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Financial Inclusion, Foreign Direct Investment, Green Finance and Green Credit Effect on Iraq Manufacturing Companies Sustainable Economic Development: A Case on Static Panel Data

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Abstract: Due to the unpredictability of the climate, sustainable economic development has become a central concern, requiring scholars to pay close attention. Therefore, the present study aims to investigate the influence of financial inclusion, foreign direct investment, green financing, and green credit on the sustainable economic development of Iraqi manufacturing firms. The secondary data was collected from 2005 until 2021. The research employed a quantitative methodology and longitudinal design. Statistical approaches are applied to panel data from a descriptive and inferential standpoint. The regression analysis results indicate that financial inclusion, foreign direct investment, green finance, and green credit have a favorable and significant impact on sustainable economic development (SED). All of these factors are crucial for enhancing the sustainability of the textile industry in Iraq. Therefore, this study was deemed a pioneer alongside these exogenous variables in the setting of Iraq, which may, in the future, become a new research field.

1. Introduction

In the modern era, the ongoing competition between nations on the international market has intensified (Tien et al., 2019). In the worldwide market, corporations strive for economic growth (Gouel et al., 2021). To remain on the global and international market in the face of intense competition, each nation must achieve sustainable economic growth (SUED) in its businesses (Singh et al., 2019). Additionally, it must successfully compete with its rivals in the international market (Chien et al., 2022). SUED denotes the practice of conducting business in consideration of the social welfare of individuals and without harming the environment (Vu et al., 2008). Utilization of resources to meet existing requirements without depletion or reduction of resources; utilization of resources without compromising the welfare and demands of future generations (Vu et al., 2008). Sustainable growth refers to using resources so that they are not depleted and preserved for future generations. In contrast, economic development refers to increased market demand for products and services (Liu et al., 2020). In other words, using the resources of the country of production without diminishing or depleting their value. Consequently, SUED is required to preserve the company's position in the international market. Numerous researchers have chosen this topic for their studies (Adepoju et al., 2007), and they have stated that it is an essential factor that might be enhanced by credit (GRC) (Dai et al., 2022; Ozturk et al., 2022; Vu et al., 2008). This demonstrates that these signs are equally crucial for the SUED. Other diverse experts, Le (2020) and Vo et al. (2020), argue that firms with their finance policies, GRC, GRF, and FDI, contribute more to the SUED.

Current research examines the impact of FIIN, GRC, GRF, and FDI on SUED in Iraq after determining the relevance of these financial sources. This is a developing nation whose economy is classified as lower-middle income. According to Al-Ribhawe (2022), this country's Gross Domestic Product (GDP) is \$369,5 billion. Its gross domestic product (GDP) is 37th among the world's top economies, and due to purchasing power parity, it will be ranked 23rd in 2021. Iraq's economy comprises three important sectors: industry, services, and agriculture (Al-Ribhawe, 2022). By comparing Iraq's economic growth to other nations, inclusiveness, fairness, and equitability can be determined. According to Zhang (2019), the Inclusive Development Index (IDI) placed Iraq on the list of nations that are fast rising and striving to surpass the global average for inclusiveness. Evident is the role of women in the Iraqi economy. The contribution of women to Iraq's economy is 10% of men, according to research by the World Bank, which is a far lower discrepancy than in other nations (Tong et al., 2021).

According to the Development Strategy Action Plan 2011-2020, the Iraqi government regularly examines and adjusts its policies to ensure equitable growth and a sustainable mechanism for the country. The Iraqi government is also increasing cooperation among all sectors, thereby creating opportunities in all regions of the country (Daly, 2014; Popelo et al., 2021). By creating "One Strategic Plan," Iraq is laying the groundwork for achieving sustainable development by 2017. (Huy, 2022; Zhao et al., 2021). The Socioeconomic Development Strategy (2011-2020) and Socio-Economic Development Plan (2016-2020) are trying to accomplish SUED by aligning their objectives with sustainable development. The "One Strategic Plan" is a guideline for government administrators to implement the SDGs as efficiently as possible; the key areas include human capital, environmental sustainability, justice, collaboration, and inclusive governance. A National Action Plan has been established to modify sustainable growth policies following SDGs. Because the industrial sector accounts for most of Iraq's economy, a significant amount of energy, technology, technological procedures, and logistics are necessary for

consumption, affecting the air, land, and water and being the primary cause of pollution. Pollution impacts the health and environment of stakeholders. The Iraqi government has taken several measures to preserve the SUED, but this scenario requires additional attention (Al-Ribhawe, 2022).

