Investigating the factors influencing foreign direct investment in Saudi Arabia

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ABSTRACT

This study examines the factors that influence Foreign Direct Investment (FDI) in Saudi Arabia, using data from 2002 to 2022. It focuses on seven key variables, grouped into three categories: economic factors, human resources, and governance. Six different models are used to assess these factors. The results show that both economic growth and population growth positively and significantly encourage FDI. On the other hand, trade openness, exports, and strict regulations have a negative and significant impact on FDI. These findings suggest that promoting economic and population growth, while reconsidering trade and regulatory policies, is important for increasing FDI in Saudi Arabia.

1. Introduction

Attracting foreign direct investment (FDI) is one of the most essential strategies for developing countries to increase capital formation to generate higher gross domestic product (GDP) growth rates. FDI is a crucial instrument that developing nations employ to address their economic issues. The rapid expansion of FDI has recently sparked considerable empirical research to explore the primary elements influencing FDI.

Developing nations have leveraged FDI to solve economic challenges. Attracting foreign direct investment is critical to developing countries' plans to increase capital formation and achieve higher GDP growth rates. FDI plays a vital role in the modern global economy, and many developing nations are developing strategies to attract international investors. The swift growth in FDI over the last few periods has driven a massive empirical literature to observe the core factors affecting FDI.

From a theoretical perspective, foreign direct investment is widely recognized as a driving factor for growth and development (Hayat, 2019; Horobet et al., 2021). This has led to numerous studies examining FDI flows (Kornecki and Raghavan, 2011). Foreign Direct Investment has garnered significant attention in recent decades due to its potential influence on economic development, particularly in high-income countries (Hashmi et al., 2020; Contractor et al., 2020). In contrast to the previous studies above, this study investigates the various factors influencing FDI in Saudi Arabia, including economic, political, legal, and demographic factors.

As a leading oil-exporting country, Saudi Arabia has historically been an attractive destination for FDI. However, the nation's efforts to diversify its economy have led to a dynamic shift in the FDI landscape. Understanding what drives FDI in Saudi Arabia is crucial for the country's economic diversification plans and investors looking to capitalize on emerging opportunities within the Kingdom.

This research aims to investigate and understand the numerous factors influencing FDI in Saudi Arabia. The study seeks to uncover the economic, human resource, and governance determinants of FDI inflows in Saudi Arabia from 2002 to 2022. By dissecting the economic, human resources, and governance factors, the study contributes insights into the dynamics of FDI inflows within the Saudi context. This period is critical as it encompasses significant policy shifts and economic reforms, including Vision 2030 initiatives that are poised to transform the country's investment landscape.

The rest of the paper is organized as follows. Section 2 delves into the related literature, presenting a comprehensive review of relevant studies and scholarly work. Section 3 details the data sources and the research model used. Section 4 offers an in-depth analysis of the estimated results, highlighting valuable insights from our analysis.

Finally, Section 5 concludes the paper by summarizing the key findings and providing policy recommendations based on the research outcomes.

2. Literature review

2.1. FDI in Saudi Arabia

The Saudi economy has long relied on oil revenues as its cornerstone. Nevertheless, recent initiatives by the government have been directed toward reducing this dependency by diversifying its economic sectors. Since the rollout of the Fourth Development Plan from 1985 to 1990, there has been a concerted focus on invigorating the investment sector. This study is designed to explore the dynamic interplay between domestic investment, FDI, and economic growth in Saudi Arabia, spanning the years 1970 to the present, utilizing time-series econometric methods. The importance of this study is underscored by the understanding that the dynamic relationships between these macroeconomic factors will significantly influence governmental policy decisions. The flow of FDI is shaped by a multitude of elements. Specifically, we are interested in how the following factors influence FDI inflows into the Kingdom: Economic, human resource, and government factors.

Fig. 1 presents the net inflows of FDI as a percentage of Saudi Arabia's GDP, drawing on data compiled by the World Bank. This visual representation offers a quantitative snapshot of the country's attractiveness to foreign investors relative to the size of its economy. The graph likely illustrates trends over time, providing insight into how external economic policies, global market conditions, and domestic reforms have influenced the investment landscape. Such a figure would be instrumental in identifying periods of increased or decreased FDI activity, potentially correlating these with specific policy initiatives or global economic events. The percentage format allows for easy comparison with other countries or regions, thereby contextualizing Saudi Arabia's performance within the broader global economy.
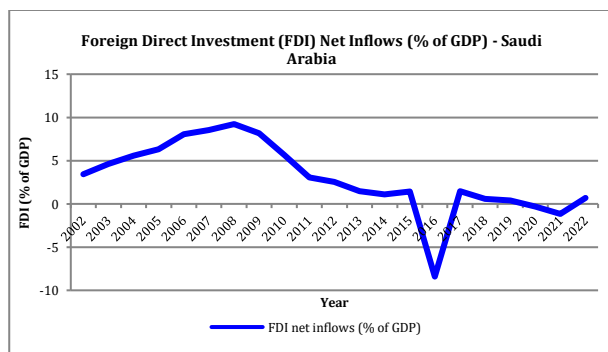
Fig. 1: Foreign direct investment, net inflows (% of GDP)-Saudi Arabia

