (Hymer, 1976; Buckley & Casson, 1976). These theories emphasize firms' strategies to exploit market imperfections, such as monopolistic advantages, transaction costs, and information asymmetries, through direct investment abroad. By internalizing operations, firms seek to mitigate inefficiencies and capture the benefits of direct control over foreign assets or activities. The influential work by Buckley and Casson (1976) on the Internalization Theory focuses on firms' internal organizational capabilities and governance structures as determinants of FDI extent and form. It underscores firms' motivations to internalize market transactions and activities to reduce transaction costs, protect proprietary assets, and enhance coordination and control over global operations.

Raymond Vernon's Product Life Cycle Theory introduces a dynamic perspective, suggesting that FDI is influenced by shifts in the life cycle of products and technologies (Vernon, 1966). In this framework, however, firms invest in foreign production facilities to capitalize on their home country's innovation in the initial stages, followed by shifts in production locations based on cost considerations and market demand as products mature.

In addition, the Institutional Theory broadens the perspective by emphasizing the influence of institutional factors, such as legal systems, regulatory frameworks, and political stability, on FDI decisions and outcomes (North, 1990). Institutional theorists argue that the institutional environment of host countries, which can either facilitate or impede foreign investment activities, shapes firms' investment behavior.

Lastly, the Gravity Model represents an influential theoretical aspect behind FDI determinants derived from international trade theory. It suggests that FDI flows between countries positively correlate with economic size, market openness, geographical proximity, cultural affinity, and institutional quality (Tinbergen, 1962). This model

emphasizes the significance of economic and social factors in influencing FDI patterns. These theories provide complementary insights into the drivers and mechanisms underlying FDI inflows.

3.2 Empirical Background

In selecting the determinants for this study, we were guided by economic intuition and drew inspiration from previous theories and empirical studies in the field. It is important to note that different studies may yield varying findings regarding the effects of the same determinants for several reasons. One significant factor is the contextual differences across countries and time periods, which can influence the relationship between determinants and FDI inflows. Additionally, the operationalization of variables and the choice of econometric techniques may contribute to disparities in results.

a. Market Potential

Countries experiencing higher market growth present greater market potential and more promising prospects for FDI. Consequently, FDI tends to be attracted to countries with higher economic growth rates, as they offer larger economies of scale for FDI to capitalize on their ownership advantages (Culem, 1988). A stable macroeconomic environment characterized by sustained high growth rates is more likely to allure FDI inflows compared to a volatile economy. Proxies used to measure growth rates include GDP growth rates, industrial production indices, interest rates, and inflation rates (Duran, 1999; Dasgupta & Ratha, 2000).

b. Government Expenditure

For the relationship between FDI and government expenditure, Othman and Ismail (2018) focus on examining the influence of government expenditure on FDI inflows in the host nation. An assembled panel dataset consisting of seven countries, including Malaysia,

Indonesia, Singapore, Thailand, the Philippines, India, and China, spanning the period from 1982 to 2016 is utilized for this study. The influence of government expenditure on FDI is analyzed through the application of the pooled Mean Group estimation method. The outcomes of this paper indicate that government expenditure has a positive long-term effect on FDI, suggesting that it contributes to attracting FDI.

Similarly, Yuan et al. (2010) conducted a study utilizing a fixed-effect model and panel data from 81 countries during the period from 2002 to 2006. Their study found that a rise in government spending had a positive impact on FDI inflows, particularly in developing countries. This suggests that expanding government expenditure can attract higher levels of FDI, especially in economies still in the process of development. Conversely, Mkenda and Mkenda (2003) investigated the factors influencing FDI inflows in 31 African countries. They employed a panel data estimation method to analyze the determinants. The findings of the study revealed that the level of government involvement in the economy, as indicated by government consumption as a share of GDP, exhibited a negative connection with FDI inflows. The authors argue that governments of excessive size are often perceived as obstacles to private investment and may even displace private investment altogether.

c. Liquidity

Numerous studies have examined the relationship between money supply, serving as a proxy for liquidity, and FDI. In the specific case of Norway, Boateng et al. (2015) conducted a study employing co-integrating regressions alongside Fully Modified OLS (FMOLS) along the vector autoregressive and error correction model (VAR/VECM) to investigate this relationship from 1986 to 2009. The findings of their study indicated a significant negative linkage between money supply and FDI in Norway.

In contrast, another study conducted by Mugableh (2015) aimed to examine the determinants of inward FDI in Malaysia utilize the Autoregressive Distributed Lag (ARDL)

model. The results indicated that money supply has a positive impact on FDI inflows. This relationship is further supported by studies such as Shahrudin and Satar (2010) and Bekhet and Al-Smadi (2017).

d. Financial Development

For the relationship between FDI and financial development, Nasser and Gomez (2009) explored the impact of financial development on FDI. The study covered a span from 1978 to 2003 across 15 Latin American nations. The results showed a positive correlation between FDI and stock market trading volume, which serves as a crucial gauge of stock market development. Additionally, Claessens et al. (2001) investigated the FDI determinants across 77 countries from 1975 to 2000. Their research demonstrated a positive association between FDI and market capitalization, as well as domestic value traded.

Ngobe and Emenike (2020) conducted a study using ARDL to examine the association between FDI and stock market development in the Kingdom of Eswatini during the period of 1990 to 2018. Their research findings revealed a positive and statistically significant long-term connection between FDI and stock market development in the Kingdom of Eswatini. However, in the short run, no significant relationship was observed between FDI and stock market development. On the other hand, Fernández and Hausmann (2000) found that countries with underdeveloped capital markets tend to attract higher FDI levels. Conversely, when the host country possesses well-developed capital markets, the level of FDI tends to be lower.

e. Inflation

The inflation rate serves as a conventional indicator, often reflecting the economic stability or tension within an economy and the efficiency of monetary and fiscal policies in managing money supply and fiscal balance (Buchanan, 2011). The stability and

resilience of an economy are often associated with lower inflation rates (typically quantified through the consumer price index [CPI] or wholesale price index) , making it a crucial factor in attracting FDI (Balasubramanyam, 2002).

