T.C.
SAKARYA UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMIC MAJOR SCIENCE

A STUDY ON THE RELATIONSHIP BETWEEN MONEY SUPPLY AND MACROECONOMIC VARIABLES IN SOME SELECTED MIDDLE EASTERN COUNTRIES

Asan Jalal Abdulqadir SHEKHANI

M.Sc. THESIS

Supervisor: Prof. Dr. Fuat SEKMEN

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This thesis has been accepted unanimously of votes by the examination committee on 14/01/2022.

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Prof. Dr. Fuat SEKMEN	Successful
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Assan Jalal Abdulqadir SHEKHANI

14/01/2022

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Assan Jalal Abdulqadir SHEKHANI

14/01/2022

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ABBREVIATION

ADF **:** Augmented Dickey–Fuller

ADF **:** Augmented Dickey Fuller

AEC **:** ASEAN Economic Cooperation

AIC **:** Akaike information criterion

ARDL **:** Auto Regressive Distributed Lag

B **:** Intercept parameter.

CPI **:** Consumer price index

DD **:** Demand deposit

DSP **:** Difference Stationary Process

ECM **:** Error correction model

EX **:** Exchange rate

FPE **:** Final prediction error

GDP **:** Gross Domestic Product

HQ **:** Hannan-Quinn information criterion

INVST **:** Investment

IR **:** Interest rate

LR **:** Sequential modified LR test statistic (each test at 5% level)

MS **:** Money supply

OLS **:** Ordinary Least Squares

PP **:** Phillips–Perron

SC **:** Schwarz information criterion

Tsp **:** Tread stationary process

VECM **:** Vector error correction model

WD **:** World Bank

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ABSTRACT

Title of Thesis: A Study on the Relationship between Money Supply and Macroeconomic Variables in Some Selected Middle Eastern Countries

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Supervisor: Prof. Dr. Fuat SEKMEN

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Knowing the relation between macroeconomic variables and money supply could be mentioned as a proper strategy and approach to evaluate the economic condition of several Middle Eastern counties. Researchers and economists concentrated on regional development and the elements that drive regional economic growth, such as money supply, because it is sensitive and significant and directly influences economic movement. In addition, its influence on the economic movement can produce a harmonic effect on other variables, including inflation, economic growth, interest rate, exchange rate, investment, and real GDP (Gross domestic product). As it's well-known, growth in money supply becomes a factor to increase inflation rate associated with economic growth and interest rate will remain unchanged as a result of rising general prices and rising money demand.The influence of money supply on the economy was evaluated by examining and assessing the financial system's influence on the income advancement of four countries (Iraq, Turkey, Iran, and Egypt) for the period of (1980 to 2019). This research obtained data from the Data Market, World Development Indicator, and World Bank databases. To achieve this objective, theoretical economic model applications and econometrics models, such (ARDL) as well as panel estimation (fixed and random effects model). The descriptive statistics show that the distribution of the sequence under investigations is normal through applying the empirical determination process. Sequences properties have been examined by utilizing a unit root test and all of the series found will be integrated in the first order. Furthermore, the Johansen cointegration test was accomplished to determine the long association amid the factors, and the findings revealed a long-term link amongst or among the different factors. Long run relation shows that both LMS2L and LINVST have proper or strong relations (positive) with the global GDP variable. Furthermore, LMS2 and LINVST have a statistically significant favorable impact on GDP (0.88 and 0.53), respectively. More clearly, in the case of changing LMS2 by 1%, GDP value rise by 0.88% and increasing LINVST by 1% will lead to raising GDP by 0.53%.

Keywords: Money Supply, Macroeconomic Variables, Economic Growth.

ÖZET

Başlık: Seçilmiş Bazı Orta Doğu Ülkeleri İçin Para Arzı ve Makroekonomik Değişkenler Arasındaki İlişki Üzerine Bir Çalışma

Yazar: Asan Jalal Abdulqadir SHEKHANI

Danışman: Prof. Dr. Fuat SEKMEN

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Makroekonomik değişkenler ile para arzı arasındaki ilişkinin bilinmesi, birkaç Orta Doğu ülkesinin ekonomik durumunu değerlendirmek için uygun bir strateji ve yaklaşım olarak belirtilebilir. Araştırmacılar ve ekonomistler, hassas ve önemli olduğu ve ekonomik hareketi doğrudan etkilediği için bölgesel kalkınma ve para arzı gibi bölgesel ekonomik büyümeyi yönlendiren unsurlara odaklandılar. Ek olarak, ekonomik hareket üzerindeki etkisi, enflasyon, ekonomik büyüme, faiz oranı, döviz kuru, yatırım ve reel GSYİH gibi diğer değişkenler üzerinde uyumlu bir etki yaratabilir. Bilindiği gibi para arzındaki büyüme, ekonomik büyüme ile ilişkili olarak enflasyon oranını artıran bir faktör haline gelmekte ve artan genel fiyatlar ve artan para talebi sonucunda faiz oranı değişmeyecektir. Para arzının ekonomi üzerindeki etkisi, finansal sistemin dört ülkenin (Irak, Türkiye, İran ve Mısır) gelir artışı üzerindeki etkisi (1980-2019) dönemi için incelenip değerlendirilmiştir. Bu araştırma Data Market, World Development Indicator ve World Bank veri tabanlarından veriler elde edilmiştir. Bu amaca ulaşmak için teorik ekonomik model uygulamaları ve ekonometrik modeller, örneğin (ARDL) ve panel tahmini (sabit ve rastgele etkiler modeli) modelleri kullanılmıştır. Tanımlayıcı istatistikler, deneysel belirleme sürecinin uygulanmasıyla incelenen dizinin dağılımının normal olduğunu göstermektedir. Dizi özellikleri birim kök testi kullanılarak incelenmiş ve kullanılan tüm serilerin birinci dereceden durağan olduğu görülmüştür. Ayrıca, faktörler arasındaki uzun dönemli ilişkiyi belirlemek için Johansen eşbütünleşme testi yapılmıştır ve elde edilen bulgular, farklı faktörler arasında uzun dönemli bir ilişkinin varlığını ortaya çıkarmıştır.Uzun dönemli ilişki dikkate alındığında, hem LMS2L hem de LINVST'nin küresel GSYİH değişkeni ile doğru veya güçlü (pozitif) ilişkilere sahip olduğunu göstermektedir. Ayrıca, LMS2 ve LINVST, sırasıyla GSYİH (0.88 ve 0.53) üzerinde istatistiksel olarak anlamlı bir olumlu etkiye sahiptir. Daha açık bir ifadeyle, LMS2'nin %1 oranında değiştirilmesi durumunda GSYİH değerinin %0,88 ve LINVST'nin %1 oranında artırılması GSYİH'nın %0,53 oranında artmasına yol açacaktır.

Anahtar Kelimeler: Para Arzı, Makroekonomik Değişkenler, Ekonomik Büyüme

INTRODUCTION

Subject of The Study

Understanding the connection among both the money supply and macroeconomic factors in distinct Middle Eastern countries necessitates separate knowledge of the money supply and economic determinants. Several studies have looked into the link between economic growth and financial success. So, the money supply could be mentioned as a very significant and sensitive variable in an economic area in which the value and velocity of money supply in any place or country around the world can realize the pace of economic movement. Also, the most important point related to the relationship between both variables is that the alteration in the level of money supply will directly produce a huge impact on macroeconomic variables, including inflation, economic growth, interest rate, exchange rate, investment, real GDP as well because money supply called as a total amount of money or cash that available in banks that circulate all the time (George et al, 2018).

Moreover, macroeconomic variables are another significant point covering several different parts of economic issues, including (inflation, GDP, unemployment and employment, economic output, etc.). In addition, each mentioned variable plays a great or important role in any region and countries' financial performance or economic performance (Sharma et al, 2011). Although, in this regard, a policy has been applied by Turkey after the financial crisis in 2008 to expand the money supply, it can be said that several other countries applied the same policy.

The purpose of applying this policy is to change several macroeconomic variable directions because there is a strong connection among macroeconomic variables, including (GDP, inflation rate, interest rate, etc.), money supply. Moreover, changing the money supply in any place must be done after a proper evaluation regarding endogenous and exogenous outcomes. In other words, expanding the money supply will have two outcomes, either endogenous or exogenous, due to the direct relation between macroeconomic variables and money supply. Due to that, researchers claim that both interest rate and inflation rate need to take into account particularly and theoretically (Kaplan and Güngör, 2017).

Furthermore, fundamental macroeconomic aspects influence economic growth by verifying active structuring of economic activity in public and private sectors via liquidity availability. Private sectors will get credits to carry on businesses in case of proper money supply support. Therefore, the money supply is considered a viable tool critical in boosting a nation's economic growth as well as, governments widely focuses on the application of financial regulation as a powerful instrument for ensuring and maintaining economic security and fostering economic development (Chaitip et al, 2015).

Operation of the money supply is called monetary policy, and the aim or feature of monetary supply is to produce macroeconomic outcomes including exchange rates, inflation, GDP and so on. In addition, this action or policy is performed by banks to provide economic stability and provide a proper chance for economic growth. Based on monetarist's belief, this policy (money supply) will not influence domestic products and countries output, but it will directly impact inflation. In this regard, monetary policy is considered a key economic growth point. Depending on several important debates about the connection between money in the economy, Monetarist's trust said policy (monetary policy) influences price without producing effect on unemployment and GDP. However, Keynesians trust that alteration in money supply will alter the price and output of any country (Chaitip et al, 2015).

According to Phebian (2010), high economic growth depends on creating more employment opportunities, reducing poverty, and improving living standards by increasing per capita income through an economy's money supply and moderate inflation rate. The link involving money inflation rate, supply, and economic growth has been studied in a number of ways. Based on Kaplan and Gungor (2017) study, rising inflation rate refers to the money supply expansion associated with the economy's expansion. Also, interest rates will remain unchanged due to increased money demand and overall prices. According to classical economists, the economy has full employment, and the main problem in the economy is inflation. As a consequence, a rise in the money supply is the origin of inflation.

İmportance of The Study

The following are the primary goals of this study:

- To see how successful the new monetary policy is in a few Middle Eastern nations.
- In various Middle Eastern nations, to assess and identify the link between financial system and macroeconomic factors.
- To compare the impact of money supply and microeconomic variables between selected middle eastern countries.

Methodology of The Study

This section targets picking the strategies that will be employed to decide the influence of the money supply on economic growth. Also, to scrutinize and measure the influence of money supply on financial development for four countries (Iraq, Turkey, Iran, and Egypt) in (1980 to 2019) data of this research gathered from the Data Exchange, World Development Indicator and World Bank databases. To achieve this objective, theoretical economic model applications and econometrics models, such ARDL(Autoregressive Distributed Lag) as well as panel estimation, will be used in this thesis.

Problem Statement

As it is well-known, the money supply issue is very significant for any country, so controlling the money supply issue will be a great approach toward having a proper economic condition and economic growth because rising money supply and lowering money supply will directly influence economic growth. According to statistics, the availability of money and economic security are inextricably linked (Mukherjee, 2019). Meaning, changing the money supply in any place or country needs to be done after an appropriate evaluation and analysis of internal and external factors (Kaplan and Güngör, 2017). In this regard, proper money supply growth is significant for economic development and provides price stability in countries due to its direct relation with individuals' economic situation. Therefore, it can be said that controlling the expansion of the money supply is necessary and required to achieve stability. Related to macroeconomic variables, there will be a good control between inflation and deflation because rising and lowering each of them will produce an unstable economic situation (Mukherjee, 2019). In this research, I will directly focus on money supply and macroeconomic variables of some Middle Eastern countries like (Turkey, Egypt, Iraq,

etc.) to evaluate their economic situation and figure out the key points between macroeconomic and money supply in mentioned countries.