FDI is a critical driver of economic growth, serving as a conduit for knowledge transfer, creating jobs, and enhancing competitiveness in the host country's economy. GDP is one of the primary indicators used to measure the health of a country's economy. It represents the total dollar value of all goods and services produced over a specific period. A strong GDP suggests a good economy, which can attract FDI as investors seek profitable business ventures in flourishing markets. Past literature has found a positive relationship between GDP growth and FDI. FDI has a positive impact on growth in financially developed countries. However, the relationship is not universal and depends on the specific conditions of the host country.

The relationship between economic factors and FDI has been extensively studied, with scholars using various analytical models to understand this complex interaction. Sabroso and Cañete's (2023) research, utilizing multiple regression over five decades, was notable in suggesting that certain economic factors do not directly correlate with economic growth, indicating that FDI could be a significant driver of economic stability. Mohamed and Abdulle (2023) applied the vector autoregression (VAR) model and found that FDI has a positive impact on Somalia's GDP, imports, and exports. Their findings provide empirical evidence of the close relationship between FDI and key economic indicators. Similarly, Shaukat et al. (2023) application of the autoregressive distributed lag model indicated how GDP and natural resources in the Netherlands positively influence FDI, whereas inflation serves as a deterrent. This points to the importance of economic conditions, such as market size, economic openness, deficits, and currency strength, as identified by Karahan and Bayır (2022), in either attracting or repelling FDI.

The third economic variable under consideration in this study is exports, which refers to the value of a country's goods and services provided to the rest of the world. Along with imports, exports constitute international trade. Exports serve as a pathway or strategy for achieving success in the global marketplace through international trade. In developing countries, there is a positive effect of FDI on the unit values of exports (Harding and Javorcik, 2012).

The impact of human resource indicators on FDI has been subject to varied findings. Riabushka and Yusiuk (2020), through system-structural analysis, found that while institutional factors and market size were significant in Ukraine, average wage, a human resource indicator, did not hold as much weight in influencing FDI. This suggests that human capital may not always be a primary consideration for foreign investors. However, Tan et al.'s (2021) investigation into the Chinese economy suggested that investing in human capital can be a strategic move to enhance FDI inflows. Their empirical study, involving cointegration tests and Granger causality tests, reinforced the importance of developing a skilled workforce to boost economic attractiveness for FDI.

Governance quality emerges as a crucial element in attracting FDI, as underscored by the work of Baci

et al. (2022). Their regression models highlighted that, alongside GDP growth, trade, and assistance, good governance is a significant attractor of FDI, while poor governance and inflation can deter investment. This was further reinforced by Shrivastava et al. (2022), who advocated for governance that supports currency stability and international trade to draw in FDI.

The approach blending complex networks with panel data analysis cast light on the growing interconnectedness of countries within the FDI network, suggesting that governance strategies that maintain competitive currency valuation and promote national competitiveness are critical in the global race for FDI.

In March 2020, the World Health Organization recognized CVID-19 as reaching alarming levels of spread and severity. Then it rapidly escalated into a global pandemic. The spread of the COVID-19 pandemic has significantly disrupted all aspects of human activities and the economy in all sectors arrow the world. The government's stringent regulations against public assemblies also led to a decline in economic growth. There have been limited studies on the effects of COVID-19 on FDI (Lee and Rugman, 2012). Camino-Mogro and Armijos (2020) conducted a study to determine the effect of lockdown policies on FDI using weekly data. The finding of their study shows a negative impact of COVID-19 on FDI flows. A related study by Fu et al. (2021) utilized bilateral FDI data from January 2019 to June 2020 and found evidence of the negative effects of COVID-19 on FDI of the host economies.

The COVID-19 pandemic significantly affected FDI globally, and Saudi Arabia was no exception. The combination of a health crisis, a sharp decline in oil prices, and disruptions to trade and global supply chains led to a short-term contraction in FDI inflows. As the pandemic forced a rapid reevaluation of economic priorities, Saudi Arabia's efforts to diversify its economy, particularly through its Vision 2030 agenda, gained added urgency. While some sectors, notably oil and tourism, faced challenges, others, such as healthcare, digital infrastructure, and renewable energy, emerged as potential new magnets for FDI. In the long term, the pandemic may have accelerated structural changes in the economy, potentially leading to a more diversified and resilient landscape for FDI in Saudi Arabia.

Economic crises have repeatedly tested the resilience of Saudi Arabia's oil-dependent economy, prompting the kingdom to undertake significant reforms. Historically, fluctuations in oil prices have been the primary catalyst for economic instability, with low oil prices leading to budget deficits and necessitating austerity measures. In response to such challenges, Saudi Arabia has embarked on an ambitious economic diversification plan, Vision 2030, aimed at reducing its reliance on oil and developing other sectors like tourism, entertainment, and renewable energy. The government has introduced fiscal reforms, such as VAT and subsidy cuts, to stabilize its finances.