Conversely, high inflation rates are viewed as a source of macroeconomic instability, potentially deterring FDI inflows (Buckley et al., 2007; Kalirajan and Singh, 2010; Schneider and Frey, 1985). Studies by Kalirajan and Singh (2010) and Schneider and Frey (1985) have shown that declining inflation rates tend to coincide with increased FDI inflows in developing countries. Additionally, in developing nations, higher inflation rates have been associated with decreased FDI inflows, highlighting the negative impact of inflation on market stability (Schneider and Frey, 1985; Kalirajan and Singh, 2010).

Moreover, Demirhan and Masca (2016) employed cross-sectional analysis to examine the factors influencing FDI inflows in 37 developing nations from 2000-2004. The analysis findings indicates a notable inverse association relationship between inflation which serves as a proxy for economic stability and FDI inflows. On the other hand, Sridharan et al. (2010) examined the determinants of FDI inflows in BRICS countries (Brazil, Russia, India, China, and South Africa). Their study, spanning from 1975 to 2007, utilized panel data analysis. The results found that economic stability, measured by inflation rates, is insignificant in influencing FDI inflows in these countries.

f. Infrastructure

Infrastructure emerge as a key factor affecting FDI inflows and is essential in the geographical aspect of the Ownership-Location-Internalization (OLI) model. Theoretical perspectives on this relationship vary across studies, with some indicating a substantial positive correlation linking infrastructure to FDI (Asiedu, 2006; Asiedu & Lien, 2011). Conversely, others have found no statistical significance in infrastructure's ability to attract FDI (Mohamed & Sidiropoulos, 2010; Cleeve, 2008) or even a substantial adverse correlation (Naude & Krugell, 2007; Groh & Wich, 2012).

Literature offers numerous instances that explore infrastructure's role as a key determinant of FDI. For instance, Sekkat & Varoudakis (2007) employed panel data estimators across 72 developing countries, identifying infrastructure (measured by mobile phone usage) as a primary determinant of FDI. Similarly, Mina (2007) analyzed FDI location determinants in six GCC countries from 1980 to 2002, utilizing a model based on Dunning (1981). Their findings suggested that infrastructure, represented by the natural logarithm of telephone mainlines and cell phones per 1000 individuals, positively influences FDI inflows.

Expanding on this analysis, Ali et al. (2010) investigated the FDI drivers in 69 countries across various regions, spanning Asia, East Europe, Latin America and the Caribbean, the Middle East and North Africa, and Sub-Saharan Africa, using panel data from 1981 to 2005. While infrastructure, measured by telephone mainlines per 1,000 individuals, exhibited a positive impact on FDI—it was statistically insignificant. Additionally, Cheng and Kwan (2000) examined FDI determinants in 29 Chinese areas from 1985 to 1995, employing the GMM method. Their study unveiled a notable and positive correlation between infrastructure (including all roads, high-grade paved roads, and railways) and FDI.

The influence of infrastructure quality extends deeply into the operations of multinational corporations (MNCs), affecting their productivity and efficiency levels and consequently shaping the volume and varieties of FDI inflows (Kirkpatrick, Parker, & Zhang, 2004). Kumar (2006) emphasizes the positive impact of robust infrastructure on FDI growth, contingent upon other factors remaining constant. Notably, multinational corporations exploring export markets assess the preparedness of a host country's infrastructure, recognizing its crucial role in facilitating transportation, telecommunications, water, and power supply. Baker (1999) contends that the historical success of developed economies in attracting FDI partly stems from their superior infrastructure advantages. An increase in infrastructure investment, tailored to align with the strategic objectives of

multinational corporations, has the potential to significantly enhance the investment climate, thereby attracting prestigious corporations.

g. Natural Resources

Companies heavily reliant on natural resources and commodities often seek to secure a stable and efficient supply of minerals, metals, and foodstuffs by investing in or acquiring firms. This trend has led transnational corporations from advanced economies focus their investment on developing countries rich in natural resources.

Studies by Dupasquier and Osakwe (2006), Aseidu (2002), and Deichmann et al. (2003) highlight the positive and significant impact of natural resource availability on FDI inflows. Similarly, Mohamed and Sidiropoulos (2010) analyzed a panel of 36 countries, including 12 MENA countries and 24 other developing nations, concluding that natural resources, along with the host economy's size, government size, and institutional factors, are major factors impacting FDI inflows in Middle East and North Africa (MENA) countries.

Asiedu (2006) conducted research using panel data from 22 countries in Sub-Saharan Africa (SSA) between 1984 and 2000, finding that countries rich in natural resources or possessing large markets attract more FDI. Furthermore, factors such as robust infrastructure, a skilled workforce, macroeconomic stability, readiness for FDI, an effective legal framework, reduced corruption, and political stability were found to foster inward FDI.