CHAPTER 1. LITERATURE REVIEW

1.1. Economic Variables

High economic sustainability and economic growth are extremely significant issues in developing and developed countries. There are many research and investigation regarding economic sustainability, and due to its significant influence, researchers tried to focus on this issue specifically. For example, Vinayagathasan (2013) centred on the connection of expansion of the economy with the rate of inflation and realizing economic growth with the influence of monetary policy on the items price level. Based on previous research, there are different beliefs between economists in the world regarding the level of the pace of inflation and its impact on the economy's growth everywhere, and the outcome of the studies shows that interest rate can produce a great influence on the movement of macroeconomic variables.

Makinen (2001) defines inflation in various ways. However, all the definition is often summarized to the same point. For example, inflation could be a continuous upwards movement (increase) within the general indicator. There are details to be considered about this definition. In the first place, it refers to the movement within the general price level. This does not indicate a change in one price relative to other prices. This type of change is common even when some price level is stable.

Sultana (2018) researched the impact of money supply on macroeconomic factors like inflation and interest rates on Bangladesh's income progress. To provide a clear result, time-series data from 1981 until 2016 with ARDL standing for Autoregressive Distributive Lag and ECM (Error correction mode) standing for Error Correction Model has been utilized. Researchers claim that economic growth is proved by collecting the result from empirical determination connection or relation of money supply, inflation rate, and interest rate,. Also, mentioned research concludes that in the case of short-run inflation money supply effect on economic growth is not proportional if the interest rate is ignored.

Furthermore, Wun (2016) discovered that there is a long-run association and a short-run linkage among earnings growth, inflation rate, and money supply. in his study to recognize the short- and long-term reciprocity of economic growth, money supply, and

inflation rate in China. It is a bidirectional the connection among the money supply and the inflation rate. Moreover, Nwankwoeze (2010) detect that inflation affects GDP growth negatively, but Li (2005) settled that a positive relation of inflation and GDP growth exists before an intensity level and negatively affects after the threshold level.

Conversely, according to Agalega and Antwi (2013), interest rate, GDP, and inflation possess a powerful correlation by examining the information on the corresponding variables of Ghana. Ihsan and Anjuma (2013) concluded that having a high money supply enhances the rate of inflation and interest rate by examining Pakistan's financial data from 2000 to 2011. They argued that money supply directly influences interest rate, inflation, and GDP. Therefore, keeping up an acceptable charge per unit is necessary to keep the inflation rate at five to six per cent.

According to Feldstein (1996), inflation generator social costs and a deadweight loss on the economy. However, despite these costs, inflation benefits some economic agents; for example, people work more hours to keep up their living standards within the inflationary periods. This ends up with high economic growth, which offset the negative effects of inflation.

For those economists who believe the money supply is the only factor affecting inflation, the money supply is viewed as a crucial tool for managing inflation while cash demand or supply remains constant, the alterations in the amount of money supply can be either be inflationary or deflationary in which both of them considered as a reaction to policy of the central bank. When the central bank implements an expansionary monetary policy, Inflation occurs in circulation, and deflation occurs when it reduces the amount of cash in circulation. On the contrary, growth of the money supply will create a proportion rise within the production of goods and services, and therefore, general indicant will be the same or unmovable (Okhiria and Salius 2008).

Ocansey (2020) inspected the relation between economic growth and money supply. So, domestic products are considered a specific factor to measure economic growth in this study, and due to that, they were focused on the bi-directional interconnection of domestic products and broad money supply growth. In the mentioned study, researchers were working on a quantitative approach, fundamental design of the research, and analyzing data from 1960 to 2019 through the bivariate Granger causality test.

Kunwar (2020) studied the relation between domestic products and money supply, and based on their explanation, money supply is considered cash that circulates in the region. So, determination of money supply everywhere will become a factor to help economists and specialists provide a proper policy while raising or decreasing the money supply. Also, it will influence each business cycle and economy as well. The mentioned study tried to explain specific economic variables by selecting factors that affect money supply related to domestic products in Nepal. Kunwar (2020) Collect required data from 1974 to 2017 to sketch a pure picture of money supply and economic growth using empirical relation. The Author used the ARDL(Autoregressive Distributed Lag) and VECM (Vector Error Correction Model) model in this study, and through using the mentioned model. The relationship between economic development and financial advancement seems to be substantial and long-lasting.

Gatawa et al. (2017) determined the effect of inflation and money supply on the economic process for Nigeria during (1973 – 2013) by using the model of VECM. However, Ihsan and Anjum (2013) discovered a destructive rapport amid money supply and GDP supported the information on monetary resource and GDP of Pakistan during (2000-2011). Also, Barro (1991) states that persistent inflation reduces the contribution of saving and investment on GDP depending on the unattractiveness of investing in future projects or contracts by savers and investors. As a result, productive resources are reduced due to the difficulties in calculating real returns on investment, resulting in a reduction in GDP within the long term.

According to Barro (1997), stable downward movement or progress toward the production function is required for inflation to happen. Several factors can raise or increase aggregate demand based on the mentioned paper, and the majority are limited and controlled in scope. Moreover, they observe that there is a limit or practical limit on government purchases, which may lead to reduce in tax that is why it's not possible to continue for a long time. Also, Barro (1997) could not observe or detect government purchases higher than total output or all taxes, which negatively impacted. On the contrary, , Barro mentions that the money supply could be increased at any rate, so it's normal to detect the large difference in money growth in the area. In addition, rising money supply for a high level will have two outcomes. Either over several years in

moderate inflation or a few days at the height of hyperinflation is common, Romer (1996).

Furthermore, Gatawal et al. (2017) find statistics on the monetary base, inflation, and economic growth in Nigeria between the years 1973-2013. So, VAR Model has been utilized in this study. Based on the collected result. They arrived at a decision that money supply has a positive influence on economic growth, but inflation and interest rates have an adverse influence. Money supply, inflation, and interest rates, on the other hand, do not influence economic growth, according to the causality test. In relation to the influence of monetary policy, in Ogunmuyiwa and Ekone (2010), Nigeria economic growth has been determined related to the influence of money supply between (1980 – 2006). This work used the Error Correction Model, Granger Causality Test, and Ordinary Least Squares (OLS). The study claims that the money supply is closely tied to economic growth. However, the result was not a major alternative between recessionary and expansionary money supply choices in terms of GDP growth. Although, the foreign exchange and money supply issue of Nigeria has been determined by Owolabi (2014) by collecting the data (1988-2012) and utilizing OLS. The results show that the money supply has a favorable and considerable influence on Nigeria's monetary expansion.

Furthermore, the function of the money supply in Nigeria's economic growth was established. By Uduakobong (2014) in (1985- 2012). In this research, augmented Cobb-Douglas production function has been utilized to trust ECM and Co-integration test. The study's findings show that increasing the money supply will have a statistically significant beneficial influence on Nigeria's economic development. Also, the outcome of some other researches was the same as Uduakobong (2014), including Owoye and Onafowora (2007); Okedokun (1998); Odedokun (1996); Ojo (1993). A lot of researches have been performed in order to establish the link between economic development and money supply ; however, depending on the outcomes of the research a vast amount of empirical and theoretical work needs to be completed (Ikechukwu, 2012). Also, Lee and Lie (1983) also realize the interaction of money supply and economic growth in Singapore. As per the outcomes of the research, a bidirectional relationship exists between financial development and economic growth. Das (2003)

inspected the Indian long-run of money and output relation and ensured that unidirectional influence with money affects output growth.

Like Hussain and Haque (2017), Chaitipa et al. (2015) found a big relationship of money supply and economical process for Authorized Economic Operator (AEO) open region by using Autoregressive Distributed Lag (ARDL), during 1995-2013. In addition, several researches focused on the relation between economic growth and money supply of Nigeria through using ARDL model and error correction model, and they originated positive relation both mentioned variables Ogunmuyiwa and Ekone (2010), and Chude and Chude (2016).

Moreover, the same result was found by Aslam (2016) through the investigation of the impact of money. Hameed and Ume (2011), as cited in Dingela and Khobai (2017), stated that money supply has a favorable impact on Pakistan's market economy by analyzing the information of money supply and economic growth of Pakistan by using several econometric methods. Also, using Engle-Granger and ARIMA model depends on the money supply, and GDP data for Romania Zapodeanu and Cociuba (2010) discovered that money supply and GDP have a strong relationship. Furthermore, the same outcome has been detected by Maitra (2011) using the cointegration model (1971) to identify the (expected, unexpected) variation of money and output for Singapore.

In Sri Lanka, the influence of money supply between 1959-2013 has been evaluated by Aslam (2016), the dependent variable in the mentioned study was GDP and export profits, money supply, import inflows, exchange rate, and the consumer price index are all factors that affect the economy that is independent variables. The regression analysis has been utilized to determine variables' positive and negative influence. The outcome shows that 1 per cent significant positive influence will form in Sri Lanka.

In Prasert et al. (2015), PMGE, which stands for “Pooled Mean Group Estimator” from 1995 to 2013, in several countries, it was employed to explore the link involving money supply and economic progress. Countries include “Malaysia, Indonesia, Cambodia, Lae PDR, Vietnam, Philippines, Thailand, and Singapore. The outcomes of the study reveal that money supply has a beneficial impact on economic growth as measured by GDP.

In another study, several other countries determined the link of money supply and economic growth, so the ARDL model was utilized from 1995 to 2013. The outcome of

the research display that the positive influence of money supply produces with economic growth with having long-run relation (Chaitip et al, 2015).

Cobb-Douglas production function depending on co-integration used by another study, to realize. Inam (2014) examined the influence of money supply in the Nigerian economy from 1985 to 2012 and found that money supply has a large and favourable influence on the economy in Nigeria. Furthermore, the outcomes of short-run error correction show that money supply has a detrimental but substantial influence on economic growth.

Another research looked at the impact of money availability on Nigerian economic growth from 1981 to 2015 evaluated by Galadima et al. (2017). The Johansen co-integration approach was used to ascertain the long-run relationship, and the vector error correction model (VECM) was used to determine the short-run association. The research findings show that positive influences of interest rate and money supply produce or form the economy, whereas negative influences of exchange rate produce or form the economy. Regarding the short-run relation, the negative influence of money supply and positive influence of exchange rate directly form.

Furthermore, Chepkemoi (2014) examines time-series data from 1970 to 2012 to establish an empirical link between public economic development and money supply . The Engle and Granger cointegration test, as well as the Granger causality test, were used in this work. The outcomes of the study reveal a strong long-term relationship between GDP, measured money supply, and economic growth. Also, the typically employed factors were inconsequential in terms of short-term investment possibilities. According to the study's researcher, all variables impair economic growth in the long run, with the exception of economic expansion and money supply. Kunwar (2020) uses temporal data from 1974-1975 to 2017-2018 to provide empirical correlations to assess the link between money supply and economic growth. The ARDL-VECM model and ADF test stand for Augmented Dickey Fuller in this study. The long-run link between the money supply as determined by GDP and economic growth is revealed by the findings of the study. Moreover, bidirectional causality creation between big money and gross domestic product will affect the gross domestic product, as would inflation.