Additionally, efforts to attract foreign direct investment through regulatory reforms, the development of capital markets, and the strategic deployment of its Public Investment Fund are central to Saudi Arabia's strategy to combat economic crises. The COVID-19 pandemic and market volatility in recent years have only underscored the urgency of these economic reforms, as the kingdom seeks to build a more robust and diversified economic foundation for the future.

The COVID-19 pandemic has significantly influenced global economic activity and FDI, with Saudi Arabia being no exception. The Kingdom's heavy reliance on oil revenues meant that the pandemic-induced drop in oil demand and prices likely dented its FDI appeal, particularly in the energy sector (Hensel, 2022). However, the crisis also presented an impetus for the acceleration of the country's Vision 2030 diversification goals, which include bolstering the digital economy, healthcare, and the pharmaceutical industry—sectors that have gained importance during the pandemic. Saudi Arabia's response to the pandemic, through fiscal and monetary measures, and its continued investment in infrastructure and strategic industries will shape its FDI attractiveness. While the travel and tourism sector faced a setback due to travel restrictions, recovery efforts and the promotion of new tourist destinations might enhance FDI in the long term. Ultimately, the impact of the pandemic on Saudi Arabia's FDI landscape is complex and will depend on the interplay between global economic trends, oil market dynamics, and the country's success in implementing its ambitious economic transformation plans.

This research not only contributes to the empirical body of knowledge by examining economic, human resource, and governance factors that impact FDI but also enriches theoretical understanding by engaging directly with existing theories on FDI. By integrating and testing these theories within the unique context of Saudi Arabia, particularly under the strains of the COVID-19 pandemic and global economic crises, the study challenges and extends traditional frameworks such as Dunning's Eclectic Paradigm, which emphasizes the interplay of locational advantages, firm-specific assets, and internalization incentives (Stoian and Filippaios, 2008).

The findings particularly underscore the significant role that governance structures and economic policy reforms play in attracting FDI, aligning with the Institutional-Based View. This view posits that beyond economic and market factors, the regulatory and political environments can significantly influence investment decisions. By demonstrating how recent reforms in Saudi Arabia have either bolstered confidence or highlighted areas for improvement, this research provides nuanced insights into the institutional factors that can either facilitate or hinder FDI flows, suggesting a more dynamic interaction between policy environments and investment decisions than

traditionally modeled. Moreover, the resilience and adaptability of Saudi Arabia's economy, as evidenced during the recent global crises, provide a critical empirical test of crisis management theories in international business. The strategic responses of foreign investors during such periods reveal patterns that may either support or contest theories suggesting that crises predominantly deter foreign investment. Instead, the findings indicate that certain types of crises might stimulate strategic asset-seeking behavior among foreign investors, who aim to capitalize on new opportunities that arise from economic disruptions.

By situating its analysis within the real-world context of a global pandemic and economic upheaval, the study also contributes to a more refined understanding of how contextual crises influence theoretical models of FDI. This approach not only enriches the academic debate on FDI determinants but also provides practical guidance for Saudi policymakers aiming to attract more foreign investment, identifying strengths to be leveraged and areas for improvement. Thus, the research offers

a roadmap for enhancing the investment climate in light of both existing theoretical frameworks and emergent global challenges, making a compelling case for the adaptability of FDI theories to diverse and rapidly changing economic landscapes.

3. Model specification and data collection

To explore the factors that can influence FDI in Saudi Arabia, current research considers the annual data related to the 7 explanatory variables categorized into three main elements: Economic, human resource, and governance, spanning the period 2002–2022.

In addition, to capture the impact of the pandemic and the great financial recession, we include two dummy variables such as COVID-19 and Global Economic Crises. All data are retrieved from the database of the World Bank. Table 1 provides a comprehensive summary of the primary factors investigated in this study and the sources from which the variables were derived.

Table 1: Variables description

Variables		Unit	Description	Source
	FDI	Millions or billions of USD	FDI refers to the flow of direct investment equity into the economy being reported.	World Bank database
Economic	GDP	current US$ millions	GDP, or Gross Domestic Product, is calculated as the total value of all goods and services produced within an economy, which is the sum of the gross value added by all resident producers, plus any taxes on products, and subtracting any subsidies not already included in the product values.	World Bank database
	GDP per capita	current US$	GDP per capita is the total economic output of a country, represented by its gross domestic product, divided by the population count at the midpoint of the year.	World Bank database
	Exports of goods and services	Current US$ millions	Exports of goods and services denote the monetary value of all goods and various market services supplied to entities beyond the country's borders.	World Bank database
	Trade openness	% of GDP	Trade openness is quantified as the combined total of a nation's exports and imports, represented as a percentage of the country's GDP.	Our World in Data (ourworldindata.org)
Human resource	Labor force participation rate	% of the total population ages 15+	The labor force participation rate signifies the percentage of individuals aged 15 and above who are economically active, that is, all persons contributing labor to the production of goods and services.	World Bank database
	Population	Thousands	Population refers to all residents	World Bank database
Governance	Regulatory quality	ranges from approximately -2.5 to 2.5	This represents the perceptions regarding the government's capacity to develop and enforce well-conceived policies and regulations that facilitate and enhance the growth of the private sector.	World Bank database
Dummy variables				
Variables			Description	
Economic crises			0 if the year is 2008, 1 otherwise	
COVID-19-pandemic			1 if the year is 2020, 0 otherwise	