Hailu (2010) conducted an empirical investigation focusing on the demand-side factors of FDI inflows into African countries. The study concluded that natural resources, labor quality, trade openness, market access, and infrastructure quality positively and significant impact on FDI inflows. However, the presence of a stock market was identified to have a positive yet insignificant impact.

h. Households Consumption

Sharma and Kautish (2020) conducted a study utilizing the framework of nonlinear autoregressive distributed lag bounds alongside an unspecified structural break to examine the influence of selected macroeconomic factors on FDI inflows in India spanning from 1979 to 2016. The results shed light on the significance of private consumption expenditure in propelling FDI inflows within India. Specifically, the study confirmed that improvements in private consumption expenditure be instrumental in augmenting FDI inflows in the country. Conversely, downturns in the volume of consumption expenditure were found to correspond with decreases in the volume of FDI inflows over the long term. In contrast to Sharma and Kautish's (2020) argument linking increased FDI inflows to improvements in private consumption, the research conducted by (Adjei et al. 2022) does not provide substantial evidence for an immediate connection. In their study, they found a lack of statistically significant correlation between consumption and FDI inflows.

i. Trade Openness

Regarding the association between trade openness and FDI, Musabeh and Zouaoui (2020) conducted a regression study to investigate the determinants of FDI inflows in North Africa, specifically in Algeria, Egypt, Libya, Morocco, and Tunisia, from 1996 to 2013. Their findings revealed a favorable and statistically significant connection between FDI inflows and trade openness. In another study, Guris and Gozgor (2015) analyzed the factors affecting FDI using annual data from 1986 to 2010 in Turkey. Their research indicated that trade openness positively attracts FDI. Additionally, the Granger causality analysis demonstrated that trade openness actively influences the increase in FDI inflows.

However, Mudiyanselage et al. (2021) examined the causal relationship between trade openness and FDI inflows in Romania from 1997 to 2019. They employed the ARDL Bounds test and used control variables such as Gross Domestic Product, Real Effective Exchange Rate, Inflation, and Education. The results of their study showed a negative

impact of trade openness on FDI inflows in the long run and short run. This finding is supported by Khan and Hye (2014), who found through the DF-GLS test and autoregressive distributed lag model that indicators of trade openness negatively affect FDI inflows in Pakistan from 1971 to 2009 (Vijesandiran and Vinayagathasan, 2020; Hintošová and et al. 2018; and Tahmad and Adow, 2018). A different study conducted by Wickramarachchi (2019) utilizing the ARDL approach discovered that trade openness did not exert a significant effect on FDI inflows in Sri Lanka from 1970 to 2014.

3.3 *Previous Studies about FDI in Saudi Arabia*

Popovici et al. (2021) analyzed data from 97 countries, which were classified into different income levels. The study revealed that for high-income countries like Saudi Arabia, factors such as economic growth, infrastructure development, and CPI exerted significant influences on FDI. Additionally, institutional quality and technology availability also played significant roles. In the case of low-income countries, trade openness and education emerged as important factors influencing FDI. In contrast, middle-income countries emphasized the significance of institutional quality and stability as key determinants of FDI.

Al-Matari and Mgammal (2021) conducted an extensive analysis covering the Gulf Cooperation Council (GCC) region from 1995 to 2018, employing Ordinary Least Squares (OLS) and Generalized Least Squares (GLS) methods to examine the determinants of FDI. Their study revealed several noteworthy findings. The analysis uncovered a robust positive correlation between FDI and key economic indicators, including inflation, trade ratio, gross domestic product (GDP), gross savings, and net foreign assets. These factors are indicative of a conducive economic environment and may stimulate elevated levels of FDI to the GCC region. Such findings emphasize the critical role of macroeconomic stability, trade openness, and economic growth in fostering foreign investment inflows. Conversely, the study found a negative relationship between international tourism and

FDI. This suggests that the presence of a thriving international tourism sector may not necessarily contribute positively to FDI inwards in the GCC countries. This result may reflect the differing investment preferences and risk perceptions of investors concerning the tourism industry.

In relation to the studies that have examined the FDI determinants in Saudi Arabia using previous methodologies, Al-Khathlan (2013) conducted a comprehensive study spanning from 1980 to 2010, employing Johansen-Juselius co-integration test and Error Correction Model (ECM) techniques to analyze the determinants of FDI in Saudi Arabia. The analysis investigated the impacts of domestic capital, government expenditure, and the labor force on FDI inflows. The main outcome of the paper suggests that government expenditure emerges as the primary driver of FDI inflows in the context of Saudi Arabia. This underscores the prominent role of government policies and spending in attracting foreign investment to the country.

Gazzaz (2019) conducted a study based on annual data from 2000 to 2017. Employing OLS regression analysis, the study found significant impacts on FDI for market potential, trade openness, growth expectations, and inflation, with the exception of infrastructure and market size. Notably, natural resources played a particularly influential role in attracting FDI.

Alfalih and Hadj (2020) conducted a study using annual data from 1984 to 2017, revealing different findings. The study indicated that, in the short run, FDI is positively influenced by the real exchange rate, market size, and the legal environment. Interestingly, the authors found that FDI inflows were more responsive to changes in oil prices rather than the abundance of oil resources.

Samargandi, Alghfais, and AlHuthail (2022) conducted a study on FDI in Saudi Arabia from 1984 to 2018 using the ARDL model. Their findings indicate that trade openness significantly influences the promotion of FDI inflows in both the short and long runs. Moreover, several other factors were identified as positively impacting FDI inflows,

including the World Trade Organization (WTO) membership status, institutional quality index, financial development indicator, and the global financial crisis dummy variable. Specifically, being a member of the WTO after 2006, higher institutional quality, greater financial development, and the absence of the worldwide financial crisis were associated with increased FDI inflows. The researchers highlight the significance of trade policies, institutional quality, financial development, and global economic conditions in attracting foreign investment to Saudi Arabia.