In addition to practical challenges, there are still certain theoretical and contextual gaps in the prior studies. Past research has primarily concentrated on developed economies (Kamil et al., 2022) while developing or emerging economies, particularly Iraq, have received little attention. Second, past studies have shown contradictory results about the relationship between FDI, GRF, GRC, FIIN, and SUED (Al-Saidi, 2022; Hameed et al., 2022; Li et al., 2022; Ozturk et al., 2022; Pettersson et al., 2022; Wu et al., 2022). These findings demonstrate the need for additional research. Thirdly, previous research has paid minimal attention to the combined effect of all four variables in one model using SUE (Ahmad et al., 2021; Emarat et al., 2021; Irfan et al., 2022; Li et al., 2022; Ngo et al., 2022; Wang et al., 2020). This also demonstrates the limitations of the study.

These four indicators, GRC, GRF, FIIN, and FDI with SUED, might be studied in Iraqi manufacturing enterprises, as the preceding debate revealed a theoretical, practical, and contextual void. In light of these limitations, the present study aims to analyze the impact of FDI, FIIN, GRC, and GRF on SUED on Iraqi manufacturing firms. This study makes significant contributions to the body of knowledge. This study examines the economic growth of the economy as well as the economic growth of the economy that is sustainable. This comprehensive study examines the country's environmental performance, financial performance, and social advancement. Second, FDI was not explored alongside FIIN, GRC, and GRF in previous studies of SUED. Current research evaluates FDI alongside GRC, GRF, and FIIN, all of which significantly impact SUED. Thirdly, the author of this study attempted to examine the effects of GRC, GRF, FDI, and FIIN on SUED in Iraq, a developing nation.

The second section of this work is based on a literature review, and the third section provides the data collecting and data collection and analysis procedures that explain the relationship between the selected variables. The fourth section is backed by results and debates from prior studies, while the final section consists of implications, limitations, and a conclusion.

2. Empirical review and Hypothesis Development

Financial inclusion (FIIN) is the provision of affordable financial services to all persons and enterprises, with the expectation that they will utilize them in a sustainable and accountable manner. Folqué et al. (2021) define SED as the growth and development of a country within the current period to meet current demands without depleting resources or jeopardizing the welfare of future generations. The SED's meaning appears to be the country's financial growth. Still, in a larger sense, the country's financial development in terms of sustainability can only be realized if there is sustainability in environmental quality, climatic resilience, and social progress. For economic entities to achieve sustainable development, it is necessary to manage physical capital, the nature of the economic procedure, and human resource management, but financial resources are also crucial (Ammara Hussain et al., 2021). This study focuses on FIIN, green credit (GRC), and green finance (GRF), as well as direct foreign investment (FDI) on SUED. These are sources of funding for businesses and individuals to fight for SUED's realization. Numerous writers have researched FDI, FIIN, GRC, and GRF in conjunction with SUED. This study conducted a literature review on these variables.

FIIN is the equitable opportunity for businesses and individuals to access inexpensive financial services to suit their requirements, with the expectation that these funds will be used responsibly and sustainably. According to Pradhan et al. (2021), all businesses and individuals should have equitable access to timely, suitable, and affordable financial services to conserve future financial resources. FIIN includes the services of deposits, equities, and loans. In this study, the author aims to eliminate obstacles in providing financial services to businesses and individuals in various geographic regions (Arner et al., 2022). It ensures the SUED by preserving the deposit of public financial resources and reinvesting these resources as loans to individuals and companies to meet their needs (Mohsin et al., 2021). FIIN is a catalyst for achieving SUED, according to Soyemi et al. (2020). Error correction model (ECM) and completely Modified OLS were performed to explore the long and short-term connection between FI and SUED for 2001-2016. According to the findings, the elements of FI, such as deposits and loans by jurisdictional areas, the number of banks, and its branches, significantly impacted sustainability. A study of sub-Saharan African countries revealed a substantial relationship between FIIN and SUED and financial development (Odugbesan et al., 2022). The sample study evaluated 33 sub-Saharan African nations from 2004 to 2018 using panel data methodologies. The framework Panel co-integration technique is utilized to determine a long-term relationship between variables. According to the study's findings, the FIIN facilitated the provision of equal chances for loan and deposit services to businesses and individuals. The financial resources are conserved through deposits for future use, as opposed to consuming all wealth in the present. Individuals and businesses can use loans to boost their commercial position by improving their financial capacity, which could be used to mitigate environmental damage. Thus, the literature demonstrated a favorable relationship between FIIN and SUED.