3.1. Model specification

To examine the influence of selected explanatory variables on foreign direct investment in Saudi Arabia. We specify the model as follows:

$$FDI_t = \beta_0 + \beta_0(GDP)_t + \beta_1(GDPPC)_t + \beta_2(Exports)_t + \beta_3 (Trade\ Openness)_t + \beta_4(LFP)_t + \beta_5(POP)_t + \beta_6(RegQualt)_t + \delta_1(Crisis2008) + \delta_2(COVID19) + \epsilon_t \quad (1)$$

where, FDI_t is foreign direct investment in million current US dollars at time t. GDP_t is gross domestic product in million current US dollars at time t.

$GDPPC_t$ is GDP per capita in current US dollars at time t. $Exports_t$ is the exports of goods and services in million current US dollars at time t. $Trade\ Openness_t$ is trade openness as a percentage of GDP at time t. LFP_t is the labor force participation rate as a percentage of the total population ages 15+ at time t. POP_t is population in thousands at time t. $RegQualt_t$ is regulatory quality, which ranges approximately from -2.5 to 2.5 at time t. Crisis2008 is a dummy variable for the economic crisis of 2008 (1 if the year is 2008, 0 otherwise). COVID19 is a dummy variable for the COVID-19 pandemic period

(1 if the year is 2020 or later, 0 otherwise). β_0 is the intercept term. β_1, ..., β_7 are coefficients for the respective independent variables. δ_1 and δ_2 are coefficients for the respective dummy variables indicating economic crises. ϵ_t is the error term capturing all other factors affecting FDI_t not included in the model at time t.

4. Results and analysis

We start our analysis by examining the descriptive statistics of our data, as these statistics provide a concise summary of key characteristics of a dataset, such as central tendency, dispersion, and distribution, allowing researchers to understand the nature of their data. The descriptive statistics given in Table 2 reveal several insights.

With 21 observations each, the data shows a negative average FDI of approximately -6.33 billion, the negative average value doesn't necessarily mean that Saudi Arabia experienced negative FDI inflows every year but indicates that over the 20-year period, there were enough instances of net outflows or lower net inflows to bring the average to a negative number. This could be due to a range of factors, including economic downturns, changes in investment climate, policy shifts, or global economic events that may have influenced investor decisions. The high standard deviation of 14.3 billion for FDI suggests substantial yearly fluctuations.

GDP has an average value of 602 billion with a considerable standard deviation of 245 billion, indicating significant economic changes over the years. Population growth appears steady with an average of 30.24 million and a smaller standard deviation relative to its mean. The measure of regulation quality has moderate variability with an average close to 0.08. A positive average score on the regulation quality index is likely to be favorable for attracting foreign investment, as investors typically seek stable and predictable regulatory environments.

Since the mean of the regulation quality index is positive and relatively close to zero on a scale from -2.5 to 2.5, it suggests that, on average, the perception of regulatory quality in Saudi Arabia is slightly positive. This indicates a generally favorable view of the government's policies and regulatory effectiveness in relation to private sector development.

Trade openness, with averages at 73.94 % of GDP, shows some variability and suggests a relatively open economy. Lastly, the dummy variable for crises has a low average occurrence rate of about 4.76%, indicating infrequent economic or political crises during the study period. Overall, the descriptive statistics point to a dynamic economic environment with significant year-to-year variations in the key factors that are likely to influence FDI in the Kingdom.

Table 3 presents correlation coefficients that measure the strength and direction of the linear relationships between pairs of variables related to Saudi Arabia's economy. The correlation between FDI and GDP is moderately positive (0.4607), suggesting that as Saudi Arabia's GDP increases, FDI also tends to increase.