Saeed (2023) examined the FDI determinants FDI in Saudi Arabia from 2000 to 2020 using VECM and ARDL models. In the long term, the study found that factors such as trade openness, government spending, and economic stability significantly influence FDI inflows. Surprisingly, variables like exports and market size did not show significant effects. In the short term, however, exports, trade openness, and economic stability emerged as statistically significant factors of FDI. This research underscores the dynamic nature of FDI determinants in Saudi Arabia and highlights the importance of trade policies, government expenditure, and macroeconomic stability in enticing foreign investment.

4. Contribution to the Existing Literature

This study offers valuable contributions to the body of work on FDI in Saudi Arabia. Firstly, it addresses a notable gap by being the pioneering study investigating FDI inflows utilizing a novel methodology for calculating FDIs. This methodology was introduced through collaborative efforts between the Ministry of Investment of Saudi Arabia (MISA), the General Authority for Statistics (GASTAT), the Saudi Central Bank, and the International Monetary Fund (IMF). The objective of this methodology is to elevate the quality of the Saudi's FDI statistics, align them with global standards, yield more precise and comprehensive outcomes, and further enrich the understanding of FDI dynamics in Saudi Arabia.

Secondly, this study investigates the influence of global GDP as a fixed control variable on the determinants of FDI. By incorporating global GDP, oil prices, FDI outflows, and the FDI stock into the analysis, this study accounts for broader economic conditions and their potential impact on the relationship between FDI and other independent variables. This consideration helps to mitigate confounding effects and provides a more nuanced understanding of the determinants of FDI.

Furthermore, this study utilizes quarterly data, enabling a detailed examination of short-term fluctuations and changes in FDI and its influencing factors. By analyzing the quarterly patterns and dynamics of FDI inflows, our contribution leads to a more profound comprehension of FDI behavior and its influencing factors.

Lastly, this study seeks to analyze the FDI behavior and to what extent it is consistent with the goals of Vision 2030 objectives in Saudi Arabia. By examining the alignment between FDI trends and the objectives of Vision 2030, this study sheds light on the progress and effectiveness of the economic transformation efforts in Saudi Arabia.

5. Empirical Methodology

5.1 *Data*

We utilize quarterly data for Saudi Arabia covering the period spanning from 2012:Q1 to 2023:Q3[2]. The dependent variable, FDI inflows, is sourced from the General Authority of Statistics (GASTAT). Market potential, represented by the log of overall GDP; trade openness, reflecting the ratio of exports and imports to GDP; and household consumption, acting as a proxy for private final consumption expenditure, are obtained from GASTAT. The oil exports, serving as a proxy for the natural resources variable, and government expenditure, representing government spending, are sourced from GASTAT and the Ministry of Finance, respectively. Electricity Consumption data, acting as a proxy

[2] The new methodology for estimating quarterly data on FDI was applied by the General Authority for Statistics (GASTAT).

for Infrastructure, is obtained from the Saudi Electricity Company. Macroeconomic Stability, represented by the CPI, is sourced from the GASTAT, while Financial Development, represented by the TASI Index (1985=100), is obtained from TASI. Additionally, the liquidity variable, indicated by Money Supply (M3), is sourced from the Saudi Central Bank. Moreover, the control variables (including FDI Stock and FDI Outflows from GASTAT), along with additional control variables (Global GDP from Oxford Analytics and Oil Prices from OPEC), are also included. All variables are log-transformed for analytical examination.

Table 1. FDI Determinants Description

	Symbol	Proxy Measurement	Source	Sample Period
Market Potential	Log (GDP)	Real GDP	GASTAT	2012:Q1- 2023:Q3
Trade Openness	Log (TP)	The Ratio of Exports plus Imports to GDP		
Households Consumption	Log (C)	Private Final Consumption Expenditure		
Natural Resource	Log (OILEXP)	Oil Exports		
Government Expenditure	Log (GOVEXP)	Government Total Expenditure	Ministry of Finance	
Infrastructure	Log (ELEC)	Electricity Consumption	Saudi Electricity Company	
Inflation	Log (CPI)	CPI	IMF	
Financial Development	Log (TASI)	TASI Share Price Index (1985=100)	Tadawul	
Liquidity	Log (M3)	Money Supply (M3)	SAMA	

5.2 *Empirical Results*

5.2.1 *Unit Root Test*

The outcomes displayed in Table 2, reveal the presence of unit root for the selected variables using the Phillips Perron (1988) Test, where the results indicate that all variables chosen for the study are non-stationary in level since the p-value for all variables are not significant at 1% and 5%; thus, the null hypothesis of unit root at all level is rejected. However, after taking the first differences of all series, all variables are stationary at I (1), as seen in Table 2.

Table 2. Phillips Perron (PP) Unit Root Test

Variables	**At Level**		**At First Difference**	
	Constant	Trend	Constant	Trend
Log(FDI INFLOWS)	-3.86***	-4.20***	-7.67***	-7.82***
Log(GDP)	-2.19	-3.11	-7.81***	-8.44***
Log(GOVEXP)	-6.40***	-6.94***	-38.29***	-38.63***
Log(M3)	-1.07	-1.81	-5.94***	-5.93***
Log(TASI)	-1.47	-2.12	-6.02***	-5.97***
Log(CPI)	-0.87	-2.32	-7.50***	-7.42***
Log(ELEC)	-6.28***	-8.78***	-10.50***	-10.20***
Log(OILEXP)	-3.68***	-3.36*	-9.01***	-12.80***
Log(C)	-1.66	-3.22*	-11.04***	-12.72***
Log(TP)	-0.71	-2.51	-6.54***	-6.51***

Note: *, ** and *** indicate the significance level at 10%, 5% and 1%, respectively.