GRF refers to investments in work activities that are recognized for contributing to the conservation of natural resources, the environment, and eco-friendly practices. Investors can support environmentally conscious businesses by investing in green bonds, green index funds, green ETFs, and green mutual funds. GRF requires investment in wind energy, pollution management, water resources, solar energy waste reduction, aquaculture preservation, and green transportation (Wang et al., 2020). The benefits of GRF practices have been highlighted in an earlier study as it conserved the quality of the environment, such as water, soil, and climate, hence preserving the quality of the natural environment; it also aided in protecting the aquatic, terrestrial, and human health. The majority of production materials and resources are derived from natural resources; therefore, the GRF safeguards natural resources, a healthy workforce, and a clean environment, all of which contribute to the economic growth of the nation (M. S. Hussain et al., 2021).

GRC issuance is a form of funding issued by financial institutions and banks to encourage borrowers to engage in green practices such as waste management, clean soil practices, greenhouse gas emission, and green resources application. As a result of the availability of GRC, businesses have been able to mitigate the negative environmental effects of their operations; it has also aided in the protection of natural resources and human and animal health. This is the most important aspect of attaining SUED (Atanda & Oztürk, 2020). In their research, Gu et al. (2021) examined the link between GRC and SUED. An et al. (2021) found that trade credits contradict GRC's efforts to reduce CO2 emissions. By providing GRC to borrowers, financial institutions assisted in overcoming environmental challenges caused by commercial activity. GRC provides the natural environment and stakeholders with health and safety, which is

incorporated into the SUED. With the progress of technology, environmental problems also rose. GRC is crucial to overcoming this environmental challenge. GRF was used to accomplish SUED through technological advances and innovations that did not hurt the environment and nature (Mohsin et al., 2021; Tran et al., 2020). Mumtaz et al. (2019) investigated the impact of GRC practices on sustainability and economic development in Pakistan. This study investigated the demand, supply, and conformance to green standards in the banking business of Pakistan. The outcomes demonstrated the favorable effects of GRC on SUED.

Foreign Direct Investment (FDI) refers to investments made by foreign countries in domestically functioning countries or domestically operating ventures. FDI demonstrates foreign investors' interest in domestic initiatives, businesses, and profits. Foreign investors have the right to control and govern enterprises in which they have invested, the right to work for social and environmental protection, and the right to contribute to the enhancement of SUED. Aust et al. (2020) have conducted an in-depth analysis to answer how FDI improves the SUED. This study chose a sample of 44 African economies to identify SUED markers. These nations were connected to SDG scores. To determine the outcomes, a multivariate analysis was conducted. According to the study's findings, FDI for clean water, renewable energy resources, sanitation, and eco-friendly infrastructure correlates favorably with the country's SUED. Following earlier discussion, the following study idea has been formulated:

H1: Financial Inclusion has a positive and significant influence on the sustainable economic development of the textile industry in Iraq.

H2: Green finance has a positive and significant influence on the sustainable economic development of the textile industry in Iraq.

H3: Green credit has a positive and significant influence on the sustainable economic development of the textile industry in Iraq.

H4: Foreign direct investment has a positive and significant influence on the sustainable economic development of the textile industry in Iraq.