Table 2: Descriptive statistics

Variable	Obs	Mean	Standard deviation	Min	Max
Exports	21	2.596e+11	9.912e+10	7.764e+10	4.426e+11
FDI	21	-6.326e+09	1.431e+10	-3.596e+10	1.501e+10
GDP	21	6.023e+11	2.446e+11	1.896e+11	1.108e+12
GDP percapita	21	19183.449	5672.631	8380.959	30436.278
Laborforce	21	53.585	3.956	47	61.15
Population	21	30242445	4641942.1	22623415	36408820
RegQual	21	.078	.132	-.091	.419
Trade	21	73.938	13.251	49.713	96.103

Obs: Observation

Table 3: Pairwise correlations

Variables	COVID	Recession	Exports	FDI	GDP	GDP percapita	Laborforce	Population	REG_QUAL	Trade
COVID	1.000									
Recession	-0.125	1.000								
Exports	-0.062	-0.306	1.000							
FDI	-0.174	0.677***	0.032	1.000						
GDP	-0.249	0.054	0.779***	0.461**	1.000					
GDP percapita	-0.201	-0.052	0.878***	0.342	0.982***	1.000				
Laborforce	-0.438**	0.239	0.531**	0.553**	0.904***	0.836***	1.000			
Population	-0.282	0.121	0.563***	0.487**	0.944***	0.883***	0.921***	1.000		
REG_QUAL	-0.428*	-0.152	0.265	-0.055	0.356	0.336	0.478**	0.302	1.000	
Trade	0.284	-0.532**	0.207	-0.82**	-0.410*	-0.239	-0.61***	-0.58***	-0.167	1.000

***: p<0.01; **: p<0.05; *: p<0.1; REG_QUAL: Regulatory quality

Similarly, a moderate positive correlation exists between FDI and Population (0.4871), indicating that FDI tends to be higher with a larger population, perhaps reflecting a larger market or workforce. However, FDI appears to have a very weak and essentially negligible relationship with Regulatory Quality (REG_QUAL), as indicated by the correlation coefficient of -0.0553. Interestingly, there is a strong negative correlation between FDI and Trade openness (-0.8231), which is counterintuitive since trade openness is often associated with increased foreign investment. This might reflect unique aspects of the Saudi economy or specific conditions during the period studied. Additionally, FDI is moderately

negatively correlated with Dummy Crises (-0.4743), suggesting that FDI decreases during times of crisis. GDP and Population are strongly positively correlated (0.9436), which is expected as a larger population often contributes to economic growth, although this relationship could also be influenced by other factors like increased domestic consumption or a larger workforce. GDP's relationship with Regulatory Quality is moderately positive (0.3556), indicating that better regulatory practices might be associated with higher GDP levels. Surprisingly, GDP has a moderate negative correlation with Trade (-0.4102), which might imply that the economy's growth is less reliant on trade or that other factors are at play. GDP has a very weak negative correlation with Dummy Crises (-0.0773), implying that economic output is not significantly affected by crises in the short term.

Population is positively correlated with Regulatory Quality (0.3023), suggesting that larger populations may be associated with better governance, although this relationship is not strong. Population has a moderate negative correlation with Trade (-0.5799), indicating that as the population of Saudi Arabia increases, the trade decreases, which could be due to a variety of economic factors. The weak negative correlation between Population and Dummy Crises (-0.1385) suggests that the population size isn't strongly affected by crises. Regulatory Quality has a weak negative correlation with Trade (-0.1674), which could suggest that increased regulation is not always conducive to

trade, or it could reflect sector-specific dynamics. However, the weak positive correlation between Regulatory Quality and Dummy Crises (0.0740) implies that better governance could be slightly more prevalent in times of crisis. Lastly, Trade openness and Dummy Crises have a moderate positive correlation (0.3832), which may indicate that trade volumes increase during crisis periods, possibly due to the country's strategic economic adjustments or external factors.

The negative correlation coefficient of approximately -0.474 between FDI and the crises suggests that there is a reasonable inverse relationship between the occurrence of economic crises and the inflow of FDI in Saudi Arabia. This implies that during periods characterized by economic crises, FDI tends to decrease, which aligns with the general expectation that investors may be more cautious and risk-averse during times of economic instability, potentially leading to reduced investment flows into a country facing a crisis. This pattern reflects the idea that crises can challenge investor confidence, leading to capital flight or a reluctance to commit to new investments until stability is restored.

Table 4 provides the estimation results from the alternate specifications for Eq. 1. The estimates reveal a positive and statistically significant impact of GDP to influence foreign direct investment in the Kingdom of Saudi Arabia, which indicates that investors perceive Saudi Arabia's economic growth as a favorable environment for their investments.

