

## The Impact of Some Monetary Indicators on Gross Domestic Investment in Iraq<sup>(1)</sup>

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### Abstract:

The paper examines the impact of a number of monetary indicators on gross domestic investment in Iraq for the period 2004-2024, by using a regression analysis model in addition to adopting several statistical techniques in the purpose of testing the model validation. Unit root test results show that gross domestic investment and most of the variables series included in this study depict stationarity in their levels except for net domestic assets, and policy interest rate (end of period) where they depict trend in levels, however, they appear stationary in their first differences. Regression analysis show that except for base money variable, all independent variables included in this model seem to have significant relationships with the dependent variable, and the group of independent variables represented in the model are jointly significant. Cointegration test is established for gross domestic investment and monetary indicators suggesting there is a long-run equilibrium relationship between the series. LM test result reveal that the proposed model is valid as there is no serial correlation in the errors in the model. The results of the study indicate that the policymakers would have to concentrate on creating a favorable environment for private-sector growth in an economy dominated by oil production and public spending, as well as public investment practices require significant reforms by the authorities.

**Keywords:** Gross Domestic Investment; Monetary Indicators; IMF; Multiple Regression Analysis; Cointegration.

أثر بعض المؤشرات النقدية على الاستثمار المحلي الإجمالي في العراق

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### المستخلص:

يهدف البحث الى دراسة أثر بعض المؤشرات النقدية على الاستثمار المحلي الإجمالي في العراق للمدة من ٢٠٠٤-٢٠٢٤، من خلال استخدام تحليل الانحدار المتعدد بالإضافة الي تبني عدد من الاختبارات الإحصائية التي تهدف الي التحقق من صلاحية النموذج المقدم. يظهر من اختبارات جذر الوحدة ان الاستثمار المحلي الإجمالي وأغلب المؤشرات النقدية التي تضمنتها هذا البحث ثابتة

<sup>(1)</sup> This research is a work part of a PhD dissertation by the PhD student Zheen Jameel Khaleel, supervised by Prof. dr. Sarmad Kawkab Al-Jamil.

عند المستوى ماعدا مؤشر صافي الموجودات المحلية ومؤشر سعر الفائدة (نهاية المدة) حيث انها تختبر ميل عند المستوى ولكنها ثابتة عند الفرق الأول. كما يتبين من اختبار تحليل الانحدار المتعدد أن هناك علاقة معنوية بين كل مؤشرات المتغير المستقل التي تضمنتها البحث والمتغير المعتمد، إضافة الى معنوية المؤشرات المقدمة في النموذج مع بعضها. وتم تبني اختبار التكامل المشترك للاستثمار المحلي الإجمالي مع المؤشرات النقدية للتحقق من وجود علاقة طويلة الاجل ما بين متغيرات البحث. وأخيراً، تؤثر نتائج اختبار LM على صلاحية النموذج المقدم. تؤثر نتائج البحث على أهمية التركيز على خلق بيئة مناسبة من قبل السلطات وصانعي القرار وذلك لتشجيع نمو القطاع الخاص في اقتصاد الدولة المسيطر عليه انتاج النفط والنفقات العامة، كما ان الاستثمار العام يتطلب إصلاحات معينة من قبل السلطات.

**الكلمات المفتاحية:** الاستثمار المحلي الاجمالي، المؤشرات النقدية، صندوق النقد الدولي، تحليل الانحدار المتعدد، التكامل المشترك.

## 1. Introduction:

The flow of money, and the financial accounts that display the money supply, lies at the heart of the financial system of a country. The rate at which a country develops depends, from a macroeconomic point of view, on the accumulation of physical and human resources as well as on advances in technology motivated by the accretion of capital in its various forms. A number of variables can capture this method, one of them is gross domestic investment.

Investment is a good way to promote entrepreneurship, economic development, and helping to foster poverty reduction. Countries which have more developed financial systems, i.e. financial markets and institutions that more effectively channel the savings of society to its most beneficial use, have faster economic development, shown by loads of research studies. Well-developed financial systems facilitate the exchange of goods and services through the provision of payment services; help mobilize and pool investor savings; collect and process business information and potential investment ventures, thus allocating the savings of society to its most beneficial use; track investments and exercise corporate governance; and help diversify and minimize liquidity and inter temporal risk (Beck and Rahman, 2006: 1-2).