5.2.2 *Lag Selection Criteria*

After determining the stationarity of variables, the Vector Autoregression (VAR) lag order selection criteria are utilized to choose the optimal lag length in order to conduct the co-integration test. Based on all the lag length selection criteria, the optimal lag length is 2.

Table 3. Lag selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	548.17	NA	0.00	-22.14	-20.13	-21.39
1	771.62	297.93	0.00	-27.63	-21.61	-25.38
2	**1003.02**	**205.6911***	**5.70e-27***	**-33.46755***	**-23.43054***	**-29.72585***

Note: (*) indicates the lag order selected by the criterion.

5.2.3 *ARDL Bound Testing*

Before we proceed with the ARDL model, a cointegration bounds test will be executed. This test compares the F-statistic value with upper and lower bound critical values, following Pesaran and Pesaran (1997) and Pesaran et al. (2001). If the F-statistic value surpasses the upper bound critical value, it demonstrates a long-term relationship among variables. Table 4 displays the outcomes of the ARDL bound test, examining the long-term relationship among variables. With an F-statistic of 4.28, surpassing both the lower limit I(0) and upper limit I(1) at significance thresholds of 10%, 5% and 1%, it suggests a long-term cointegration relationship.

Table 4. Bounds Test

F-Bounds Test		Null hypothesis: No levels 0 of relationships		
Test Statistics	Value	Significance level	I(0)	I(1)
F-statistic	4.28	10%	2.13	3.09
		5%	2.38	3.41
		1%	2.93	4.06

Note: I(0) and I(1) represent stationary and non-stationary bounds, respectively.

5.2.4 *Estimating the Regression of Integration Based on the ARDL Model in the Short-Run*

This paper analyzes the dynamic relationship between lnFDI and independent variables through the ARDL model as follows:

$$\Delta\, lnFDI_t = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta\, Log(GDP)_{t-i} + \sum_{i=1}^{n} \beta_2\, \Delta Log(GOVEXP)_{t-i} + \sum_{i=1}^{n} \beta_3\, \Delta Log(M3)_{t-i} + \sum_{i=1}^{n} \beta_4\, \Delta Log(TASI)_{t-i} + \sum_{i=1}^{n} \beta_5\, \Delta Log(CPI)_{t-i} + \sum_{i=1}^{n} \beta_6\, \Delta Log(ELEC)_{t-i} + \sum_{i=1}^{n} \beta_7\, \Delta Log(OILEXP)_{t-i} + \sum_{i=1}^{n} \beta_8\, \Delta Log(C)_{t-i} + \sum_{i=1}^{n} \beta_9\, \Delta Log(TB)_{t-i} + \delta ECT_{t-1} + u_t$$

Where the parameters $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ are coefficients for a short-run, u_t is the error terms, and δ is the coefficient of the Error Correction term (ECT). The results from ARDL model suggest that the model exhibit statistical significance, given that the probability for F- Stat is less than 1%, and R-squared in the short run equals 0.93.

Table 5. ECM – Short-Term Estimates

(Dependent Variable: FDI inflows, Control Variables: FDI outflows, FDI stock, Global GDP & Oil Prices)

Variable	Coefficient	t-Statistic
COINTEQ*	**-0.73*** **	**-9.71**
Log (GDP)(-1)	-45.75***	-5.36
***Log (GDP)*(-2)**	**58.04*** **	**6.91**
Log (GOVEXP)(-1)	-0.27	-0.41
***Log (GOVEXP)*(-2)**	**-1.63*** **	**-3.10**
Log (M3)(-1)	-3.10	-0.51
***Log (M3)*(-2)**	**-43.44*** **	**-7.32**
Log (TASI)(-1)	-4.55***	-3.34
***Log (TASI)*(-2)**	**-10.43*** **	**-8.67**
Log (CPI)(-1)	27.35***	2.76
***Log (CPI)*(-2)**	**-55.14*** **	**-5.16**
Log (ELEC)(-1)	0.96	2.26
***Log (ELEC)*(-2)**	**-1.82*** **	**-3.88**
***Log (OILEXP)*(-1)**	**16.83*** **	**5.64**
Log (OILEXP)(-2)	-9.86***	-4.72
Log (C)(-1)	-6.47*	-1.77
***Log (C)*(-2)**	**-21.91*** **	**-4.76**
Log (TP)(-1)	0.57	0.94
***Log (TP)*(-2)**	**2.74*** **	**4.34**

Note: *, ** and *** indicate the significance level at 10%, 5% and 1%, respectively

5.2.5 *Estimating the Regression of Integration Based on the DOLS and FMOLS Methods in the Long-Run*

For estimating the regression in the long run and checking for robustness, the Dynamic Ordinary Least Squares (DOLS) and Fully Modified Ordinary Least Squares (FMOLS) estimation techniques have been employed, which are often preferred over the Autoregressive Distributed Lag (ARDL) model for long-run regression, due to their robustness and accuracy. DOLS and FMOLS estimators offer more dependable solutions, as demonstrated by previous literature (Persyn & Westerlund, 2008; Newey & West, 1994; Pedroni, 1999). They effectively account for potential autocorrelation and heteroscedasticity phenomena of the residuals. On the contrary, the ARDL model, often considered more of a short-run model, may not adequately address these econometric issues. Therefore, DOLS and FMOLS are recommended for more accurate long-run estimates.