Furthermore, Gnawali (2019) examines the impact of money supply on Nepal's economic growth between 1975 and 2016. Several models and tests carried out to assess the stationary of variables, including "co-integration, Vector Error Correction Model (VECM), and causality test," and then the (ADF) approach was used to assess the stagnant of variables. The study examined four separate factors, including GDP, narrow money, wide money, and foreign assistance (FA). The study's findings suggest that money supply positively impacts economic growth. On the contrary, foreign residents have a detrimental relevance on Nepal's economic progress. This study suggests that the National Reserve Bank (NRB) develop measures to boost the flow of advice from the monetary authority, which tends to contribute to national economic production, based on the findings. Attaitalla et al. (2014) determined Sudan's money supply and economic growth from 1990 to 2013. In this study, the co-integration approach was employed to assess the nature of the variables utilized.

Furthermore, the findings suggest that the variables studied have a long-term positive association, but the Granger causality test reveals no long-term causation between real GDP growth and real money supply growth. As a consequence, they find that variations in the money supply do not adequately articulate changes in the money supply and that shifts in GDP do not adequately articulate changes in the money supply in Sudan over the research process. Onyinyechi and his colleagues (2019) A study in Nigeria and Ghana to better know the implications of money supply systems on economic growth. As per the research, money supply harms GDP in Nigeria but has a positive impact in Ghana. Furthermore, in Nigeria, a large money supply has a beneficial influence on RGDP, but it negatively impacts Ghana.

Ikechukwu et al. (2012) also looked at the significance of Nigeria's money supply on productivity expansion The researchers discovered that the research affected both the actual exchange rate and the interest rate in the nations investigated. During the era, the area had little effect on domestic production, but the money supply impacted GDP. Furthermore, the results data cover the 1981 – 2010 period.

Using ten software packages, a statistical method used for the analysis process, the outcome of the study display that both interest rates and the exchange rate in Nigeria

from the chosen era did not have an impact on RGDP. Also, the broad money supply was the only variable that affected real GDP.

Nizhegorodtsev and Goridko (2015) research confirm non-liner relationships of the macroeconomic stability curves in the market and the real monetary supply and the commodities market and the size of the economy. The research adds to the logical analysis influenced by the monetary shortfall caused by the high expense. On the other hand, this research illustrates why market economy principles need a non-linear connection between the money supply and GDP volume. Nwankwoeze (2010) and Uzougu (1981) argued that a rise, regarding monetarist, in an economy, money supply induces a growth in the general prices level of goods that causes inflation in the country and thus adversely affects development and growth. Ifionu and Akinpelumi (2015) employ data from central bank statistics bulletins to study the impacts and implications of certain macroeconomic variables on money supply (2013). Furthermore, the influence of numerous variables on Nigeria's money supply was underlined in this study. In addition, regression analysis was utilized to examine the years 1981 to 2013.

Furthermore, bidirectional causation existed between the money supply, the inflation rate, and the exchange rate according to the probability level. In this research, the co-integration technique was utilized to show the existence of a long link across variables. The result supports the theory that money is important for the movement of macroeconomic variables between regions. As a result, Ihsan and Anjuma (2013) looked at how the money supply affects Pakistan's GDP. The regression analysis was used to evaluate data from 2000 to 2012. Although money supply affects GDP and both dependent variables, three separate independent variables including interest rate, inflation rate, and CPI are used. As a result of the study, it was discovered that interest rates and CPI had a substantial association with Pakistan's GDP. As a result, strong regulation of the money supply is required to boost the economy.

In the short term, Wun (2006) discovered bi-directional causation between the money supply and the inflation rate in China. He also discovered a link between China's money supply, inflation rate, and economic development. They also find that the money supply and inflation rate can cause Granger's financial method, but financial growth doesn’t Granger cause monetary resource and rate of inflation by applying VECM,

Johansen co-integration test, Granger causality further as variance decomposition from the amount of first quarter of 1999 to 3rd quarter of 2015. In reality, several researches mention that money supply and financial development are very close to each other, with a positive relationship. According to Hameed and Amen (2011), several factors influence GDP and mostly financial supply or sources comprise a tough relationship with GDP while interest rate and GDP have an important connection. William (2016) specified that expansionary financial rule might raise output or production in the short-run, but only the price stage will rise in the long run. A drop in the money supply, on the other hand, might diminish real GDP by decreasing overall needs or demand.

Also, the VAR approach has been utilized by Njimanted et al. (2016) to determine the influence of financial policy instruments on economic development in the Central African Economic and Monetary Community (CEMAC). In addition, in 1972, an agreement among several countries such as Chad, Cameroon, Gabon, Central Africa, the Republic of the Congo, and Equatorial Guinea was signed to set up CEMAC between (1981-2015). This agreement planed depending on the financial co-operation arrangements to reach economic or price stability. The mentioned study detects that financial policy tools influence the economic growth of the CEMAC community in various fields. Also, Kamaan (2014) numerically measured the influence of monetary strategy on financial development in Kenya; in reality, according to the findings, monetary policy does not have the greatest impact on Kenya's economic development.

Senbet (2011) used two models and approaches to investigate quarterly data from 1959 to 2010 to assess the effects of monetary and financial policy on the United States. such as ("Granger Causality tests, VAR models"). The findings of this analysis reveal that financial strategy has a considerably greater impact on real production in the US economy than fiscal policy. The monetarists' contention that monetary policy has a stronger influence on economic growth than fiscal policy is also supported by this study. According to Stock and Waston (1989) (as mentioned in Tabi et al (2011), p. 47), the monetary policy and inflation rate have a non-linear connection, and only the stochastic components of the money supply expansion level may impact economic activity.

Furthermore, William (2016) stated that real GDP is rather steady over the near term since it takes time to develop in economic capital, technology, and therefore, increase in the money supply with aggregate demand, resulting in price increases. Increasing the money supply will grow real GDP by raising aggregate GDP demand in the long term. By decreasing aggregate GDP, a drop in the money supply, on the other side, would result in a decline in real GDP. By decreasing aggregate GDP, a drop in the money supply, on the other side, would result in a decline in real GDP.

More than that, Blinov et al. (2015) focus on the non-linear linkage between the growth of real GDP and the growth of real money supply. Moreover, the data of several countries utilized such as (Brazil, Japan, Eurozone, and Russia). The results of the article allow having a new macroeconomic policy. Also, they allow using the dependences established to steer a more balanced macroeconomic course primarily in the monetary and credit sphere. Applying the ideas of this research may become a factor to support world economic growth and increase the opportunity of having a better lifestyle in developing countries.

Feldstein and Stock (1994) researched to determine the association amid nominal (GDP) and (M2). They discovered that the connection among nominal (GDP) and (M2) is suitably strong and stable (GDP). Alvarez et al. (2001) state that short-term interest rates are being raised. is the major mechanism of monetary policy to trigger the rate of an economy. William (2016) reports economists' views on what has transpired in the short run that real GDP is relatively constant over the short run as it takes time to develop economic resources. Finally, Vinayagathasan (2013) anticipated an inflation threshold stage for Asian LDCs and a way to influence the growth rates of their economies.

The economic growth of Asia's emerging countries was assessed in the research. They achieve this by realizing the ambiguity ideal of various dimensions and measuring the impact of monetary policy shocks on key macroeconomic variables; additionally, this research explores adequate policy tools and aids in a more professional explanation of the dynamic characteristics of these variables. They also aim to assess the influence of the foreign monetary policy shock and the oil price shock on the Sri Lankan economy in the context of Sri Lanka. Similarly, Gatawa et al. (2017) used 1973-2013 time-series

data to objectively investigate the impacts of inflation, money supply, and interest rate on economic growth in Nigeria. As a result, the data was analyzed using the VAR Model and the Granger Causality Test. Consequently, the VEC model becomes a factor that demonstrates the long-term beneficial effect of a big-money supply and the long-term adverse influence of inflation and interest rates. In addition to inflation, a large money supply and a high interest rate were shown to be adversely and inextricably linked to short-term economic growth.

1.2. Empirical Study

Numerous empirical researches were conducted on the relation of investment, saving, and the provision of funds and expansion of the economy. The current study contains an evaluation of many recent and significant empirical studies. Verma (2007), for example, employed the ARDL Boundary The link between savings, investment, and economic development in the Indian economy was investigated using a test, and it was discovered that gross domestic savings, gross domestic investment, and economic growth are all co-integrated. Saving and investment have little effect in the near term. However, over time, investment resulted in economic development. Budha (2012) discovered co-integration between the variable's investment, saving and economic development in the Nepalese setting using the ARDL way. The author established bidirectional causation between economic growth and saving and economic growth and investment using the Granger causality test expansion. Taiwo (2012), Chinuba, Akhor, and Akwaden (2015) for Nigeria, Salih (2013) for Saudi Arabia, and Mohamed Aslam (2016) for Sri Lanka all identified a link of economic growth and monetary policy, with all research indicating a positive association between money supply and GDP. Several researches in the Nepalese context, such as Gyanwaly (2012), Acharya (2018), and Gyanwaly (2019), supported the evidence of a beneficial effect of money supply on economic development via their econometric modelling.

For the first time, Friedman and Meiselman (1963) research used applied statistics to examine the relationship of variables. They utilize multiple regression examination of variations in nominal consumption to variations in a measure of nominal autonomous expenditure.

Friedman and Schwartz wanted to see whether they could quantify the link between money and production by reviewing the United States of America's monetary history to assess the role of money in economic cycles across time (1867-1960). They contend that the Great Depression's quick contraction (1929–1933) was caused by a large fall in the supply of money at the time. While Friedman and Meiselman (1963) concentrate on the monetarist-Keynesian disputes about the usefulness of monetary and economic regulations, they also consider the Keynesian assumption of a constant income-consumption connection, as well as the monetarist assumption of a stable currency necessity, and conclude that the monetarist ideal of the relationship between expenditure and money demand is more accurate. In their 1976 article, Brunner and Meltzer assert that increasing the money supply to support higher government spending will boost total expenditure and thus nominal income, resulting in a rise in real earnings. Sims (1972) was the first to investigate the link between currency and industry in the United States using Granger causality. He discovered that money aids in interpreting output rather than hinders it, implying a causal link between money and GDP and outcome compatible with Friedman and monetarists. Williams and Gowland (1967) applied Sims's model to the United Kingdom and found that causation flows from output to money (which was considered an opposed outcome to the Sims outcome). This conforms to the Keynesian perspective. Friedman and Kutuner (1992) claim that the link between money and production weakens with increasing periods in their research of the United States from 1960 to 1990. So, they discovered that the interest rate's explanatory capacity has a greater impact on how output changes are interpreted than the quantity of money. Zapodeanu and Cociuba examine the link of money supply and GDP to create a meaning that expresses this relationship explicitly for Romania, so money supply and GDP data of ten-year utilized with ADF. They established that both series are nonstationary using the Engle-Granger cointegration technique. They established that the two series are cointegrated. Abbas (1991) explores the causal link of money and productivity in many Asian nations and discoveries that cash and revenue in Pakistan, Malaysia, and Thailand are mutually reinforcing. Kalumia and Yourogou (1997) discover a substantial causal connotation of money and income in five West African nations, implying that money is not neutral. Hussein and Abbas (2000) examined Pakistan fundamental relationship of income, Money band prices and