Key economists, social scientists, and political decision makers believe that the financial sector is a major player in fragile states' recovery. As a key condition to boost economic growth and development, the need to strengthen and enable the domestic financial system and to instill new behavioral trends to mobilize and manage scarce capital funds is needed. (Agu, 2008: 14).

The financial system of a country can make a major difference in the quick pace of an economic development. Since it can connect the short-term savers (loan providers) with the long-term savers (lending companies), it can serve as an intermediate capital provider; it can help turn the maturity size and risk of individual assets, thereby making the short-term savers more likely to invest in long-term assets. In other words, any variation in the composition and size of the assets and liabilities of the financial system, as well as changes in the way it delivers services, will trigger other sectors not only to alter their decisions on the distribution of portfolios, but also to change their saving and investment decisions. The financial system, a competitive market for financial assets, liabilities and services, is defined by the way its markets, prices, institutions and policies affect other sectors of the economy, thereby boosting economic growth and development. (Agu, 2008: 15). In other words, well-functioning financial structures play a significant role in generating high levels of savings, promoting productive investment in the nonspending market, and reduce or mitigate the possible economic instability. Under this agreement, it is a crucial element in achieving an optimal level of economic development, increasing quality of life by promoting informed risk taking and by simultaneously reducing risk. The importance of this contribution can be seen in the divergence in economic heart rate between countries with viable financial structures, and those that are distressed. This contrast shows that the contribution of finance should be valued by estimating the total increase in output that is derived from finance system. (Crockett, 2011: 6).

Macroeconomic stability is a fundamental aspect of an effective financial system given the temporal nature of financial contracts. A low and consistent inflation rate incentivizes financial as well as non-financial forms of savings. In this way, it can lead to long-term contracts and savings and therefore long-term investment. Savers are more likely to entrust their savings to an increasing fixed return if that return can be assured in terms of the actual consumption units. Monetary stability allows investors to consider the return on investment and to fulfil commitments. According to cross-country theories of banking and capital markets, countries with low and stable inflation rates experience higher levels of growth in banking and capital markets. (Boyd, Levine and Smith: 2001).

The country is an oil-dependent and unstable economy which is governed by the military. Iraq is very well equipped with oil wealth and has

the world's fourth largest reserves of oil. It also has the least expensive extraction of oil. The oil production has tripled since 2003 despite unpredictable security conditions but little progress has been made in diversifying the economy as the non-oil sector has been adversely affected by a lack of security and a difficult business environment. A major increase in public spending and civil service jobs, which tripled between 2003 and 2014, funded the growth of oil production.

The main part of the public spending is mainly employee wages, pensions and transfer payments. Despite the outsized public sector of our countries, the quality of public services, particularly health, education and other utility accounts, where power outages are frequent, is much worse compared to other countries of our size, especially those of heavier oil exporting status. With violence and a tough business environment popping up, private and financial sector growth has been quite stunted in the process.

### **1.1. The importance of the research:**

The importance of this research lies in the focus by the international studies from International Monetary Fund (IMF) and the World Bank where they stress on a variety of significant obstacles remain in Iraq's financial system. First and foremost, the continuation of the need for safety in order to be improved. In order to develop a viable and robust private sector to sustain the economic growth and provide much-needed jobs for Iraq's labor force, it is also important to maintain a stable macroeconomic environment and improve the business environment. Furthermore, a couple of systems wide changes, especially in the area of public financial management and bank restructuring, are not yet complete.

### **1.2. The research problem:**

The World Bank's most recent Investment Climate Assessment identifies the lack of energy, political instability, corruption, and lack of access to finance as the most significant constraints for attracting and receiving investment. Over the last quarter century, Iraq's overall social metrics have deteriorated significantly, reflecting its deterioration in the performance of its infrastructure, its persistent economic challenges, and its suffering from three wars. Rebuilding the nation's economy in Iraq and restoring the health and welfare of the people could take up a lot of vital

resource in the country. Therefore, this study tries to examine the impact of a set of monetary indicators on gross domestic investment.