Table 4: Estimation of alternate model specifications

	(1)	(2)	(3)	(4)	(5)	(6)
	FDI	FDI	FDI	FDI	FDI	FDI
GDP	-.003	-.002	-.002	.037	.091***	.006
	(.076)	(.074)	(.073)	(.052)	(.012)	(.068)
GDP percapita	2397079.3	2276375.5	2388516.8			3144446.1
	(3159871.3)	(3044050.7)	(3021407.3)			(2495958.5)
Laborforce	-44479743	1.036e+08				
	(8.743e+08)	(7.862e+08)				
Population	3488.996*	3477.94*	3514.216**	3197.877*	4613.63***	4164.396***
	(1720.802)	(1663.27)	(1577.882)	(1504.119)	(700.567)	(773.43)
Trade	-1.337e+09***	-1.30e+09***	-1.33e+09***	-1.65e+09***	-1.09e+09***	-1.279e+09***
	(2.504e+08)	(2.416e+08)	(2.323e+08)	(2.126e+08)	(1.054e+08)	(1.958e+08)
COVID	-2.168e+09		-2.081e+09	-1.856e+09	-2.182e+09	-2.279e+09
	(4.696e+09)		(4.183e+09)	(4.113e+09)	(4.120e+09)	(4.037e+09)
Recession	8.216e+09**	8.196e+09**	8.147e+09**	8.417e+09**	6.443e+09**	7.294e+09***
	(3.453e+09)	(3.337e+09)	(3.038e+09)	(2.975e+09)	(2.334e+09)	(2.384e+09)
Exports	.04	.042	.04	.074		
	(.087)	(.084)	(.083)	(.07)		
REG_QUAL	-2.906e+10**	-2.850e+10**	-2.92e+10***	-2.97e+10***	-3.33e+10***	-3.064e+10***
	(1.001e+10)	(9.608e+09)	(8.195e+09)	(8.064e+09)	(7.325e+09)	(7.487e+09)
_cons	1.436e+11***	1.344e+11***	1.419e+11***	1.400e+11***	1.571e+11***	1.491e+11***
	(4.522e+10)	(3.924e+10)	(2.808e+10)	(2.757e+10)	(2.246e+10)	(2.291e+10)
Observations	21	21	21	21	21	21
R-squared	.964	.963	.964	.962	.959	.963

Standard errors are in parentheses; ***: p<.01; **: p<.05; *: p<.1; Columns labeled (1) – (6) represent six different regression model specifications of Eq. 1

A growing GDP implies a larger market and increased consumption, which can attract foreign investors seeking to tap into this expanding market. In addition, conducive government policies promoting economic growth and attracting foreign investment, such as tax incentives, free trade zones, and deregulation, can further encourage FDI inflows as GDP increases. In addition, for all alternate model specifications, estimates reveal that trade openness

has a negative and statistically significant impact on foreign direct investment, which implies that a high level of trade openness might indicate a higher dependency on imports, which could affect the profitability of domestic production and discourage foreign investment. Moreover, this research employs a great financial recession dummy to determine its on foreign direct investment in Saudi Arabia, and estimates in Table 4 reveal a positive and

statistically significant impact of the great financial recession on FDI inflows in the kingdom, which may be attributed to safe-haven investment situation since during times of global economic uncertainty, investors may seek safe haven destinations for their capital. In this context, with its stable political environment and substantial oil reserves, Saudi Arabia could be perceived as a relatively safe destination compared to other countries experiencing greater economic turmoil. However, our research finds the negative but statistically insignificant impact of COVID-19 on the foreign direct investment inflows to Saudi Arabia, which shows that during the pandemic Saudi government implemented stimulus measures and provided support to businesses to mitigate the economic impact of the pandemic, which helped maintain investor confidence and FDI inflows. Furthermore, Saudi Arabia's ongoing efforts to diversify its economy away from oil dependence also helped to attract FDI in sectors less affected by the pandemic, such as technology, renewable energy, and healthcare. In addition, this research finds a positive and statistically significant impact of population growth on FDI in Saudi Arabia, which implies that a growing population increases the size of the domestic market. For investors, a larger market means greater demand for goods and services, which can enhance the potential for higher sales and profits. This increased demand can attract more FDI as companies seek to capitalize on the expanding market.

Table 4 also indicates that due to the Great Recession of 2008, Oil-exporting countries such as Saudi Arabia saw a temporary gain due to rising oil prices since, in the early stages of the recession, oil prices initially soared, reaching a peak of over $140 per barrel in mid-2008. This spike was driven by several factors, including geopolitical tensions, increased demand from emerging economies, and speculative trading. This motivated the foreign investors to invest more in Saudi Arabia. Whereas a negative and statistically significant coefficient for regulation quality indicates that stringent regulations may become an impediment to attracting foreign investment in the country.

Comparing the six models based on the goodness of fit, complexity, and significance. Given the economic factors, each model's performance reflects how well it can explain the FDI in Saudi Arabia. Model 1 has the highest R-squared value (0.957049), which indicates that it explains the highest variability in FDI out of all the models. However, Model 5 has the highest Adjusted R-squared value (0.929671), which suggests it explains the variability of the dependent variable most efficiently when the number of predictors is considered. Model 6 has the highest F-statistic (56.20832), which means it is statistically significant, and the variables included in the model collectively have a strong linear relationship with FDI. However, all models show a Prob (F-statistic) close to 0, indicating that all models are statistically significant. Model 5 offers a good balance with the highest Adjusted R-squared, a high F-statistic, and a relatively low S.E. of regression. It also has one of the lowest Sum squared resid figures, suggesting that the residuals are smaller than other models. All models are statistically significant, but Model 5 offers the most reliable and valid estimates, given the balance required between model complexity and explanatory power.