discovered a one-way relationship from income to cash, rather than the other way around, demonstrating that real reasons, rather than nominal reasons, contribute significantly to Pakistan's national income growth. Abdul Raziq and colleagues (2003) examine the effect on the money supply in Qatar of real GDP, government expenditures, price level, and foreign reserves. They discovered a strong link between real GDP and money supply, implying that variations in Qatar GDP aid in explaining alteration in money supply rather than the other way around. Using the Granger test, Obaid investigates the causal link between both the money supply (M3) and real GDP in Egypt from 1970 to 2006. He finds no causal association among nominal money supply and nominal GDP over the operational hours, but when he looks at real money supply and real GDP, he finds a common link between the real money supply and real GDP in Egypt, denoting that the financial rule is an actual rule on real GDP in Egypt. Eventually, Ogunmuyiwa and Francis (1980-2006) look at the influence of money supply on Nigeria's economic growth. They discovered that the money supply is inextricably linked to growth using OLS, causality testing, and ECM exploring the determinants for time series data. When GDP growth rates are used to pick between contracts, the link is negligible. Only one research has managed to explore the link between Sudan's money supply and its level of production, as far as we understand. Suliman and Ahmed look at the long-run relationship between real GDP, money supply, and price level from 1960 to 2005, indicating that actual GDP and money supply have no direct relationship over this time period, but that money supply and prices are interconnected. The analysis is distinct from this one because it uses more recent data and spans the time after the conclusion of the civil war, which resulted in the country's division into two nations. The link between money supply and output is called the money supply-output connection remains a subject of disagreement in empirical research as well as theoretical frameworks in both long-term and short-term , as indicated by the evaluation of earlier studies available in this chapter. As with the results of theoretical studies, based on the current empirical research, I will assess four possible findings concerning the association amid inflation and economic growth. There is ambiguity in the literature

- There is no link between inflation and economic growth.
- Inflation produces a growth has a detrimental impact ;

- Inflation has a favourable impact on growth; or
- Inflation produces a nonlinear influence on growth.

As a result, there is no stability in inflation and growth, which is determined by data collection techniques.

These short examples demonstrate this idea by citing relevant empirical data on the correlation between inflation and economic growth. According to another research (Dorrance, 1963), inflation is not a strong predictor of growth. Cameron et al. (1996) further establish no trade-off between inflation and output. They conduct their investigation using quarterly and annual statistics specific to each country (United Kingdom, Canada, United States, and West Germany). This analysis demonstrates a significant, albeit arbitrary, relationship between inflation and performance improvement.

The majority of economists demonstrate that a higher inflation rate slows economic growth. However, Tobin (1965) demonstrated that inflation increase stimulate financial development, even though inflation and economic growth are frequently viewed as mutually exclusive phenomena (De Gregorio, 1992).

The researchers look on the link among inflation and the rate of economic expansion through time utilizing Kuwait's yearly data (1985-2005). He assesses the model using cointegration and an error-correction methodology to obtain a more accurate representation and concludes that inflation and growth are negatively correlated. Nevertheless , previous studies seem unable to show a negative association in countries with high inflation. Hernando and Andrés (1997) report an unfavorable relationship between inflation and real production growth. Additionally, inflation costs increase when country-specific fixed effects are taken into account. When inflation drops one percentage point, economic output increases by around 0.5 to 2.5 percentage points. The authors examined the convergence equation's effect on economic growth. She used OLS and means variable (IV) techniques to analyze panel data from OECD nations from 1960 to 1992. According to Barro (1995, 1996), inflation hampers economic progress. Inflation, in particular, will have a huge negative impact on the economy. He emphasizes the pointlessness of the outcome. The data indicate that per-capita GDP growth declines by 0.2 to 0.3 % for every percentage point increase in inflation. It is

unknown whether low inflation rates have the same effect. Barro collected data from over 100 countries from the 1960s to the 1990s, chose ten-year averages and used IV variable estimation methodology to conduct an international growth regression using panel data spanning two decades. De Gregorio (1992) used an endogenous growth model to study the link between inflation and economic growth. Gregorio concluded that each country's observation relates to six years utilizing twelve American countries (1951-1985). After establishing an undesirable link between inflation and financial development, he used the generalized least squares method to examine the estimators.

Recent empirical research has shown that increased inflation leads to increased financial development. Mallik and Chowdhury (2001) used imbalanced yearly data to look at inflation and real GDP growth in numerous South Asian nations. They used co-integration and error-correction techniques to predict regression development. In each nation, the authors identified a long-term positive correlation between inflation and economic growth. When it comes to responding to fluctuations in growth, growth is substantially less sensitive than inflation to changes in inflation. According to recent research, inflation and economic growth have a nonlinear and concave connection. Bick (2010) explores connection using a panel threshold model that integrates regime cut-off. He finds that growth is boosted when inflation rates are below the limit but loses when they surpass it. He observed that by including inflation's effect on output growth and its effect on the threshold, the barrier was decreased to 12% and its magnitude doubled. He searched panel data from 40 LDCs over 1960–2004 and came to his conclusions using regression analysis. According to Kremer et al. (2009), in their study "Using the Endogenous Repressor Panel Threshold Model to Establish the Inflation Threshold" identifies the inflation threshold. The author presents a panel threshold approach with an endogenous repressor. They conducted their investigation using panel data from 124 countries from 1950 to 2004. The authors eliminated country-specific variables and reduced the dimensions using Foreign Object Damage (FOD) transformation. They then determined the parameters using instrumental variables IV and OLS. According to the authors, when inflation rises over a certain point, it stifles economic growth in rich and nations in development . The inflation target is 2.5 per cent for wealthier countries, whereas the target is 17.2 per cent for low-income countries. Developed economies gain from greater inflation rates, but emerging

ones suffer when inflation falls below a certain level. Between 1950 and 2000, Drukker et al. (2005) scrutinized the presence of the inflation threshold. levels in industrialized and LDC nations. They identified a threshold at 19.16 per cent of the whole dataset. A 1percentage rise in inflation had no obvious influence on product development when inflation was less than 19.16 per cent at the start. If the original inflation rate was higher than 19.16 per cent, they established a negative association between these two factors. They also uncovered two developed-country thresholds: 2.57 per cent and 12.61 per cent. Khan and Senhadji (2001) employed a panel data set from 1960 to 1999 to assess the inflation-growth link for 140 countries, including rich and developing economies. To cope with nonlinearity and non-differentiability, they developed the nonlinear least-squares approach. The Study determined a threshold estimate of inflation for affluent countries at 1 to 3%, whereas it was 11 to 12% for LDCs using the conditional least squares methodology. Inflation and economic growth have a negative and statistically significant association when inflation surpasses level; however, when inflation falls below the threshold level, inflation and economic growth have a positive and statistically significant relationship. Inflation and economic growth have a positive and statistically significant association. Between 1960 and 1992, Gylfason and Herbertsson (2001) looked at whether a non-linear relationship existed between inflation and growth in 170 nations. They analyzed two imbalanced panel datasets using a random-effects panel model. In the Penn World Tables (PWT) datasets, the authors identified a stronger association between inflation and economic growth than the World Bank (WB) datasets. While the economy slowed to 1.3 per cent in a year, inflation rose by 5 to 50%. However, when they employed the DB datasets, the economic growth rate dropped by 0.6 per cent. As a result, they suggest that cross-country connections between inflation and growth are financially and statistically significant and that annual inflation rates of more than 10%-20% are harmful to long-term economic development. Between 1961 and 1994, Bruno and Easterly (1998) looked at the link between inflation and economic progress in 31 countries that suffered significant inflation. They showed that inflation and growth had an inverse connection. GDP slowed dramatically during these periods of high inflation but swiftly rebounded once the inflation rate decreased. The crucial level of inflation, according to the authors, is roughly 40%, and governments should endeavor to keep inflation beyond

that level. They also found that mild inflation had a negative impact on economic growth. Fischer (1993) was one of the first to show a nonlinear relationship with data from 93 countries. He looked examined the link among inflation and economic growth using cross-section and panel regression. Fischer grouped the data into two time frames: 1960–72 and 1973–88. During the first phase, he saw a supply shock, but the outcomes in both specimens were comparable. He observed that inflation had a non-linear influence on production, with a threshold level ranging from 15% to 40%. He claims that low inflation promotes long-term economic development, whereas excessive inflation stymies progress. Using the OLS technique and the Granger Causality test, Inam and Ime (2017) looked at the influence of monetary policy on Nigeria's economic development from 1970 to 2012. The researchers discovered that the money supply and economic growth had a weak relationship. From 1995 to 2013, Prasert et al. (2015) investigated the link between money supply and economic development in several ASEAN Economic Cooperation (AEC) countries. Cambodia, Indonesia, Lae People's Democratic Republic, Thailand, Malaysia, the Philippines, Vietnam, and Singapore were chosen. When measured against GDP, the money supply, consisting of both narrow money (M1) and demand deposits (DD), was positively connected with economic growth. Havi and Enu (2014) scrutinized the relative impact of monetary and fiscal policies on Ghana's economic development from 1980 to 2012. The study revealed that the money supply had a considerable a favourable outcome on the Ghanaian economy using the OLS approach. From 1940 to 2012, Osasohan (2014) examined the influence of monetary policy on economic development in the United Kingdom (England) using a Vector Error Correction Model. The money supply and the rate of inflation are the two main weapons of UK monetary policy in promoting the country's economic progress. Chipote and Palesa (2014) evaluated the influence of monetary policy on economic development in South Africa from 2000 to 2010 using the Error Correction Model and Johansen Co-integration. Money supply as a monetary policy instrument has little influence on economic development in South Africa, as per the research. Onyeiwu (2012) used the OLS technique to study the effects of monetary policy on economic development in Nigeria from 1981 to 2008. As per the research, money supply has a beneficial influence on GDP. From 1981 to 2009, Jawad et al. (2011) utilized cointegration and error correction to look at Pakistan's monetary, fiscal,

and trade policies, as well as economic development, and discovered a significant positive association between the variables in both the short and long run. The findings revealed that monetary policy is far more effective in Pakistan than financial measures. This research backs up monetarists' claim that monetary policy is a more effective economic instrument than financial regulation.

Between 1974 and 2008, Nouri and Samimi (2011) inspected the influence of monetary policy on economic development in Iran.

According to the OLS technique, the money supply significantly influences the progress of the Iranian economy The monetarist notion that a country's money supply is the principal economic engine of progress is supported by this study.

Khan and Blejer (1984) conducted a cross-sectional analysis covering 24 developing nations from 1971 to 1979, using a modified neoclassical growth model to demonstrate the consequences of excluding and differentiating between private and government investment. This approach has been promoted because governments play a critical role in developing country investments. This has been established that public investment has a significant influence on private sector investment in developing nations.

Borensztein (1990) used data from the Philippines to examine the debt overhang effect experimentally. The research found that debt excess hurts private investment. So, this impact was the most pronounced when it comes to private debt was used as a proxy for debt overhang rather than overall debt. The government may influence private investment by altering public policy instruments utilized for stability. Tightening monetary policy will harm private investment and, as a result, growth. Government financing of the budget deficit can squeeze the private sector, and hence the government should finance the budget deficit more via foreign borrowing than domestic borrowing. Additionally, they discovered that exchange rates and high-interest rates had a detrimental effect on investment and, therefore, growth.