### **1.3. The aim of the research:**

The aim of this paper is to gather data and perform some statistical analyses looks at the relationship between Gross Domestic Investment and monetary indicators in Iraq. By using a multiple regression analysis, a dynamic model was created that explains the relationship between Gross Domestic Investment in Iraq and a number of monetary indicators for the period 2004 to 2024.

### **1.4. The data source:**

For the purpose of this study, 21 observations were gathered from the International Monetary Fund publications in Iraq for the period 2004-2024. The data from 2004 to 2018 are actual as reported by the authorities and IMF, while the data from 2019 to 2024 are estimated by the IMF based on the latest data of the country and are published in the official country reports by International Monetary Fund.

## **2. The Empirical Literature:**

This section addresses previous findings and results from research relating to gross domestic investment, monetary indicators, and their variables. Merton (1990) addressed the financial system and economic performance by analyzing three specific topics: financial innovation, below-investment grade debt, and loan guarantees. He referred to these topics as “strategic research sites” and explained that the prime use for these topics is to concrete settings from which to establish propositions, raise general questions, and expose some common fallacies about financial markets and institutions. Including the functional and dysfunctional roles of government in the economic performance of the system.

Reinhart and Rogoff (2002) have argued that the official classifications for exchange rates has serious flaws through describing the evolution of the official standard annual classification scheme; the has served as the basis for so many studies. The paper proposed a new approach for reclassifying exchange rate arrangements which is by month unlike the official classification which imposes the same regime on the entire year. The new approach recognizes that an exchange rate regime is difficult to ascertain based on a monthly basis or even a yearly basis data. The paper provides examples on how the new approach of reclassification

of exchange rate arrangements may reshape the existing evidence on the links between exchange rates and different variables of economic activity.

Ocaya et al (2012) analyzed a dynamic relationship of gross domestic product (GDP) and domestic investment (DI) in Rwanda between 1970 and 2011 by a VAR model. The Augmented Dickey-Fuller (ADF) tests and Phillips-Perron tests indicated that GDP and DI are integrated of order one. The Augmented Engle-Granger and Johansen tests of co-integration show that GDP and DI series are co-integrated. In the estimated VAR model, gross domestic product was shown to almost perfectly predict domestic investment. The unidirectional causality suggests that policies initiated towards GDP provide important information for predicting DI in Rwanda.

Carrière-Swallow and García-Silva (2013) have argued that Chile's monetary policy system was well prepared for handling the 2008 financial crisis, with flexible inflation aimed at a capital-open regime. In contrast with the 1997-1998 Asian-LTCM-Russian crisis, the country performed favorably, which led the central bank to aggressively increase its exchange rate band policies in order to uphold currency and thus exacerbate the liquidity crunch. The economic crisis was also strong. The subsequent investigation provided mixed proof of the efficacy of Chile's capital controls in defending the exchange rate against external shocks. They argue that the policy regime has shifted to liberalization of the capital account since 1999 as regards internal stability.

Knight (2015) discusses how financial system has the ability to shift economies onto a more sustainable footing by managing large pools of capital and assets, as it is the fundamental component of capitalism. It addresses the need for the financial system to reassess how it judges and rewards business success, as well as it must revalue businesses and whole industries based on a world of limited resources and must replace a new value system based upon accountability, honesty and trust with its own, much-maligned culture. It concludes that the change the financial system needs to witness will deliver capitalism fit for this century.

### **3. Data Methodology:**

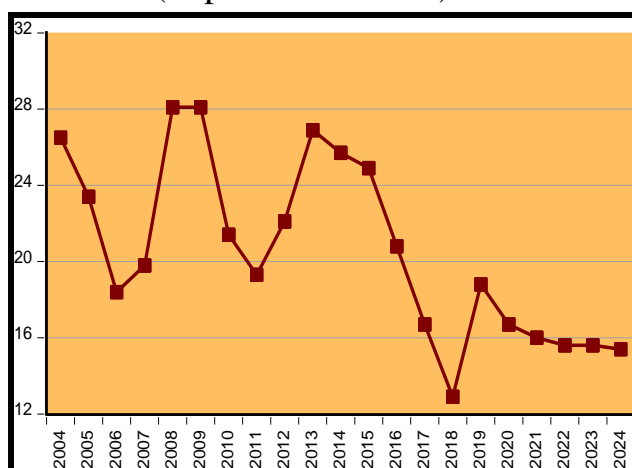
For the purpose of this study, 21 observations were gathered from the International Monetary Fund publications in Iraq for the period 2004-2024. The variables we examined are Gross domestic investment and a number of Monetary indicators that include: Net foreign exchange assets of

which: CBI; Gross foreign exchange assets; Foreign exchange liabilities; Net domestic assets; Growth in broad money; Base money; Policy interest rate; Currency in circulation (annual growth); Currency in circulation (in millions of US\$); and Reserve in money.