Table 6. Long-Term Estimates

(Dependent Variable: FDI inflows, Control Variables: FDI outflows, FDI stock, Global GDP & Oil Prices)

	DOLS		FMOLS	
Variable	**Coefficient**	**t-Statistic**	**Coefficient**	**t-Statistic**
Log (GDP)	55.13**	2.87	21.59***	5.86
Log (GOVEXP)	-6.69**	-2.57	-0.90**	-2.13
Log (M3)	-17.74	-1.26	-7.72**	-2.37
Log (TASI)	0.59	0.14	0.41	0.34
Log (CPI)	82.93**	2.61	29.45***	3.96
Log (ELEC)	-4.10	-0.39	0.48*	1.67
Log (OILEXP)	-8.57	-1.48	-6.94***	-4.26
Log (C)	0.35	0.04	-6.87***	-3.14
Log (TP)	-2.46*	-1.75	0.29	0.81

Note: *, ** and *** indicate the significance level at 10%, 5% and 1%, respectively

5.2.6 *Stability Test*

As demonstrated in Figure 3, the null hypothesis, which indicates the stability of all coefficients within the regression, remains unchallenged. The CUSUMQ test results fall inside the critical limits at the 5% significance level, reinforcing this stability. Furthermore, our examination of the model depicted in Figures 3 and 4 reveals no significant structural break, suggesting consistent performance over time. This observation not only bolsters Confidence in the model's robustness but also assures its reliability throughout our study.

Figure 3: CUSUM Squared

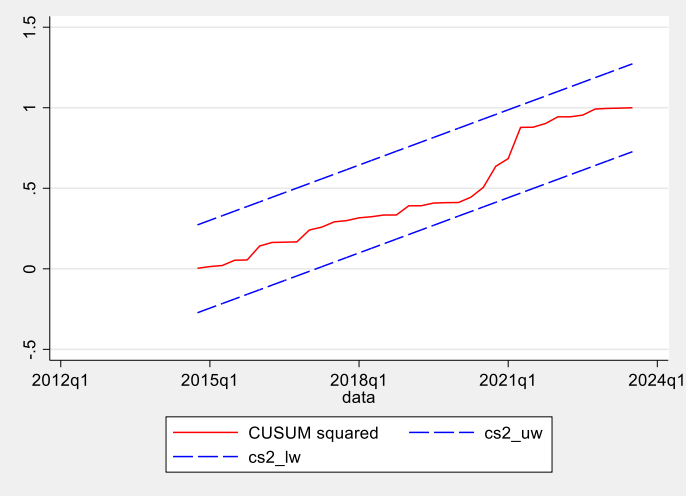
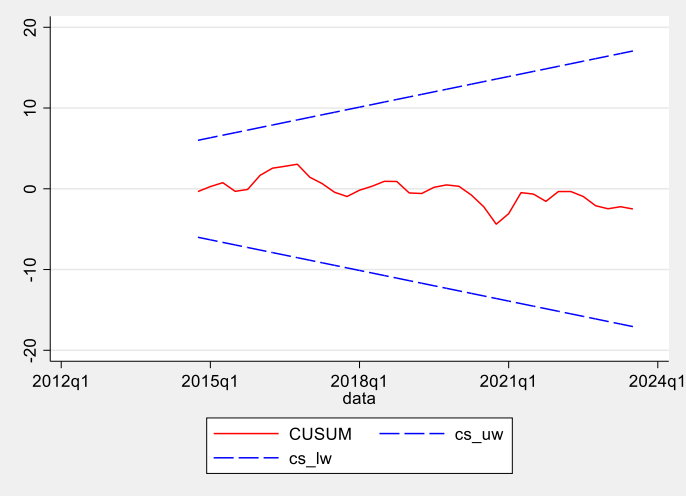


Figure 4: CUSUM



5.2.7 *Results and Discussion*

a. Market Potential

Market Potential demonstrates a highly significant coefficient of 58.04 in the short run, emphasizing the crucial role of economic growth prospects in attracting foreign investment. Countries with rapidly growing economies provide more opportunities for profit and expansion. The positive and significant coefficient indicates that sustained growth prospects boost investor confidence, signaling long-term stability and profitability, which aligns with previous research by Culem (1988). However, it is essential to carefully examine this relationship and its lasting effects. While strong GDP growth rates initially attract foreign investment by showing promising economic prospects and market opportunities, it is essential to ensure that this growth is sustainable and of high quality to attract long-term investment.

In the long run, both DOLS and FMOLS estimates reveal positive and highly significant coefficients of 55.13 and 21.59, respectively, reaffirming the connection between sustained growth prospects, investor confidence, and long-term stability and profitability. Long-term GDP fluctuations can be impacted by a range of factors, such as global economic conditions, temporary shocks, and alterations in policies. Nevertheless, policies aimed at attracting FDI should not only rely on high growth rates but also include supportive frameworks, infrastructure improvements, and institutional reforms. This holistic approach is essential for translating short-term growth into sustained FDI inflows. FDI tends to have higher elasticity to GDP growth in the short term compared to the long term. The difference in responsiveness between short-term and long-term elasticity can be attributed to dynamic versus structural factors. In the short run, FDI responds swiftly due to dynamic elements like business cycles and investor sentiment. Over the long term, structural factors play a greater role, leading to sustained FDI trends. Investors adapt their strategies based on the investment horizon and prevailing economic conditions.

b. Government Expenditure

In the short term, the projected coefficient of -1.63 for government expenditure suggests that a rise in government spending results in a reduction in FDI inflows. This could be as a result of the crowding out of private investment and distortion of resource allocation caused by increased government spending. Moreover, the significant negative short-run coefficient suggests that targeted government expenditure could lead to resource competition, resulting in higher costs and limited availability. This could deter foreign investors, as scarcity of essential inputs for their operations could impede their ability to conduct business effectively, discouraging them from investing in the host country. These findings align with the research conducted by Mkenda and Mkenda (2004).