Derived from the following findings, this research looked at the extent to which domestic borrowing influences long-term economic expansion . From 1970–1979, Khan and Reinhart (1990) examined private investment and economic development in 24 emerging nations. They took pains to differentiate between public and investment from the private sector. The majority of past research made use of total investment. The

strategy's objective was to determine which of the two supported greater economic development than the other and their interconnectedness, using a neoclassical model. They included exports and imports as variables in addition to capital and labor. Their findings revealed that public investment contributed 43 per cent more to economic growth than the government sector. However, they stressed that these are only direct benefits and that the impact of public investments may be much greater than previously documented. When the public investment was excluded from the regression, it was shown that both exports and imports had a beneficial effect on growth.

In their respective research, Levine, Loyaza, and Beck (2000), Levine and Zerros (1998), and King and Levine (1993) have demonstrated that bank loans to the private sector are a key predictor of economic progress. As a result, the likelihood that increasing government money supply could push out private-sector bank loans could generate worries about the effects of increasing government money supply on GDP.

Christensen (2004) used a new data set of 27 Sub-Saharan African nations from 1980 to 2000 to perform a cross-country examination of the influence of money supply markets in Sub-Saharan Africa. According to the study's conclusions, these nations' money supply markets are often tiny, highly volatile, and have a limited investor base. Furthermore, despite their money supply is far lower than their foreign obligations, interest payments constitute a huge financial hardship in several countries. Changes in the money supply have also been shown to have a major crowding-out impact on private investments.

Oshadami (2006) performed research and discovered that increasing the money supply harms the economy's development. This is due to other macroeconomic variables such as the majority of market participants not wanting to have longer maturities, the government's ability to issue debt instruments with shorter maturities, disrupting the functioning of monetary policy, and inflation and complicating the economy, Prediction.

Abbas and Christensen (2007) recently examined the optimum money supply in low-income nations (including 40 sub-Saharan African nations, including Kenya) and developing markets between 1975 and 2004. They discovered that maintaining a relatively stable level of money in the market as a proportion of GDP largely influenced

gross domestic output. Furthermore, the study found that loan levels above 35 per cent of total bank deposits negatively influenced the gross domestic product. However, For Kenya, the accuracy of this finding is contested , given how much progress has been made in the 25 management of the money supply over time. Between 2005 and 2007, the nation saw increased economic development not recorded in the research.

Hanson (2007) performed a basic regression study on 17 emerging nations with substantial financial systems between 1994 and 2004. According to the statistics, there appears to be a negative association between the expansion of private-sector lending and the rise in state debt. Hagist, Moog, Raffelhuschen, and Vatter (2009) calculated implicit government debt by calculating the discrepancy between the net present value and the present value of the future of expected government liabilities and income. According to his calculations, the total debt-to-GDP ratio is often double that of gross debt, and in certain circumstances, reaches five times that of open debt.

Moki (2012) examined the link between African nations' economic and national debt development. For 30 years (1980–2010), the causal study design examined all 53 African nations. The study's findings indicate that public debt is strongly linked with the gross domestic product when multiple linear regressions are used. In addition, monetary policy showed a negative correlation with gross domestic product. Finally, Baum, Checherita-Westphal, and Rother (2012) used an enhanced approach of moment least-squares regression to analyze the link between economic growth and social debt. Between 1990 and 2010, they discovered a positive link between debt and growth in 12 Eurozone countries when debt was less than 67 percent of GDP, an insignificant correlation when debt was between 67 and 95 percent of GDP, and a negative correlation when debt was greater than 95 percent of GDP. The authors believe that the poor connection between credit and growth is linked to several of the symptoms of the 2008–2010 financial crises.

The bond that exists among public debt and GDP growth was studied by Herndon, Ash, and Pollin (2013), and they discovered that it differed considerably between historical periods and nations. Reinhart and Rogoff's finding that nations with public debt in GDP of more than 90% experience large decreases in GDP growth has been proven accurate by studies. However, these mistakes misrepresent the reality that nations with large

public debt levels have low GDP growth rates over the medium term, giving the false impression that high public debt levels invariably imply a major drop in GDP growth. At varying public debt levels, the data indicated a wide variety of effects on GDP growth across the 20 industrialized nations.

Panizza and Presbitero (2013) investigated the link between public debt and economic development in developed countries. They pointed out that rising public debt has a detrimental influence on domestic production income, and those financial measures are necessary to restore economic security and aspirations. However, they noted that how public debt contributes to development may vary depending on the institution's competence, the size of the public sector, the method and purpose of debt collection, and the structure and structure of public debt.

CHAPTER 2. METHODOLOGY AND MODEL SPECIFICATION

2.1. An Overview

This section targets picking the strategies that will be employed to decide the influence of the money supply on financial development. Also, to scrutinize and measure the influence of money supply on financial development for four countries (Iraq, Turkey, Iran, and Egypt) in (1980 to 2019) data of this research gathered from the Data Exchange, World Development Indicator and World Bank databases. To achieve this objective, theoretical economic model applications and econometrics models, such ARDL(Autoregressive Distributed Lag) as well as panel estimation, will be used in this thesis. Thus, this chapter begins with an introduction to regression analysis. The first section of this chapter is about the time-series regression model, explaining the various steps (stationary, co-integration, estimation and diagnostic checking). The second section looks at the panel estimation model with its different stages, such as the Hausman test and two different models, including fixed effects and random effects.

2.2. Stationary and Non-Stationary Time Series

It can be said that stationary refers to the numerical or statistical characteristics of a method that leads to keeping the time serious the same and does not change over time. In other words, this kind of time serious does not rely on the time observed by the series. Stationary time series will have no predictable forms (Kwiatkowski et al, 1992). While non-stationary time serious refers to the approach or rule that is not expectable and there is no possibility of modelling or forecasting. The outcomes collected using non-stationary may be false or wrong, because there's the chance to indicate a relationship among several variables where one of the variables does not exist. In the mentioned case, the data of non-stationary require transfer to stationary data to collect reliable and acceptable results (Nason, 2006). Also, with utilizing (DSP) which is one of the non-stationary models for determination of economic model, old Ordinary Least Square (OLS) analytical data to assess the validity of an inclusive assessment method, coefficient of determination (R2), Fisher Rate (F Statio), Durbin-Watson (DW-Stat), t-statistics etc. because it is greatly confusing and untrustworthy in case of prediction and strategy. In the mentioned sequence, several things such as variance, mean, covariance,

etc., are altered with time and influence the long-run growth of the sequence. As previously stated, many time series variables are only stationary once they have been distinguished. As a result, using several variables for regressions results in the loss of associated information about the balancing connection between the variables in question. In this regard, using Co-integration led to keeping related long-run relation information's safe without losing data among considered data that had been lost on differencing. Depending on both Engle and Granger (1987) and Granger (1981), the method of co-integration determination cannot be used in cases of having variables with integrated of various orders. The technique of the ARDL co-integration process, on the other hand, is suitable, according to Johansen and Juselius (1990), since the method is used to study the long-term connection between the series with different orders of integration (Pesaran et al. 2001; Pesaran & Shin, 1999).

2.3. Co-Integration Analysis

Engle and Granger (1987) and Granger (1981) first formalized the idea of cointegration by applying several tests and, inside a dynamic specification framework, approximation techniques to observe the presence of long-run correlations of particular variables. Co-integration refers to how time-series away from stability can balance without drifting too far apart. Co-integration is a term that refers to numerous stationary linear arrangements of various variables, each of which is non-stationary on its own but is attached to an order. It's also an econometric concept that simulates the presence of a lengthy equilibrium between convergent basic economic time series. As a result, co-integration makes the numerical and financial underpinning for the empirical error adjustment model, which combines short and long-run data in exhibiting components, more difficult. Testing for co-incorporation is essential to set up, assuming that a model experimentally displays significant since a long time ago runs connections. Assuming it neglected to build up the co-mix among basic factors, it becomes basic to keep working with factors in contrast to all things considered (Nkoro and Uko, 2016). Different co-integration tests, such as "ADLC, BCT," are available in Engle and Granger's (1987) approach or methodologies.

2.4. Estimation Process

The approximation process of the data could be mentioned Estimation process, which is very significant for different purposes even with having missing data or incomplete set input data. The outcome of this process is certain because it comes from a proper source. More clearly, this process refers to using the value of numbers belonging to the data example to evaluate the assessment of an equivalent human parameter.

2.5. Time-Series Regression: Basic and Fundamental

Regression is a numerical strategy to evaluate the straight linear relation among variables. Regression is principally utilized for causal induction and expectation. In its least difficult (bivariate) structure, regression displays the connection between dependent and independent variables (Y, X), known as straightforward regression. Another type of mathematical strategy is multiple deviations, intended to focus on the connection between single dependent variables and a few free (independent) variables (Campbell and Campbell, 2008, p. 4) *. Time series analysis and panel data measurement are employed to measure several variables in this research.

2.6. Autoregressive Distributed Lag (ARDL) approach

This type of approach is known as a dynamic econometric demonstrating process, and it is proposed for the first time by Hendry (1986). Some other researchers developed this approach, but the most popular one was Pesaran and Shin (1999), based on OLS rating and ECM conversion.

2.7. The ARDL has numerous advantages, which are as follows:

- The most common advantage of this method is that it lies in its co-integrating vectors ID with some other vectors.
- Regardless matter whether the first order combined, I (1), zero-order combined, I (0), or both are employed, this approach can be applied. Also, it is not possible to use this method by having a combined stochastic pattern I (2).
- The ARDL method always can cover false or incorrect variables in the co-integration examination method.

- This approach requires a sufficient number of lags to scan the data processing procedure to show the base traditionally.
- The ARDL method is based on theory and employs statistically significant factors. If a few of these conditions aren't met, the model is re-estimated by modifying the functional form, eliminating a few key variables, or substituting new variables with dependent or independent variables while progressively adding new explanatory variables.
- This approach produces reliable findings for a modest sample size of a cointegration investigation. This method is also used to investigate the same model's short- and long-term effects.
- Autocorrelation, multicollinearity, normalcy, functional form, heteroscedasticity, and structural stability of the model may be easily checked using the ARDL technique (Menegaki, 2019).

2.8. Panel Regression Model: Basic and Fundamental

This model is information or data that perceptions are obtained on similar elements throughout different periods. This model expresses information with various time series perceptions (T) for a large number of (N) cross-section units (Jirata, 2018, p. 12). As illustrated below, the panel data contains cross-sections and time-series dimensions, with all cross-section units observed over the period*. :

X_{it} ; i = 1; : : : ;N, t = 1; : : : ; T

2.9. Advantages of the panel estimation model

- Accurate explanations: One of the advantages of this estimation process is that it can provide tuning dynamics; it could also discover and quantify impacts not visible in cross-sectional or time-series data. Many modifications are hidden in cross-sectional datasets that appear to be rather steady. Panel data are ideal for looking at the length of economic conditions like investments and economic development. If these panels are lengthy enough, they can reveal the rate at which economic policy changes are implemented.
- Improving model specification: this method allows nonlinear variables to be controlled. It is sometimes claimed that the true reason a person receives (or

does not receive) certain impacts is that numerous factors in the definition of a human model, which are connected to the descriptive variables involved, are ignored.