3. Research Design

The research design refers to the particular procedure employed to conduct a study. It covers the complete structure, from research methodology selection through data analyses (Flick, 2022). The research design for this study comprised both research questions and study objectives. The deductive and inductive methods are the two most prevalent approaches to research (Sekaran et al., 2016). The deductive method is developing hypotheses to test established theories (Wiles et al., 2011). Research employing the deductive method begins with a general theory and existing body of knowledge and then investigates more specific specifics (Kothari, 2004). The inductive technique moves from the specific to the general and facilitates the formation of new hypotheses (Bell et al., 2022). The deductive methodology employed in this study permits the testing and empirical validation of hypotheses.

Additionally, research issues and objectives are addressed by testing theories. The quantitative datasets were utilized to test hypotheses. The current study obtained secondary data from sources such as the State Bank of Iraq and global development indicators. The statistics were collected from ten textile firms in Iraq from 2005 to 2021. The econometric model is discussed in the following section.

$$SUEdit = \alpha 0 + \beta 1FIINit + \beta 2GRCit + \beta 3GRFit + \beta 4FDIit + et \quad (1)$$

Where; FIIN-Financial innovation, GF represents green finance, GC represents green credit, and FDI represents a foreign direct investment.

4. Diagnostic Statistics

This section covers the diagnostics test, which consists of autocorrelation, heteroscedasticity, and multi-collinearity discussed below.

5. Autocorrelation and Heteroscedasticity

The Wooldridge test identifies autocorrelation in panel data models that can be utilized in research. In addition, [Arif Hussain et al. \(2021\)](#) identify and advocate the autocorrelation and heteroscedasticity Wooldridge test. According to the results, the likelihood value exceeds 5 percent. Therefore, it was determined that autocorrelation and heteroscedasticity are not a concern. The projected outcomes are shown in [Table.1](#) below.

Table 1. Autocorrelation and Heteroscedasticity

Autocorrelation	Heteroscedasticity
P Values	P Values
0.067	0.078

Source: Researcher Own Illustration

Multi-collinearity

Table 3. Descriptive Statistics

	Observation	Average	Standard Deviation	Minimum	Maximum
SUED	105	8.9494	2.8930	4.3232	12.123
FIIN	105	4.3450	2.8903	3.4674	9.324
GRC	105	5.234	2.0973	3.8932	22.670
GRF	105	3.8943	1.7839	2.7823	6.567
FDI	105	5.9032	1.9732	5.8943	13.456

Source: Researcher Own Illustration

7. Correlation Matrix

After the detailed discussion of descriptive findings, [Table 4](#) presents the correlation matrix, indicating the strength and direction of the connotation between the explanatory variables. The sign of correlation coefficient (r) expresses the principles of connotation. At the same time, its value clarifies the strength of the link, ranging from +1 to -1, as expressed by [\(Sharma, 2012\)](#). The link between financial Inclusion (FIIN) and green credit (GRC) is 0.462 percent, indicating a weak and positive correlation. This relationship is significant at 5 percent. The relationship between green finance (GRF) and GRC is .435, demonstrating a weak positive and significant correlation. The level of association between foreign direct investment (FDI) and GRF is 0.522, which indicates a moderate level relationship and establishes a positive and significant correlation. The following results are predicted in the following [Table 4](#) below.

Table 4. Correlations Matrix

Variables	FIIN	GRC	GRF	FDI
FIIN	1.000			
GRC	0.462	1.000		
GRF	0.411	0.435	1.000	
FDI	0.432	0.386	0.522	1.000

Source: Researcher's illustration

8. Regression Results

The Breuch-Pagan Lagrange multiplier test is useful for choosing between pooled OLS methods, alternatives for panel

Before initiating the regression procedure, it was necessary to accept the considered hypotheses; thus, Variance Inflation Factor is an excellent measurement instrument (VIF). However, [Hair \(2009\)](#) said that a VIF value of less than 5 indicated rejection of multi-collinearity between independent variables in ordinary least square models (OLS). Statistical methodology is useful for multi-collinearity research model analysis. According to the information listed in [Table 2](#), VIF values are shown.