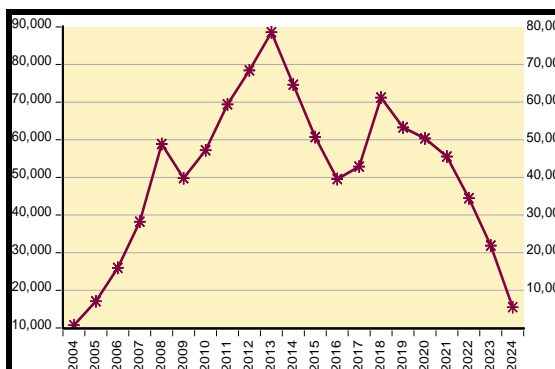
The national economy is composed of Gross Domestic Investment, which is the amount of money spent by domestic firms within them of their country. There are several factors used by economists and policymakers to calculate the economics of a country. Gross domestic investment is one of those and is used by policymakers to evaluate economic indexes in any country. Monetary accounts come from the Central Bank's balances, commercial banking and non-bank financial intermediaries. Although these accounting sheets are typically correct, classification errors, evaluation errors and time errors are subject to discrepancies in accounting procedures. For instance, the treatment of non-performing assets can make a significant difference if the income from interest is reported on the basis of an accrual or on cash basis. Valuation errors usually occur in foreign exchange transactions, especially in countries with flexible exchange rates or in countries with currency devaluations in the reporting period.

In order to understand the data used, we first plotted the time series for Gross Domestic Investment and a number of Monetary Indicators as shown in Figure 1.

Gross domestic investment  
(in percent of GDP)

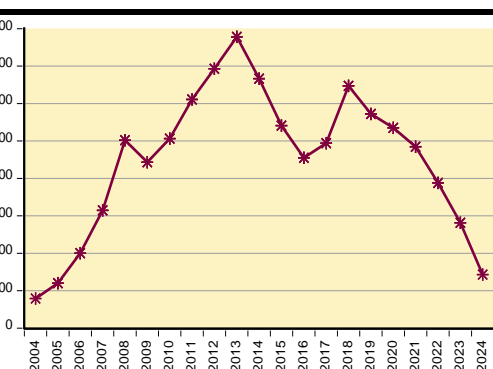


Net foreign exchange assets of which: CBI  
(in billions of ID)



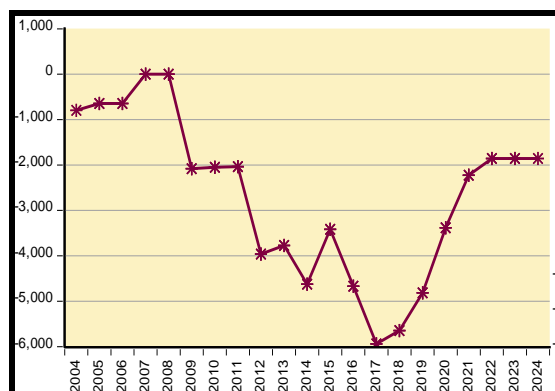
(in billions of ID)

Gross foreign exchange assets  
(in millions of US\$)

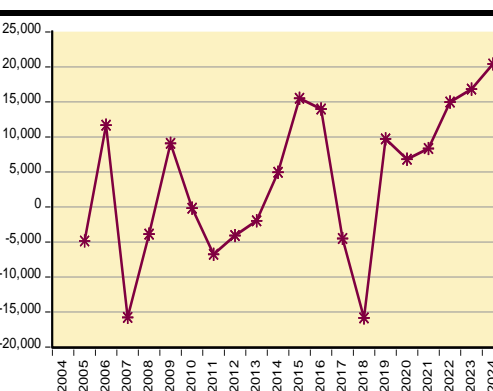


(in millions of US\$)