- Fixing and controlling problems: Unnoticed heterogeneity can induce bias, and panel data can help solve this problem. Neglected variable bias is a common issue when fitting models to cross-sectional datasets. In addition, it provides more competent approaches with extended explanations according to time and individuals in a section.
- Larger hypotheses and smaller samples: This panel data allows for scientific investigation of a broad variety of hypotheses. It also works with small sample sizes and a large number of observations. There might be nT observations made up of a time series of parallel units if there are (n) observation units and the search is done in a (T) time period (T over n) (2010, Green)

With having different approximation ways of panel data, the typical one is fixed and random effects models. Due to that, this study utilizes the same model for panel estimation.

2.10. Fixed Effects Model

The linear regression of (y) over (x) can be specified as a fixed-effects model and adds a set of indicator variables (zj) per unit to the specification. This ideal or approximation is also called the least squares dummy variable (LSDV) model (Clark & Linzer, 2012). A fixed panel is a group of people examined during the course of the investigation. Some are stable, although not all are balanced. A rotating panel is one in which the members move from one period to the next (Greene, 2010: p 348). The following is an example of a fixed effect: (Karlsson, 2014, p. 9)

$$Y_{it} = \alpha_i + \beta_1 \chi^1,_{it} + \beta_2 \chi^2,_{it} + \ldots + \beta_k \chi^k,_{it} + \varepsilon_{it}$$

The fixed-effects model posits that variations in the constant term may reflect differences between units, which must be evaluated as a parameter. The Frisch-Waugh Theorem may be used to rewrite the model by using the mean deviation of all explanatory factors instead of individual particular dummy variables. This reformulation does not influence the estimated parameter findings, but it provides

computational advantages due to the small number of variables. Furthermore, the fixed effects model is desirable because it is resilient and does not include any meaningful time-invariant regressions. On the other hand, time-invariant regressors are unpredictable since their impacts are captured in each bespoke dummy. Nevertheless, in the simpler version, the variables are all zero (Jirata, 2018).

2.11. Random-Effects Model

Such a model is expected to follow various distributions. Instead of calculating the data directly, the parameters must be assessed from the distribution in this procedure. All are utilised when reducing the results to data from the entire population (Koller, 2016). Based on Skoglund and Karlsson (2002), it can be written as follows.

$$Yit = \mu + \beta 1 \chi 1,it + \beta 2 \chi 2,it + \ldots + \beta k \chi k,it + (\alpha i - \mu) + \varepsilon$$

The individual component is not handled as a parameter in the random-effects model, which is also not anticipated. Rather it is regarded as a random variable with mean μ and variance $\sigma\alpha 2$ (Baltagi, 2005, p. 33).

2.12. Comparing the Fixed and Random Effects Models

The fixed and random effects models, as detailed below, have certain commonalities and differences. (Baltagi, p. 33, 2005)

Table 1: Assumptions and Comparison of Fixed and Random Effects Models

Fixed Effects Model	**Random Effects model**
The model is correct: $(\varepsilon it) = 0$	The model is correct: $(uit) = E\ \alpha i - \mu + \varepsilon it = E\ \alpha i - \mu + E\ \varepsilon it = 0 + E\ \varepsilon it = 0$
Full rank: $rank\ \boldsymbol{X} = rank\ \boldsymbol{X'X} = K$	Full rank: $rank\ \boldsymbol{X} = rank\ \boldsymbol{X'X} = K$
Exogeneity: allows for the endogeneity of all the regressors. The model can deal with the unobserved heterogeneity.	Exogeneity: $uit\ \boldsymbol{xi}, = 0$; $(\alpha i - \mu\ \boldsymbol{xi} = E\ \alpha i - \mu = 0$. It assumes the exogeneity of all the regressors.
There is no assumption of homoscedasticity.	Homoscedasticity.
The omitted time-invariant variables are Assumed to be uncorrelated.	The omitted time-invariant variables are allowed to Correlate.
Advantages and disadvantages of fixed and random effects models	
Fixed effects model	**Random effects model**
It enables the correlation of individual and time-specific Effects with explanatory factors. x $_{it}$.	When the sample size grows, the number of parameters remains constant.
A researcher does not need to model their correlation patterns.	It enables the development of efficient estimators that take advantage of within-group and between-group differences.
It minimizes bias caused by missing factors such as race and gender, which vary over time.	Using fewer degrees of freedom and individual differences are considered to be random, rather than Fixed.
The fixed Effects model has several parameters, and the lack of degrees of freedom may be prevented.	It has smaller standard errors and a higher statistical power.

Source: the researcher's own work, conducted with the following: (Dougherty, 2011; Hsiao, 2014; Sheytanova, 2015). Furthermore, the benefits of random effects characteristics are the downsides of fixed effects qualities. On the contrary, , the drawbacks of random effects characteristics are the benefits of fixed effects properties; thus, statistical hypothesis testing should be performed to select the most appropriate model for the data There are numerous methods to determine the best appropriate model, whether fixed or random effects; the Hausman test is the most trustworthy.

2.13. Hausman Test

In addition, the most common and proper specification test could be mentioned as a method that has been offered by Hausman (1978). This approach allows differences among fixed and random influence, and its estimation is significantly different.

Typically, this test could be used as alternative and null hypotheses. Moreover, this approach performs its functions depending on comparing two different estimations. Based on the null hypothesis, mentioned estimation actions are reliable. Due to that, numerical dissimilarities among them lead to Provide proof against the null hypothesis, and all the process performs depending on the variances among fixed and random effects estimators. Also, both mentioned effect estimations would have dissimilar outcomes, specifically when T is small, and N is large (Baltagi, 2005). The Hausman test can be written as follows:

H0: The random-effects model is the one to use (if the p-value is more than 0.05)

Ha: The fixed effects model is the one to use (if the p-value is less than 0.05)

With several panel data and estimation, this approach faces several limitations that are not preferable by the users. The first limitation could be mentioned as implicit restrictions in which infrequently verified, but having wrong verification will directly affect the estimation process. However, Hausman (1978) determined the models to select the most preferred model, but mathematical testing is unnecessary or sufficient. As a mathematical tool, this model is useful in existing research since it relies on various aspects such as economic theory, economic and political situations, data kinds, observation time, and investment space.

2.14. Summing Up

In time series, a stationary series is a crucial concept. There are several fixed tests; the current study uses Dickey-Fuller (DF). Though at least one independent variable and the dependent variable are not stable, the cointegration test is utilised to avoid misleading regressions. Also, an estimation or estimate is a value that may be used for a reason even though the input data is partial, imprecise, or unstable. The estimation will be done using the OLS and ARDL methods. The most prevalent method for completing a regression analysis is OLS. However, the ARDL approach, as indicated above, offers several advantages. After that, the panel regression model will be utilised; Panel data is a sort of data in which data are collected on the same entity set throughout many periods. Finally, the Hausman test is utilised to differentiate among fixed and random impact models in the study. A diagnostic test was used in this investigation to check

that the models fit and were accurate. Furthermore, the diagnostic check contains six primary tests used to match the model's theoretical, statistical, and economic competency.

CHAPTER 3. RESULT AND DISCUSSION

3.1. An Overview

This chapter contains ten sections. The data and data sources are described in the first section. The second part discusses whether the Changes have stopped or not. The third section explores merging to find long-term relationships between variables. The fourth part is Time Series Estimation by Using (ARDL). The fifth section below presents the result of the ARDL international rating. Part Six is the Panel Estimation of Economic growth Mode. The seventh fixed-effects model. Part eight is a model of random results. The ninth part of the statutory and randomized outcome models results and the last part of the randomized results are related to the Hausman test.

3.2. Data Description and Data Sources

The current study used the second annual data in four countries, namely: Turkey, Iran, Egypt, and Iraq (1980-2019). Information gleaned from the Data Market, World Development Indicator and the World Bank website are reasons for selecting these data sources for reliability and widespread use. Also, the World Bank data bank offers a variety of data editing tools

3.3. The Panel Unit Root

This section discusses whether the variables are fixed or not and whether they have a unit root. In addition, Phillips – Perron (PP), Fuller (ADF), and Augmented Dickey were utilised to ensure data stability. The results of the panel unit root test are as follows:

Table 2: Panel unit root tests for the dependent and independent variables: GDP

Method	Statistic	Level prob.	First difference Prob.**	Cross sections	Obs
Null: Unit root (is based on the assumption of a shared unit root process)					
Levin, Lin & Chu t*	-7.92903	0.8489	0.0000	4	152
Null: Unit root (presupposes that each unit has its own root process)					
Im, Pesaran and Shin W-stat	-8.97868	0.9933	0.0000	4	152
ADF - Fisher Chi-square	78.8014	0.9907	0.0000	4	152
PP - Fisher Chi-square	75.0933	0.9917	0.0000	4	152

Table 3: Panel unit root tests for the dependent and independent variables: MS2

Method	Statistic	Level prob.	First difference Prob.**	Cross-Sections	Obs
Null: Unit root (believes that all unit root processes are the same)					
Levin, Lin & Chu t*	-5.21467	1.0000	0.0000	4	153
Null: Unit root (presupposes that each unit has its own root process)					
Im, Pesaran and Shin W-stat	-2.58746	1.0000	0.0048	4	153
ADF - Fisher Chi-square	24.0159	0.9981	0.0023	4	153
PP - Fisher Chi-square	11.3194	0.9970	0.1843	4	153

Table 4: Panel unit root tests for the dependent and independent variables: CPI

Method	Statistic	Level prob.	First difference Prob.**	Cross-Sections	Obs
Null: Unit root (presupposes that the unit root process is the same for all units.)					
Levin, Lin & Chu t*	-2.0274	0.0213	0.0213	4	156
Null: Unit root (presupposes that each unit has its own root process)					
Im, Pesaran and Shin W-stat	-2.2766	0.0114	0.0114	4	156
ADF - Fisher Chi-square	19.2885	0.0134	0.0134	4	156
PP - Fisher Chi-square	16.4787	0.0360	0.0360	4	156

Table 5: Panel unit root tests for the dependent and independent variables: IR

Method	Statistic	Level prob.	First difference Prob.**	Cross-Sections	Obs
Null: Unit root (believes that all unit root processes are the same)					
Levin, Lin & Chu t*	-11.7360	0.9729	0.0000	4	152
Null: Unit root (presupposes that each unit has its own root process)					
Im, Pesaran and Shin W-stat	-13.6851	0.1337	0.0000	4	152
ADF - Fisher Chi-square	107.489	0.1503	0.0000	4	152
PP - Fisher Chi-square	101.941	0.0028	0.0000	4	152

Table 6: Panel unit root tests for the dependent and independent variables: INVST

Method	Statistic	Level prob.	First difference Prob.**	Cross-Sections	Obs
Null: Unit root (believes that all unit root processes are the same)					
Levin, Lin & Chu t*	-9.02723	0.1546	0.0000	4	152
Null: Unit root (presupposes that each unit has its own root process)					
Im, Pesaran and Shin W-stat	-9.51697	0.1232	0.0000	4	152
ADF - Fisher Chi-square	83.8116	0.1580	0.0000	4	152
PP - Fisher Chi-square	89.7176	0.1420	0.0000	4	152

Table 7: Panel unit root tests for the dependent and independent variables:EX

Method	Statistic	Level prob.	First difference Prob.**	Cross-Sections	Obs
Null: Unit root (believes that all unit root processes are the same)					
Levin, Lin & Chu t*	-5.47781	1.0000	0.0000	4	152
Null: Unit root (presupposes that each unit has its own root process)					
Im, Pesaran and Shin W-stat	-5.82871	1.0000	0.0000	4	152
ADF - Fisher Chi-square	51.7221	0.9950	0.0000	4	152
PP - Fisher Chi-square	50.9009	0.9951	0.0000	4	152

The table above expresses that all variables are not standardized, but after taking the first difference, they become static. Although, above all, the variables stand out in the first variation, the validity of the ARDL boundary test results for collaborative integration and granger-causality analysis.