Table 5 presents the results of the diagnostic tests conducted to assess the reliability of our estimates. These tests include the Breusch-Godfrey test for autocorrelation, the Variance Inflation Factor (VIF) test for multicollinearity, the White test for heteroscedasticity, and the Jarque-Bera test for normality. The findings indicate that there is little evidence of autocorrelation in the model's residuals, while multicollinearity is a concern for GDP and population variables. Additionally, the tests suggest that the regression model maintains homoscedasticity and that the residuals are likely normally distributed. This comprehensive analysis reinforces the robustness of our results and their implications for foreign direct investment in Saudi Arabia.

Table 5: Diagnostic tests

	Breusch-Godfrey test (autocorrelation)	VIF test (multicollinearity)	White test (heteroscedasticity)	Jarque-Bera test (normality)
Diagnostic Checking	Obs* R-squared 0.0150	(1.23-30.66)	Obs*R-squared 0.0481	p-value 0.910044 Jarque-Bera 0.188524

To check the reliability of our estimates, we performed several diagnostics checks. For instance, to check for the presence of autocorrelation (also known as serial correlation) in the residuals, we performed.

Breusch-Godfrey test. Autocorrelation occurs when the residuals (the differences between observed and predicted values) are not independent across observations but instead follow a pattern over time or across data points. An Obs* R-squared value of 0.0150 is low, suggesting little evidence of autocorrelation in the model's residuals. In time-series data, autocorrelation can lead to inefficient estimates and can cause the standard errors of the coefficients to be underestimated. whereas the values of VIF tests for multicollinearity indicate that multicollinearity remains a concern for GDP (VIF of 13.21319) and population (VIF of 15.96477), as both exceed the common threshold of 10. Meanwhile, regularity quality, trade openness, and the economic crises all have VIF values well below this threshold, suggesting that multicollinearity is not a significant issue for these variables. these values suggest that each variable explains a large proportion of the variance of the other independent variables, indicating that they are potentially redundant or

convey similar information. To address this, the present study may consider collecting additional data.

The White test for heteroscedasticity yielded an Obs*R-squared value of 0.0481, which is relatively low, suggesting that there may not be substantial heteroscedasticity in the regression model. This value represents the test statistic that should be compared against a chi-squared distribution critical value to determine the presence of heteroscedasticity formally. Since this test statistic falls below the critical value at the 5% significance level, the null hypothesis of homoscedasticity (constant variance of residuals) cannot be rejected, indicating that the variance of the error terms in the model is stable across observations. The Jarque-Bera test is used to test whether the residuals of the model are normally distributed. Many statistical tests assume normality in the error distribution, and violations of this assumption can affect the validity of these tests. P-value of 0.910044 suggests that we fail to reject the null hypothesis of normality in the residuals, and the Jarque-Bera statistic of 0.188524 is low, indicating that the residuals are likely normally distributed.

5. Conclusion

This research aimed to investigate the determinants of foreign direct investment in Saudi Arabia while considering time series data from 2002–2022 and employs 7 explanatory variables related to three main categories: Economic, human resource, and governance. In this context, this research specifies 6 alternate models, and our estimates reveal a positive and statistically significant impact of economic growth and population growth on attracting foreign direct investment in the country. Whereas trade openness, exports, and stringent regulations have negative and statistically significant impacts on inducing foreign investors in the kingdom.

This research provides valuable policy insights into the determinants of FDI in Saudi Arabia, analyzing time series data from 2002 to 2022 and examining seven explanatory variables across economic, human resource, and governance categories. The findings indicate that economic growth positively and significantly influences FDI inflows. This suggests that maintaining robust economic growth is crucial for attracting foreign investors. Policies aimed at sustaining high growth rates through economic diversification, infrastructure development, and fostering a conducive business environment can enhance Saudi Arabia's appeal to foreign investors. Encouraging sectors that promise high growth potentials, such as technology, renewable energy, and advanced manufacturing, could be particularly effective.

Conversely, the research highlights that population growth, trade, exports, and stringent regulations negatively impact FDI. These findings imply that rapid population growth may strain resources and infrastructure, potentially deterring investment. Therefore, policies should improve urban planning, infrastructure, and resource management to mitigate these pressures. The negative impact of trade and exports suggests a need to reassess trade policies and export strategies, ensuring they are aligned with FDI goals. Reducing overly stringent regulations is also crucial, as excessive regulatory burdens can dissuade investors. Streamlining regulatory processes, enhancing transparency, and reducing bureaucratic hurdles can make the investment climate more attractive. These insights emphasize the need for a balanced approach that promotes economic growth while addressing regulatory and infrastructural challenges to boost FDI in Saudi Arabia.