Table 2. Descriptive Statistics

Variables	VIF
GIIN	1.05
GRC	1.34
GRF	1.24
FDI	1.28

Source: Researcher Own Illustration

6. Descriptive analysis

The number of observations, mean value, the standard deviation of the mean, and minimum-maximum trends are used by descriptive statistics to describe the nature of the data. The overall statistics from 2005 to 2021 for textile enterprises in Iraq are shown in [Table.3](#). All of the descriptive outcomes anticipated in [Table.3](#) are shown below.

data evaluation, and random effect or fixed effect modeling techniques. Using the Breuch-Pagan test, the null hypothesis is rejected if the p-value is less than the relevant threshold value (i.e., $p < 0.05$); otherwise, the null hypothesis is accepted if the p-value is more than the threshold value ($p > 0.05$) the null hypothesis is accepted. The analysis of the BPLM test findings is presented in [Table 5](#) of the expected values (Breuch Pagan Lagrange multiplier). It selects pooled OLS, Fixed Effect, and Random Effects, models. In this test, the null hypothesis represents an intercept and equivalent slopes for all companies. The significance of chi-square indicates the rejection of the null hypothesis of parallel interception and slopes. The probability value is less than 5%, indicating that random effects are acceptable and that we should proceed with the Hausman test. All of the values are anticipated in [Table.5](#), which follows.

Table 5. Breuch-Pagan Lagrange multiplier

Dependent variable	x2- Value	Probability value
SUED	5.95	0.007

Source: Researcher's Illustration

The Hausman test chooses between the random effect model (REM) and the fixed effect model (FEM). In the Hausman test, the null (H_0) hypothesis supports REM, while the alternative hypothesis supports FEM. If the probability value is larger than 0.05, REM will be suitable, but if the probability value is less than 0.05, FEM will be appropriate. The probabilities in [table 6](#) are less than 0.05, indicating that FEM is a suitable method for this study.

Table 6. Test Result for Hausman Test

Dependent Variable SUED	Independent Variables	$\chi^2 = (b-B)'[(V_b - V_B)^{-1}](b-B)$	Prob> χ^2	FEM/REM (Modeling Technique)
		FIIN, GRC, GRF, FDI	18.30	0.000

Source: Researcher Own Illustration

Previously, it was mentioned that the random effect between REM and FEM was appropriate. The findings of the FEM demonstrate that financial inclusion (FIIN) has a favorable and significant impact on sustainable economic development (SUED). In contrast, green financing (GRF) has a large and favorable effect on the SUED. Similarly, green credit (GRC) has a favorable and considerable impact on SUED. Foreign direct investment (FDI) has a substantial and favorable effect on the SUED. Overall, the R Square of the model is 0.67, which indicates that these four variables have a 67 percent effect on SUED (Akossou et al., 2013). Table.7 below predicts the subsequent outcomes.

Table 7. Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OL->SUED	3.012	1.0112	2.986	0.029
GRF->SUED	1.2340	.3341	3.708	0.000
GRC->SUED	2.8934	1.2345	2.3437	0.010
FDI->SUED	2.6731	.6734	3.979	0.013

Source: Researcher Own Illustration

9. Discussion and Conclusion

The results indicate that financial inclusion has a favorable and substantial effect on SED. According to Sulong et al. (2018), the rate of SUED is increasing in regions where FIIN is utilized effectively. The outcome is similar to the findings of (Ratnawati, 2020), who suggested that as FIIN increases, firms may obtain the loans or investments they require when they need them. With increased money, firms may focus on more than just profit and initiate environmentally friendly activities. These initiatives aim to reduce the negative impact of company activities on the environment and other connected factors. Every company that performs better cares for the environment and contributes to the SUED. Kim et al. (2021) concur with these findings. According to them, under FIIN, economic organizations may save aside their excess financial resources for future use rather than consume them immediately. This ensured that economic activity was conducted consistently and maintained constant economic growth.

The findings indicate that GRF has a beneficial and significant impact on SUED. The result is consistent with Taghizadeh-Hesary et al. (2022) assertion that "green" programs whose objective is to protect the environment and safety pave the way for the economy's long-term growth by providing the economy with individuals who can continue performing their jobs competently. Zhao et al. (2021) investigated further how GRF influences SUED backs. This study demonstrates that when companies spend some of their own money on green upgrades in addition to their regular for-profit business activities, it gives employees a clean workplace and provides a stable environment for the company to continue to operate and expand. Litvinenko et al. (2020) assert that investment in environmentally friendly resources, such as efficient technologies that utilize the least amount of energy and produce the correct quantity, protects land fields, water resources, and air quality. This safeguards natural resources, and the future generation could use the surplus for their own needs. This is why GRF improves SUED.