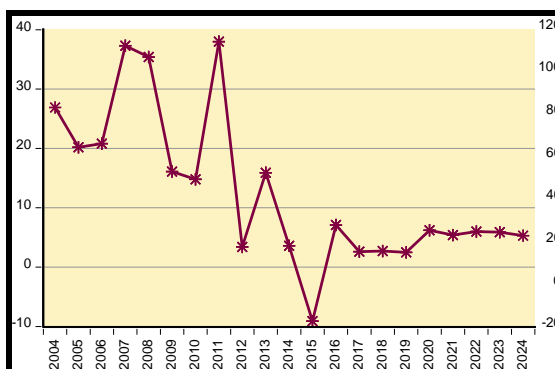
Foreign exchange liabilities  
(in billions of ID)



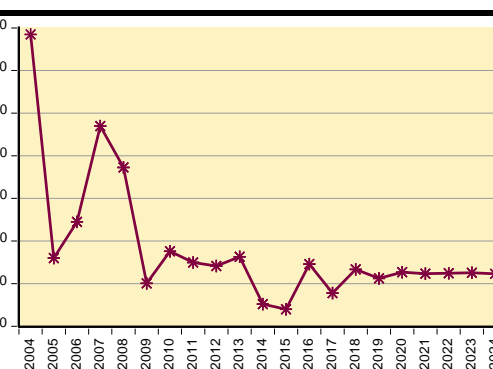
Net domestic assets  
(in billions of ID)



Growth in broad money  
(annual growth)



Base money  
(annual growth)