Conversely, the long-term coefficient of -0.90 in FMOLS offers a more complex view of the relationship between government spending and FDI inflows. Although this coefficient is still negative, it suggests that the effect of government spending on FDI inflows lessens over the years. This could be due to changes in the economy's structure and dynamics or foreign investors adapting to the current market conditions. Over time, government spending might positively impact FDI inflows by improving infrastructure, promoting institutional development, or boosting overall economic growth. However, the decreasing significance of this estimated coefficient implies that other factors might become more important in influencing FDI inflows.

c. Liquidity

Over the short run, the calculated coefficient of -43.44 for liquidity (M3) implies a statistically significant negative relationship between liquidity and FDI inflows. This implies that a growth in liquidity, which is indicative of the availability of money in the economy, results in a decrease in FDI inflows.

Over the long term, the coefficient is -7.72 (significant when considering a threshold of 5% under FMOLS). This indicates that over time, increased liquidity continues to possess

a notable negative effect on FDI inflows, corroborating the findings of Boateng et al. (2015). The adverse link between increased liquidity and FDI inflows in Saudi Arabia could be due to the availability of local debt. High liquidity allows both domestic and foreign investors to easily access local debt markets, thereby reducing their reliance on FDI. The increased availability and attractiveness of local debt instruments can divert both domestic and foreign investors from FDI, leading to lower foreign direct investment inflows.

d. Financial Development

With a short-run coefficient of -10.43, an enhancement in financial development produces a significant drop in FDI inflows. This result highlights the complex relationship between financial markets and foreign investment, as increased financial development can enhance capital mobility and market efficiency but also introduce volatility and risk. The presence of more complex financial products and instruments may increase the exposure to market fluctuations and uncertainties. This can make foreign investors more cautious and hesitant to engage in FDI activities, particularly in the short run.

However, it is essential to critically evaluate this relationship and its long-term implications. While financial development might initially deter FDI by increasing competition for investment funds and raising uncertainty, its long-term impact depends on countries' ability to develop robust regulatory frameworks, strengthen investor protection, and enhance investment climate. In line with Ngobe and Emenike (2020), the insignificant and positive long-run coefficients of 0.59 based on DOLS and 0.41 based on FMOLS suggest that, over the long term, financial development does not consistently influence FDI inflows in Saudi Arabia. This result indicates that other factors may become more influential over time.

e. Inflation

The short-run coefficient of -55.14 suggests that a rise in CPI causes a significant declining in FDI inflows. This result is consistent with earlier research; it has been noted that the inflation rate serves as an indicator of market stability, with higher inflation adversely impacting FDI inflows in developing nations (Schneider and Frey, 1985; Kalirajan and Singh, 2010). This also underscores the importance of price stability in attracting foreign investment, as higher inflation rates can erode investor confidence and purchasing power. While high inflation may deter short-term investment by increasing uncertainty and reducing the real return on investment, its long-term impact might be mitigated by various factors such as adaptive expectations, monetary policy effectiveness, and structural reforms.

The long-term coefficients 82.93 and 29.45 according to Dynamic OLS (DOLS) and Fully-modified OLS (FMOLS), respectively, they have a p-value less than the 1% level. These findings suggest a robust positive correlation between CPI and FDI inflows over longer periods of time. This somewhat unexpected outcome could be due to a variety of factors.

The long-run positive correlation between inflation and FDI in Saudi Arabia can be a reflection of the country's market stability compared to short-term fluctuations. Furthermore, certain sectors with higher consumer market and CPI values are associated with larger consumer markets and higher consumer demand, making them attractive to foreign investors.

f. Infrastructure

In the short term, the coefficient for infrastructure, represented by electricity consumption, is -1.82, which is significant at the 1% level and aligns with results from research carried out by Kumari et al. (2017). This indicates a considerable negative association between electricity consumption and the inflow of foreign direct investment. This suggests that short-term variations in electricity consumption could negatively affect

FDI inflows, possibly due to immediate disruptions or changes in economic activity. These disruptions might deter foreign investors from making investments in the economy because of concerns about stability or operational issues resulting from infrastructure deficiencies.

Additionally, Baker (1999) suggests that developed economies consistently attract larger FDI compared to less developed nations, partly due to their superior infrastructure advantages. Consequently, this negative impact might reflect resource diversion, as heavy infrastructure spending absorbs capital that could otherwise be allocated to FDI projects. The effect of infrastructure on economic development may range from minimal to negative, as suggested by previous research (Eberts, 1986; Devarajan et al. 1996; Pritchett and Summers, 1996).

On the other hand, the long-term estimated coefficient valued at 0.48 has a p-value lower than the 10% level, suggesting a positive link between electricity consumption and FDI inflows over an extended period. This means that while short-term variations in electricity consumption can have negative effects on FDI inflows, long-term improvements in infrastructure, as indicated by increased electricity consumption, are linked to higher FDI inflows. Improved infrastructure, including a reliable electricity supply, efficient transportation networks, and modern communication systems, is essential for attracting foreign investors looking for stable and favorable business environments for their investments. As suggested by (Sahiti et al. 2018), the quality of infrastructure in a host country can significantly influence the productivity and efficiency of MNCs, consequently impacting the level and types of FDI.

g. Natural Resources

The short-run estimated coefficient of 16.83 for oil exports, representing natural resources, reveals a noteworthy positive connection with FDI at the 1% level. This implies that, in the short term, heightened levels of FDI are attracted to economies with increased oil exports. Such a finding aligns with expectations, as nations abundant in natural resources often witness elevated FDI inflows due to the perceived profitability associated with resource extraction and related industries.