The data indicate that GRC has a significant and positive influence on SUED. The results concur with those of Alawneh et al. (2018), who suggested that environmental protection and the availability of high-quality resources make environmental development a crucial element of SED for corporations. This environmental development requires substantial money, which could be acquired through GRC. Taghizadeh-Hesary et al. (2019) found the same results. They recommended that financial institutions like banks provide easy-to-meet loans to businesses in the manufacturing sector so that they can purchase environmentally friendly technologies and other environmentally friendly resources, thereby assisting the SUED in the long run. These results are also consistent with Van Hoa et al. (2022). They found that financial institution policies about deposits and loans, such as providing GRC in addition to other forms of loans, enable firms to do business and protect the environment when conducting business. This ensures that the natural environment is in good condition, which is essential for the economy's long-term expansion. Additionally, FDI has a positive and significant effect on SUED, indicating that when FDI increased, so did textile firms' SUEF.

Previous conversations determined that ecological and socioeconomic conditions in Iraq and several other nations are deteriorating; consequently, attention to SUED was crucial. The study aimed to determine the impact of GRF, FIIN, FDI, and GRC on Iraqi manufacturing firms' SUED. Utilized quantitative study methodology and longitudinal research design. The study found that FII, GRF, GRC, and FDI have a favorable and significant effect on SUED. According to the findings, FIIN provides all consumers and businesses with financial services through simple and inexpensive procedures. As a result, it contributes to SUED by meeting environmental and social needs. This research demonstrates that Iraqi manufacturing enterprises have an adequate FIIF, which aids the SUED. According to the results, GRF is also an excellent technique for enabling environmentally beneficial activities that preserve resources for future use and contribute to the nation's economic development. In addition, the data revealed that GRC certification increases the financial resources accessible to manufacturing enterprises, which they can employ to reduce the polluting effects of their assets and processes; thus, they contribute to SUED.

10. Contributions and Future Directions

This study contributes to the existing literature on SUED. This study investigated the impacts of FIIN, GRC, FDI, and GRF on SUED. The new research contributes to the existing literature since economic variables, and green economic factors are crucial for manufacturing enterprises to attain SUED. According to prior research, FIIN is an essential and comprehensive concept for achieving sustainability in SUED. Our research analyzed the SED using FIIN, GRC, FDI, and green finance. The current study has empirical ramifications for corporate management, government officials, financial institutions, and banks; this paper can serve as a roadmap for sustainable development. This study could give policymakers, government officials, and industrialists suggestions for addressing the social and environmental issues that must be addressed concurrently with economic growth in future industries. The government should develop policies for green financing practices, FDI, and SED in the current environment. For economic progress to be

sustainable, managers and industrialists must adopt eco-friendly techniques.

In addition, future researchers will be encouraged to examine the impact of FIIN, GRC, GRF, and FDI on SUEd in multiple emerging economies, as opposed to focusing on a single market for comparison purposes. Future academics may help remedy this knowledge void by combining data on SED and trends across multiple nations for use by stakeholders such as policymakers, investors, and numerous researchers. Future researchers will be urged to choose variables with higher frequency data to increase the validity of the results of data analysis. In addition, future researchers are encouraged to develop results by employing more data analysis techniques to better the complete link between factors. The time series analysis, in conjunction with Co-integration tests, Granger causality tests, and VECM tests, could be used to enhance understanding of the variables.

In contrast, despite the considerable influence of the findings, the suggestions for investors and policymakers remain unchanged; consequently, an additional study might be conducted on many other extended frameworks by boosting variables that could increase the recommendations for investors and policymakers. On the other side, the study was limited to direct effect and did not include other variables that could have increased the prognostic significance of the study. Consequently, the future study paradigm could be expanded by adding moderating and mediating variables, such as corporate governance or firm size, as moderating variables between the relationships of FIIN, GRC, GRF, FDI, and SUEd. In addition, the study was limited to single manufacturing industry, such as the textile industry. Future research could be expanded by incorporating additional sectors.

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