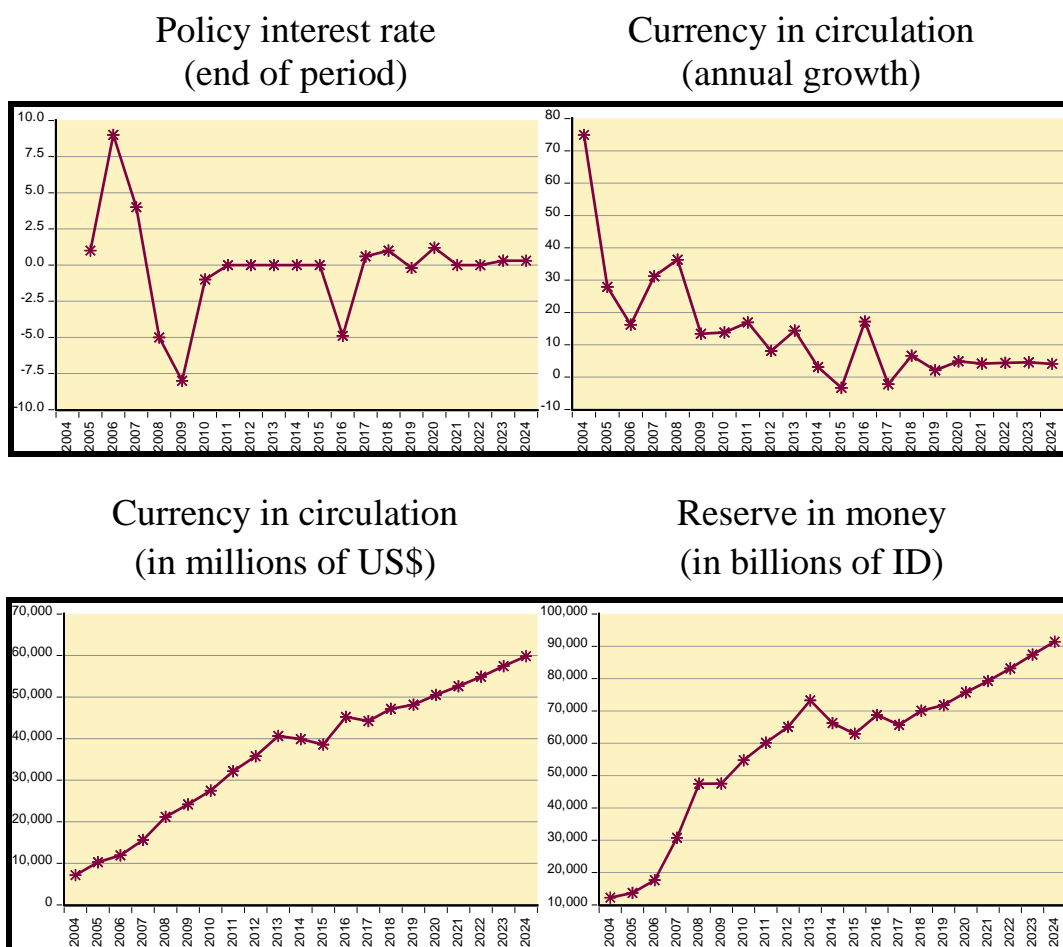


Figure (1): Time Series Plots for the research variables

Source: Derived by the researcher from EViews outcomes analysis based on IMF reports.

Shown in Figure 1 above the normality plots for the 11 variables studied in this research. Results indicate that the variables' series Gross Domestic Investment, Net foreign exchange assets of which: CBI (In billions of ID), Gross foreign exchange assets (Gross reserves) (in millions of U.S. dollars), Foreign exchange liabilities (In billions of ID), Growth in broad money, Currency in circulation, and Reserve money (In billions of ID); are normally distributed. Whilst the rest of series; Net domestic assets (In billions of ID), Base money (annual growth), Policy interest rate (end of period), and Currency in circulation (annual growth) do not appear normally distributed, and findings from the figures support these results.

Apparent is that all series in this group depict stationarity in their levels except for Net domestic assets, and Policy interest rate (end of period) where they depict trend in levels, however, they appear stationary in their first differences.

#### 4. Results and Discussion:

For the next section, we will present empirical time series analysis on the relationship between Gross Domestic Investment and Monetary Indicators:

##### 4.1. Johansen Cointegration Test:

Cointegration tests are used to determine the existence of long-run equilibrium relationship between independent and dependent variables. The Johansen cointegration test was adopted for this purpose. Presented below are the test result for the proposed model.

Table (1): Cointegration test outcome for monetary indicators and gross domestic investment model

Sample (adjusted): 2006 2024				
Included observations: 19 after adjustments				
Trend assumption: Linear deterministic trend				
Series: B1 D1 D3 D4 D7 D10				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.999361	276.9104	95.75366	0.0000
At most 1 *	0.951995	137.1659	69.81889	0.0000
At most 2 *	0.899120	79.47350	47.85613	0.0000
At most 3 *	0.734030	35.89087	29.79707	0.0088
At most 4	0.425551	10.72780	15.49471	0.2288
At most 5	0.010225	0.195273	3.841466	0.6586
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Derived by the researcher from EViews outcomes analysis based on IMF reports.

From the table above, the null hypothesis of no-cointegration is rejected in the model, implying that gross domestic investment and monetary indicators are cointegrated. This verifies that there is a long-run equilibrium relationship between gross domestic investment and monetary indicators in Iraq. The result of this testing procedure is reported at the bottom of the table as (\*) symbol denotes rejection of the hypothesis at the 0.05 level.

#### 4.2. Multiple regression analysis model:

This model determines the relationship between a set of monetary indicators and gross domestic investment, and it examines the level of effect that multiple monetary indicators have on gross domestic investment in Iraq for the period 2004-2024.

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \beta_5 x_{i5} + \beta_6 x_{i6} + \beta_7 x_{i7} + \epsilon$$

where, for  $i=20$  observations after adjustments:

$y_i$  = Gross domestic investment (dependent variable)

$x_{i1}$  = Net foreign exchange assets

$x_{i2}$  = Gross foreign exchange assets

$x_{i3}$  = Foreign exchange liabilities

$x_{i4}$  = Net domestic assets

$x_{i5}$  = Base money

$x_{i6}$  = Policy interest rate

$x_{i7}$  = Currency in circulation

$\beta_0$  = constant term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$  = slope coefficients for explanatory variables

$\epsilon$  = the model's error term

Table (2): Multiple regression analysis outcome for monetary indicators and gross domestic investment in Iraq for the period 2004-2024