3.4. Panel Co-Integration Test

The next stage is to study the integration to find the long-term connection between the variables after defining the order of the direct variables. There are three standard tests for assembling panels used in the literature. The study adopted a method called the Johansen-Fisher panel co-integration tests. The following are the outcomes of the panel integration.

Johansen Fisher Panel Integration Test:

Series: LGDP LINVST LMS2 CPI EX IR

Date: 06/16/21 Time: 14:52

Sample: 1980 2019

Included observations: 6240

Trend assumption: Linear deterministic trend

Lags interval (in first differences): 1 1

Table 8: Unrestricted Co-integration Rank Test (Trace and Maximum Eigenvalue)

Cross Section	Trace Test Statistics	Prob.**	Max-Eign Test Statistics	Prob.*
Hypothesis of no co-integration				
1	100.2168	0.0238	36.2089	0.1280
2	86.5632	0.1812	37.5905	0.0929
3	162.4594	0.0000	57.6597	0.0002
4	112.4727	0.0022	55.7379	0.0004

Table 9: Results from individual cross sections

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-Eigen test)	Prob.
None	60.10	0.0000	41.28	0.0000
At most 1	29.86	0.0002	11.90	0.1557
At most 2	22.08	0.0048	7.540	0.4796
At most 3	18.23	0.0196	8.457	0.3901
At most 4	14.70	0.0652	12.08	0.1476
At most 5	11.73	0.1636	11.73	0.1636

The table above shows the outcomes of the panel co-integration testing. They reject the null hypotheses of less than half of co-integration vectors.

3.5. Time Series Estimation by Using (ARDL) (Autoregressive Distributed Lag)

Verification of unit-root presence in time series data and verification of integration relationships between variables includes approval of the adoption of the ARDL standard to assess the impact of GDP, EX, INVEST, IR, CIP and MS2 on economic growth in cross-cutting countries (Egypt, Turkey, Iran and Iraq). Flexible ratings are tested using the E-views 9 software.

3.5.1. Economic growth model estimation

The Autoregressive Distributed Latency (ARDL) approach is a dynamic economic modelling method based on OLS estimations and ECM transformations initially introduced by Hendry and further modified by Pesaran and Shin (1999). Also, the ARDL method has many advantages: the ARDL method does not include the preliminary unit root test, and the ARDL method can be used regardless of whether the sub regressor is integrated with the first system I (1), zero-. combo order, I (0), or a combination of both. But, this operation will crash before my integrated stochastic approach (2). The ARDL approach can add dummy variables into an integrated test

integration process if there are enough delays. The influence of (INVST, MS2, IR, EX, CPI) on economic growth (GDP) in many nations from 1980 to 2019 is examined using empirical analysis.

3.5.2. Model specification

$GDP = f(INVST, MS2, IR, EX, CPI)$

By including a bias parameter, a slope for each explanatory variable, and a stochastic error term, performance statistics may be turned into an econometric model, as illustrated below:

LGDPt=B0+B1LINVSTt+B2LINVSTt+B3LMS2t-B4IRt-B5EXt-B6CPIt+Ut

Where:

LGDP = economic growth.

LINVST = Investment

LMS2 = Money supply

IR = Interest rate

EX=Exchange rate

CPI=Consumer price index

β = intercept parameter.

U = a random error term having a zero mean and constant variance that is assumed to be uniformly distributed.

Coefficients are economic model parameters that specify indications and strengths of the link between GDP and the elements that affect the model's parameters (called Definitive Variables). The descriptive variant is a big interest coefficient that shows the percentage reaction to a change in interest rate, investment, CPI, and Money Supply with a change in GDP growth.

Vector Autoregression Estimates

Date: 07/15/21 Time: 23:22

Sample (adjusted): 1982 2019

Included observations: 149 after adjustments

Standard errors in ( ) & t-statistics in [ ]

Table 10: Result of ARDL estimations

	GDP	MS2	INVST	IR	EX	CPI
GDP(-1)	1.091734 (0.08804) [12.4009]	-125.4581 (88.6830) [-1.41468]	8.68E-07 (5.7E-06) [0.15325]	6.54E-12 (4.2E-11) [0.15397]	-5.36E-10 (1.3E-09) [-0.41498]	-6.06E-11 (1.1E-10) [-0.53366]
GDP(-2)	-0.095281 (0.09020) [-1.05635]	129.4139 (90.805) [1.42431]	-1.51E-06 (5.8E-06) [-0.26089]	-1.05E-11 (4.3E-11) [-0.24114]	7.79E-10 (1.3E-09) [0.58915]	5.35E-11 (1.2E-10) [0.46022]
MS2(-1)	-0.000149 (7.5E-05) [-1.97856]	0.504747 (0.07568) [6.66991]	3.22E-10 (4.8E-09) [0.06671]	1.46E-14 (3.6E-14) [0.40348]	4.76E-13 (1.1E-12) [0.43187]	5.82E-14 (9.7E-14) [0.60080]
MS2(-2)	0.000161 (9.2E-05) [1.73807]	0.961185 (0.09308) [10.3261]	-4.56E-10 (5.9E-09) [-0.07674]	2.21E-15 (4.5E-14) [0.04963]	-3.59E-14 (1.4E-12) [-0.02652]	-6.81E-14 (1.2E-13) [-0.57153]
INVST(-1)	-263.5886 (1484.49) [-0.17756]	-394828.8 (1495386) [-0.26403]	0.992472 (0.09547) [10.3957]	1.83E-07 (7.2E-07) [0.25525]	-7.84E-06 (2.2E-05) [-0.36032]	-2.97E-07 (1.9E-06) [-0.15534]
INVST(-2)	-259.2467 (1499.01) [-0.17295]	512605.4 (1510009) [0.33947]	-0.089282 (0.09640) [-0.92613]	7.85E-08 (7.2E-07) [0.10862]	1.05E-05 (2.2E-05) [0.47713]	7.36E-08 (1.9E-06) [0.03809]
IR(-1)	20227736 (1.8E+08) [0.11421]	-3.44E+11 (1.8E+11) [-1.92955]	-10928.90 (11390.2) [-0.95950]	0.904293 (0.08539) [10.5897]	-2.786379 (2.59736) [-1.07277]	-0.022076 (0.22842) [-0.09665]
IR(-2)	-1.13E+08 (1.8E+08) [-0.61309]	2.60E+11 (1.9E+11) [1.40126]	8701.010 (11826.0) [0.73575]	0.085754 (0.08866) [0.96721]	4.238869 (2.69675) [1.57184]	0.022606 (0.23716) [0.09532]
EX(-1)	3619999. (7913662) [0.45744]	5.29E+10 (8.0E+09) [6.63622]	-19.76823 (508.940) [-0.03884]	-0.004229 (0.00382) [-1.10835]	1.457484 (0.11606) [12.5584]	-0.007807 (0.01021) [-0.76491]
EX(-2)	3048595. (7890172) [0.38638]	-5.72E+10 (7.9E+09) [-7.19977]	31.59601 (507.429) [0.06227]	-0.000627 (0.00380) [-0.16474]	-0.528787 (0.11571) [-4.56987]	0.007416 (0.01018) [0.72874]
CPI(-1)	-6159033. (6.5E+07) [-0.09517]	7.75E+10 (6.5E+10) [1.18898]	-326.3593 (4161.96) [-0.07841]	-0.006671 (0.03120) [-0.21378]	1.587116 (0.94908) [1.67228]	0.973790 (0.08346) [11.6673]
CPI(-2)	-8741030. (6.3E+07) [-0.13771]	-8.70E+10 (6.4E+10) [-1.36110]	-404.3599 (4082.01) [-0.09906]	0.000997 (0.03060) [0.03259]	-1.426279 (0.93084) [-1.53225]	-0.092878 (0.08186) [-1.13460]
C	1.18E+10	5.08E+12	403687.2	3.507480	-14.53710	6.642949

	(6.2E+09) [1.90014]	(6.2E+12) [0.81286]	(398922.) [1.01194]	(2.99078) [1.17276]	(90.9684) [-0.15980]	(7.99990) [0.83038]

Table 11: Statistical Indicators

R-squared	0.973372	0.999405	0.842216	0.924191	0.987470	0.872655
Adj. R-squared	0.971022	0.999353	0.828294	0.917502	0.986364	0.861418
Sum sq. resids	2.02E+23	2.05E+29	8.35E+14	46922.07	43409933	335719.6
S.E. equation	3.85E+10	3.88E+13	2477552.	18.57459	564.9696	49.68427
F-statistic	414.2805	19044.54	60.49483	138.1647	893.1653	77.66357
Log likelihood	-3836.429	-4866.774	-2398.315	-639.9680	-1148.800	-786.5682
Akaike AIC	51.67019	65.50032	32.36665	8.764671	15.59463	10.73246
Schwarz SC	51.93228	65.76241	32.62873	9.026760	15.85672	10.99455
Mean dependent	2.13E+11	3.69E+14	1715577.	39.38470	1844.130	57.19349
S.D. dependent	2.26E+11	1.53E+15	5979020.	64.66907	4838.256	133.4646

- Determinant reside covariance (dof adj.) 2.40E+72
- Determinant reside covariance 1.39E+72
- Log likelihood-13644.02
- Akaike information criterion 184.1882
- Schwarz criterion 185.7607
- VAR Lag Order Selection Criteria GDP
- Endogenous variables: GDP
- Exogenous variables: C
- Date: 07/15/21 Time: 23:24
- Sample: 1980 2019
- Included observations: 128

Table 12: Lag Selection Criteria (GDP)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3532.576	NA	5.57e+22	55.21212	55.23440	55.22118
1	-3353.765	352.0340	3.46e+21	52.43383	52.47839*	52.45193
2	-3352.638	2.200891	3.45e+21	52.43184	52.49869	52.45900
3	-3352.636	0.003129	3.51e+21	52.44744	52.53657	52.48366
4	-3352.029	1.168092	3.53e+21	52.45357	52.56498	52.49884
5	-3351.267	1.451841	3.54e+21	52.45730	52.59099	52.51162
6	-3350.596	1.267959	3.56e+21	52.46244	52.61841	52.52581
7	-3342.548	15.09135*	3.19e+21*	52.35231*	52.53056	52.42473*
8	-3341.955	1.102298	3.21e+21	52.35867	52.55920	52.44015

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

- MS2
- VAR Lag Order Selection Criteria
- Endogenous variables: MS2
- Exogenous variables: C
- Date: 07/15/21 Time: 23:26
- Sample: 1980 2019
- Included observations: 125

Table 13: Lag Selection Criteria (MS2)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4557.348	NA	2.77e+30	72.93357	72.95620	72.94276
1	-4134.986	831.2097	3.27e+27	66.19177	66.23702	66.21015
2	-4119.169	30.87447	2.58e+27	65.95470	66.02258	65.98228
3	-4118.369	1.548805	2.59e+27	65.95790	66.04841	65.99467
4	-4115.143	6.192703	2.50e+27	65.92229	66.03543	65.96825
5	-4093.495	41.21868	1.79e+27	65.59192	65.72768	65.64707
6	-4087.860	10.63863	1.67e+27	65.51776	65.67615	65.58210
7	-4038.884	91.68379	7.73e+26	64.75014	64.93115	64.82367
8	-4035.161	6.909752*	7.40e+26*	64.70657*	64.91021*	64.78930*