However, the negative long-run estimated coefficients of -8.57 and -6.94, according to DOLS and FMOLS, respectively, present a different perspective. Despite the initial positive impact on FDI, the diminishing long-term effects of oil exports on FDI could stem from various factors. These include economic consequences due to resource dependence, potential crowding out effects on non-oil sectors, concerns regarding institutional quality, and ongoing diversification efforts to reduce reliance on oil exports. It is important to note that the Kingdom of Saudi Arabia's Vision 2030 plays a remarkable role in this context. Indeed, it corresponds to a strategic plan aimed at decreasing the country's reliance on oil, diversifying its income sources, and enhancing public service domains including health, education, infrastructure, and tourism. This Vision is anticipated to have a substantial impact on attracting external direct investment and fostering economic growth.

h. Households Consumption

The short-run estimated coefficient of -21.91 at the 1% significance level indicates an adverse impact on FDI inflows. This seemingly counterintuitive relationship warrants careful examination. Higher domestic consumption could imply a mature market with reduced growth prospects, making it less appealing for foreign investors seeking rapid expansion opportunities. However, this interpretation overlooks potential nuances.

While high consumption levels might dampen the immediate need for FDI, they could also signal a thriving consumer market with significant potential for long-term investment. The significant long-run estimated coefficients of -6.87 as per FMOLS suggest a diminishing negative impact over time, indicating a potential adjustment in investor perceptions or market dynamics.

i. Trade Openness

The short-run coefficient of 2.74 is statistically significant, with a p-value below the 1% level. Similarly, in the existing literature, Chakrabarti (2001) identifies a positive correlation exists between trade openness and the inflows of FDI across 135 countries. The significant long term estimate of -2.46 as per DOLS implies that a surge in trade openness generates a diminution of FDI inflows. This result might raise concerns about the potential diversion of investment away from FDI towards trade activities.

However, it is essential to critically assess this relationship. While high trade openness could offer alternative avenues for businesses to access foreign markets without committing to FDI, it may also signal a favorable business environment conducive to international trade, which could indirectly have an impact on FDI across an extended duration. Asiedu (2002) further explores this relationship, noting that the impact of trade openness on FDI is determined by the investor's orientation: low openness benefits market-seeking investors, while high openness attracts export-oriented firms. In contrast, Schmitz and Bieri (1972) find that increased trade openness lowers FDI levels in countries that impose trade restrictions like Canada as well as the European Economic Community (EEC). Still, it has no significant impact on European Free Trade Association (EFTA) countries. Additionally, Wheeler and Mody (1992) observe that US multinationals prefer countries with lower trade openness, such as Brazil and Mexico, due to higher trade barriers, making them FDI recipients. Thus, while trade openness generally fosters FDI,

the relationship is complex and varies based on investment motives and prevailing trade barriers.

6. Conclusion

In conclusion, the comprehensive analysis of quarterly data from Saudi Arabia, spanning from 2012:Q1 to 2023:Q3, provides a thorough understanding of the factors influencing the inflows of FDI. The findings underscore the complex interplay between various economic variables and their impacts on FDI dynamics.

This empirical work highlights the significant role of market potential in attracting FDI. The short-term results emphasize the importance of robust economic growth prospects in fostering investor confidence and signaling long-term stability and profitability. However, this relationship diminishes in the long run, suggesting that continuous growth alone may not be sufficient to attract FDI without the support of complementary policies and infrastructure development.

In addition, the analysis of infrastructure, represented by electricity consumption, uncovers both short run challenges and long run opportunities for FDI inflows. While short run variations in electricity consumption negatively affect FDI inflows, long-term improvements in infrastructure correlate positively with increased FDI inflows.

The examination of natural resources, represented by oil exports, reveals the initial allure of resource-rich economies to foreign investors. However, the diminishing long-term effects of natural resources on FDI inflows underscore the need for economic diversification and institutional quality to sustain FDI attractiveness.

The study also explores other determinants, including government expenditure, liquidity, financial development, inflation, household consumption, and trade openness. These factors reveal complex relationships with FDI inflows and must be carefully considered. A comprehensive approach must be adopted to attract and retain foreign investment.

Therefore, the detailed analysis of FDI determinants in Saudi Arabia highlights the importance of a policy framework that caters to the diverse needs and priorities of investors. By fostering sustained economic growth, improving infrastructure, diversifying the economy, enhancing institutional quality, and fostering an enabling business environment, Saudi Arabia can bolster its attractiveness as a destination for foreign investment, driving long-term economic development and prosperity.

Based on empirical evidence and economic analysis, we propose the following policy recommendations. In an effort to mitigate the adverse effect of government expenditure on FDI inflows, it is advisable to prioritize measures aimed at enhancing fiscal discipline and augmenting private sector participation through the privatization of projects. Furthermore, FDI inflows should be leveraged to positively influence Saudi Arabia's export structure by boosting non-oil exports and concentrating on advanced industrial sectors, thereby promoting sustained economic growth, creating sustainable employment opportunities, and facilitating technology localization.

Given the evident correlation between oil sectors and FDI, it is recommended that higher priority be given to economic diversification endeavors, as delineated within Vision 2030 initiative, to lessen reliance on oil, along with attracting foreign investment. Additionally, concerted efforts should be made to enhance institutional quality through improvements in transparency, accountability, and governance, thereby establishing a more favorable investment environment conducive to sustained FDI inflows. Despite the seemingly counterintuitive short-term harmful consequence of households' consumption in relation to FDI inflows, it is imperative to consider the long-term potential of a thriving consumer market. To capture the interest of foreign investors, it is crucial to showcase the long-term growth prospects and opportunities inherent within the consumer market.

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