Dependent Variable: B1				
Method: Least Squares				
Sample (adjusted): 2005 2024				
Included observations: 20 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D1	0.004279	0.001254	3.412560	0.0051
D3	-0.004188	0.001274	-3.288399	0.0065
D4	-0.003794	0.001310	-2.896578	0.0134
DD5	0.000205	7.71E-05	2.659538	0.0208
D7	0.001958	0.035042	0.055867	0.9564
DD8	-0.689674	0.138296	-4.986958	0.0003
D10	-0.000336	4.62E-05	-7.273483	0.0000
C	25.57305	2.064617	12.38634	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R-squared	0.905361	Mean dependent var		20.33000
Adjusted R-squared	0.850154	S.D. dependent var		4.613036
S.E. of regression	1.785703	Akaike info criterion		4.286676
Sum squared resid	38.26483	Schwarz criterion		4.684969
Log likelihood	-34.86676	Hannan-Quinn criter.		4.364427
F-statistic	16.39957	Durbin-Watson stat		2.344376
Prob(F-statistic)	0.000029			

Source: Derived by the researcher from EViews outcomes analysis based on IMF reports.

The best multiple regression model that allows us to predict the outcome (gross domestic investment) based on information provided on multiple explanatory variables (monetary indicators) is the model proposed above. Except for base money variable, all independent variables included in this model seem to have significant relationships with the dependent variable, and the group of independent variables represented in this model are jointly significant and F value support the significance of this model. As seen from Table 1 there is a significant relationship between six independent variables with the dependent variable, and the variation in the outcome can be explained by the variation in the independent variables. This relationship is supported by  $R^2$  which indicates that 90.5% of the variations in the gross domestic investment can be explained by changes in a set of monetary indicators. The output from Table 1 interprets that if other variables are held constant, gross domestic investment will increase by 0.004 if net foreign exchange assets increases by one unit, and it will increase by 0.0002 if net domestic assets increases by one unit. The model also shows that gross domestic investment will decrease by 0.004, 0.003, 0.689, and 0.0003; following a single unit rise in: gross foreign exchange assets, foreign exchange liabilities, policy interest rate, and currency in circulation respectively.

What we learn about Iraq financial system from these results:

- The change in foreign assets is not corresponded with the change in investments, as the change in investments is low and this affects Iraq's economy.
- Any increase in interest rate leads to a decrease in investments as a result of increasing the cost of money.

The t-Statistic values  $> 2$  for all significant independent variables stand for the affect that monetary indicators have on public gross national savings, these results are represented in Table 1.

### 4.3. Breusch-Godfrey Serial Correlation LM Test:

Another test to assess the validity of modelling assumptions in the regression model is Breusch-Godfrey Serial Correlation LM Test. It tests for autocorrelation in the errors in the regression model. In other words, it tests for the presence of serial correlation that has not been included in a proposed model structure. Presented below is the test result for the research model.

Table (3): LM test outcome for monetary indicators and gross domestic investment model

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.361403	Prob. F(2,10)	0.7054
Obs*R-squared	1.348165	Prob. Chi-Square(2)	0.5096

Source: Derived by the researcher from EViews outcomes analysis based on IMF reports.

From the table above, we accept the null hypothesis for the proposed model which means there is no serial correlation in the errors in the models. This result can be confirmed from F-statistic and Chi-Square values for the model, both of them seem to be insignificant as observed from their probabilities where they are  $> 0.05$ .

## 5. Conclusion:

Dynamic relationship between gross domestic investment and monetary indicators was analyzed using time series data of Iraq for period 2004-2024. Regression analysis indicates that there is a significant relationship between gross domestic investment and a number of monetary indicators included in the model. Cointegration test for gross national savings and public finance show that there is a long-run equilibrium relationship between the series. The findings from this study suggests that with an economy dominated by oil production and public spending, the authorities will need to focus on creating an enabling environment for private-sector development, from which; reorienting public expenditure in order to help create fiscal space for essential investment, eliminating an exchange restriction and a multi-currency practice, fiscal policy should be anchored on scaling up capital spending, and expenditure ceilings should be established supported by phased measures to lower current spending and

boost non-oil revenue. A stronger financial system, better business environment, and a far-reaching structural reform plan can boost private-sector activity and employment and thus increase the investment.

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