While this study provides valuable insights, it also acknowledges several limitations. Issues such as data availability and the specificity of the data may limit the depth of analysis possible. The static nature of our current approach might not sufficiently capture the dynamic aspects of investment flows, and the complexity of establishing causality between economic factors and FDI presents inherent challenges. Moreover, factors like geopolitical dynamics and socio-cultural determinants of FDI, which are often elusive in quantitative analyses, were not fully accounted for in our study. Addressing these limitations in future research will be crucial for developing more nuanced and broadly applicable insights that can effectively guide policy decisions and support sustainable economic development.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Baci N, Mulla G, Millo D, and Xhyheri K (2022). Foreign direct investment and its drivers: an empirical comparative study on developed and developing countries. WSEAS Transactions on Environment and Development, 18: 992-1004. https://doi.org/10.37394/232015.2022.18.95

Camino-Mogro S and Armijos M (2020). The effects of COVID-19 lockdown on foreign direct investment: Evidence from Ecuadorian firms. MPRA Paper No. 104821. Available online at: https://mpra.ub.uni-muenchen.de/104821/1/MPRA_paper_104821.pdf

Contractor FJ, Dangol R, Nuruzzaman N, and Raghunath S (2020). How do country regulations and business environment impact foreign direct investment (FDI) inflows? International Business Review, 29(2): 101640. https://doi.org/10.1016/j.ibusrev.2019.101640

Fu Y, Alleyne A, and Mu Y (2021). Does lockdown bring shutdown? Impact of the COVID-19 pandemic on foreign direct investment. Emerging Markets Finance and Trade, 57(10): 2792-2811. https://doi.org/10.1080/1540496X.2020.1865150

Harding T and Javorcik BS (2012). Foreign direct investment and export upgrading. Review of Economics and Statistics, 94(4): 964-980. https://doi.org/10.1162/REST_a_00226

Hashmi SH, Hongzhong F, and Ullah A (2020). Effect of political regime, trade liberalization and domestic investment on FDI inflows in Pakistan: New evidence using ARDL bounds testing procedure. International Journal of Information, Business and Management, 12(1): 276-299.

Hayat A (2019). Foreign direct investments, institutional quality, and economic growth. The Journal of International Trade and Economic Development, 28(5): 561-579. https://doi.org/10.1080/09638199.2018.1564064

Hensel HM (2022). Security dynamics in the Gulf and the Arabian Peninsula: Contemporary challenges and opportunities. First Edition, Routledge, London, UK. https://doi.org/10.4324/9781003298458

Horobet A, Popovici OC, and Belaşcu L (2021). Shaping competitiveness for driving FDI in CEE countries. Romanian Journal of European Affairs, 21(2): 48-68.

Karahan Ö and Bayır M (2022). The effects of monetary policies on foreign direct investment inflows in emerging economies: Some policy implications for post-COVID-19. Future Business Journal, 8: 39. https://doi.org/10.1186/s43093-022-00152-6 **PMCid:PMC9510547**

Kornecki L and Raghavan V (2011). Inward FDI stock and growth in Central and Eastern Europe. The International Trade Journal, 25(5): 539-557. https://doi.org/10.1080/08853908.2011.604297

Lee HH, Hayakawa K, and Park CY (2023). The effect of COVID-19 on foreign direct investment. Global Economic Review, 52(1): 1-17. https://doi.org/10.1080/1226508X.2023.2171459

Lee IH and Rugman AM (2012). Firm-specific advantages, inward FDI origins, and performance of multinational enterprises. Journal of International Management, 18(2): 132-146. https://doi.org/10.1016/j.intman.2011.11.001

Mohamed AN and Abdulle AYA (2023). The asymmetric effects of foreign direct investment inflow on economic growth: Fresh evidence from Somalia. Journal of Law and Sustainable Development, 11(7): e416. https://doi.org/10.55908/sdgs.v11i7.416

Riabushka LB and Yusiuk A (2020). The impact of fiscal risks on public debt and macroeconomic indicators. Ph.D. Dissertation, Sumy State University, Sumy, Ukraine.

Sabroso LM and Cañete AP (2023). Factors driving foreign direct investment: An empirical investigation using multiple regression. Journal of Asian Development, 9(1): 16-31. https://doi.org/10.52941/jad.v9i1.43

Shaukat S, Fatima A, Waseem M, and Bhatti MK (2023). Government expenditure impact on the economic growth of Pakistan. Review of Economics and Development Studies, 9(1): 27–36. https://doi.org/10.47067/reads.v9i1.476

Shrivastava N, Bangur P, and Shrivastava D (2022). Factors influencing foreign direct investments: Indian evidence. International Journal of Economics and Accounting, 11(3): 233-243. https://doi.org/10.1504/IJEA.2022.126281

Stoian C and Filippaios F (2008). Dunning's eclectic paradigm: A holistic, yet context specific framework for analysing the determinants of outward FDI: Evidence from international Greek investments. International Business Review, 17(3): 349-367. https://doi.org/10.1016/j.ibusrev.2007.12.005

Tan L, Xu Y, and Gashaw A (2021). Influence of exchange rate on foreign Direct investment inflows: An empirical analysis based on co-integration and Granger causality test. Mathematical Problems in Engineering, 2021: 7280879. https://doi.org/10.1155/2021/7280879