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

- INVEST
- VAR Lag Order Selection Criteria
- Endogenous variables: INVST
- Exogenous variables: C
- Date: 07/15/21 Time: 23:27
- Sample: 1980 2019
- Included observations: 128

Table 14: Lag Selection Criteria (INVST)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2187.323	NA	4.14e+13	34.19254	34.21482	34.20159
1	-2071.220	228.5777	6.86e+12	32.39406	32.43862	32.41216
2	-2070.799	0.822381	6.92e+12	32.40310	32.46995	32.43026
3	-2066.415	8.493647	6.56e+12	32.35023	32.43936	32.38644
4	-2066.394	0.040863	6.66e+12	32.36552	32.47693	32.41079
5	-2066.351	0.080168	6.76e+12	32.38049	32.51418	32.43481
6	-2047.821	35.03463	5.14e+12	32.10657	32.26254	32.16995
7	-2024.062	44.54727*	3.60e+12	31.75097	31.92922*	31.82340
8	-2022.038	3.764588	3.55e+12*	31.73496*	31.93550	31.81644*

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 15: Lag Selection Criteria (IR)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-726.2340	NA	5039.966	11.36303	11.38531	11.37208
1	-600.7775	246.9925	720.9172*	9.418399	9.462962*	9.436505*
2	-600.5206	0.501801	729.3407	9.430009	9.496854	9.457169
3	-599.9641	1.078171	734.4213	9.436939	9.526065	9.473152
4	-597.7757	4.205864*	720.9236	9.418370*	9.529778	9.463636
5	-597.7617	0.026753	732.1372	9.433776	9.567465	9.488095
6	-597.7559	0.010838	743.6301	9.449312	9.605282	9.512683
7	-597.6835	0.135867	754.5265	9.463804	9.642056	9.536229
8	-597.5684	0.213985	765.0847	9.477631	9.678165	9.559109

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

- EX
- VAR Lag Order Selection Criteria
- Endogenous variables: EX
- Exogenous variables: C
- Date: 07/15/21 Time: 23:28
- Sample: 1980 2019
- Included observations: 128

Table 16: Lag Selection Criteria (EX)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1324.791	NA	58096426	20.71549	20.73777	20.72454
1	-1046.505	547.8760	763004.8	16.38289	16.42746	16.40100
2	-1044.138	4.622838	746886.0	16.36154	16.42838	16.38870
3	-1042.472	3.227588	739164.5	16.35113	16.44026	16.38734
4	-1042.443	0.056996	750471.4	16.36629	16.47770	16.41156
5	-1036.719	10.91023	697098.9	16.29249	16.42618	16.34681
6	-1025.127	21.91755	590787.3	16.12698	16.28295	16.19035
7	-1001.674	43.97390	416000.2	15.77615	15.95441	15.84858
8	-998.8624	5.227622*	404418.6*	15.74785*	15.94838*	15.82933*

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

- CPI
- VAR Lag Order Selection Criteria
- Endogenous variables: CPI
- Exogenous variables: C
- Date: 07/15/21 Time: 23:29
- Sample: 1980 2019
- Included observations: 128

Table 17: Lag Selection Criteria (CPI)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-723.4334	NA	4824.173	11.31927	11.34155	11.32832
1	-658.1106	128.6042	1765.790	10.31423	10.35879	10.33233
2	-655.8534	4.408606	1731.452	10.29458	10.36143	10.32174
3	-642.4239	26.01968	1425.840	10.10037	10.18950*	10.13659
4	-641.2614	2.234173	1422.252	10.09783	10.20924	10.14310
5	-640.4705	1.507506	1426.949	10.10110	10.23479	10.15542
6	-636.7366	7.059554	1367.331	10.05838	10.21435	10.12176
7	-635.9318	1.508845	1371.584	10.06144	10.23969	10.13386
8	-633.2095	5.061862*	1335.257*	10.03452*	10.23506	10.11600*

* Indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

3.6. The tables below present the result of ARDL estimation for the countries

- Dependent Variable: D(LGDP)
- Method: ARDL
- Date: 07/01/21 Time: 23:11
- Sample: 1983 2019
- Included observations: 145
- Maximum dependent lags: 4 (Automatic selection)
- Model selection method: Akaike info criterion (AIC)
- Dynamic regressors (3 lags, automatic): LINVST LMS2 IR EX CPI
- Fixed regressors
- The number of models that were tested was: 12
- Selected Model: ARDL (2, 3, 3, 3, 3, 3)

Note: The sample size of the final equation is bigger than the sample size of the selection sample.

Table 18: Result of ARDL estimation for the countries: -

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
LINVST	0.538137	0.047853	11.24565	0.0000
LMS2	0.887399	0.016405	54.09417	0.0000
IR	-0.015033	0.005937	-2.532277	0.0132
EX	-0.000494	0.000230	-2.144196	0.0349
CPI	-0.007209	0.001409	-5.118194	0.0000
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Short Run Equation				
COINTEQ01	0.351619	0.174191	-2.018579	0.3471
D(LGDP(-1))	0.148872	0.135885	1.095568	0.2764
D(LINVST)	-6.367817	6.073945	-1.048382	0.2975
D(LINVST(1))	-3.635864	3.845610	-0.945458	0.3471
D(LINVST(2))	-5.535248	5.275316	-1.049273	0.2971
D(LMS2)	1.393549	1.564025	0.891001	0.3755
D(LMS2(-1))	0.527120	0.795943	0.662259	0.5096
D(LMS2(-2))	0.795812	0.463415	1.717276	0.0896
D(IR)	-0.004325	0.005081	-0.851305	0.3970
D(IR(-1))	0.038233	0.038883	0.983277	0.3283
D(IR(-2))	-0.052095	0.058617	-0.888743	0.3767
D(EX)	-0.073035	0.057130	-1.278400	0.2046
D(EX(-1))	0.050016	0.052436	0.953844	0.3429
D(EX(-2))	0.010897	0.012440	0.875986	0.3835
D(CPI)	-0.093487	0.094454	-0.989758	0.3251
D(CPI(-1))	-0.010659	0.010349	-1.030040	0.3059
D(CPI(-2))	-0.008800	0.004616	-1.906366	0.0600

Mean dependent var	0.196036	S.D. dependent var	3.386778
S.E. of regression	1.919752	Akaike info criterion	1.400610
Sum squared resid	309.5777	Schwarz criterion	2.821667
Log-likelihood	-36.94792	Hannan-Quinn criter.	1.977752

Table (4.4) shows the results of ARDL estimates and shows the positive correlation between LMS2L, LINVST and global GDP over time. LMS2 and LINVST have a positive and statistically significant effect on GDP (0.88 and 0.53), respectively. In other words, if LMS2 changes by 1%, GDP increases by 0.88%., And if LINVST changes by 1%, GDP increases by 0.53%. However, IR, CPI, EX, have a negative and

statistically significant effect on economic growth. Therefore, many of the results are in line with perceptions. Moreover, according to the literature presented by (Wun, et al (2016); Ihsan, et al (2013); Ogunmuyiwa et al (2010); Owolabi, et al (2014); Uduakobong, et al (2014); Chude, et al (2014); al (2016); Zapodeanu and Cociuba, et al (2010); Aslam, et al (2016); Prasert, et al. (2015); Chaitip et al. (2015); Chepkemoi, et al (2014)); Kunwar, et al (2020); Abdalla, M. and Abdelbaki, HH, 2014 .; Ikechukwu et al, (2012); Feldstein and Stock (1994); Friedman, et al (1968).

In addition, Cointeq (-1) error correction name is (-0.35) and is statistically significant at (1% and 5%), indicating speed correction for correction.

The length ranges from short to lengthy. It also guarantees that the variables have a long-term stable connection. The ARDL models have much detail. Besides, the table shows that R2 and adjusted R2 are the highest in all types of economic growth in all countries. These findings indicate that the model is data-intensive and has appropriate meanings. Besides, the table shows the S.E. retreat rate. This value is crucial in establishing the model's appropriateness. S.E. has a very low value in the economic growth model. .

3.7. Panel Estimation for Economic growth Model

Using a panel dataset eliminates the drift produced by unseen variables, which is a typical issue when creating models with several datasets due to dynamic drift. Besides, with a time-consuming awareness of individuals and individuals in different categories, more information is available on the panel, providing more effective measurements.

The fixed-effects model has a slope coefficient equal for time and section units, while the constant-coefficient differs based on the horizontal cross-sectional units because it has a unit effect, Greene. Every horizontal section unit takes a different value of constant, which means that the differences between the units are expressed with the differences in the constant term. On the other hand, if these individual effects are treated as random variables similar to error terms, they are placed within the random-effects model. (Xu et al, 2007)

3.8. Fixed effects model

An example of an embedded result is the reversal of the line (y) to (x), which adds to the definition of a series of dynamic indicators. For example, a focused panel refers to the same set of people observed during the study.

3.9. Random effects model

Random result patterns are thought to follow a certain distribution. The parameters should be evaluated from this distribution rather than the coefficient itself. When the goal is to display findings for the full population polled, they are utilised.

3.10. The results of fixed and random effect models are as follows

- Dependent Variable: LGDP
- Method: Panel Least Squares
- Date: 06/16/21 Time: 15:03
- Sample: 1980 2019
- Periods included: 40
- Cross-sections included: 4
- Total panel (unbalanced) observations: 157
- White period standard errors & covariance (d.f. corrected)
- WARNING: estimated coefficient covariance matrix is of reduced rank

Table 19: Fixed and random effects models produced the following results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.11505	2.002455	12.04274	0.0000
LINVST	0.128565	0.056148	2.289751	0.0234
LMS2	0.040020	0.071142	0.562537	0.5746
IR	-0.001377	0.003864	-0.356401	0.7220
EX	-0.000146	1.37E-05	10.65433	0.0000
CPI	-0.031619	0.001232	-25.65591	0.0000

Table 20: Result of Fixed and Random effects models.

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.659338	Mean dependent var	23.99776
Adjusted R-squared	0.640924	S.D. dependent var	6.036957
S.E. of regression	3.617525	Akaike info criterion	5.465073
Sum squared resid	1936.800	Schwarz criterion	5.640272
Log likelihood	-420.0082	Hannan-Quinn criter.	5.536228
F-statistic	35.80600	Durbin-Watson stat	1.012711
Prob(F-statistic)	0.000000		

- Dependent Variable: LGDP
- Method: Panel EGLS (Cross-section random effects)
- Date: 06/16/21 Time: 15:05
- Sample: 1980 2019
- Periods included: 40
- Cross-sections included: 4
- Total panel (unbalanced) observations: 157
- Wallace and Hussain estimator of component variances
- White period standard errors & covariance (d.f. corrected)
- WARNING: estimated coefficient covariance matrix is of reduced rank

Table 21: Result of Fixed and Random effects models.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.7642	1.853917	13.35783	0.0000
LINVST	0.061764	0.049865	1.238627	0.2174
LMS2	0.035872	0.069860	0.513476	0.6084
IR	-0.003841	0.002694	-1.425908	0.1560
EX	-0.000117	1.88E-05	6.228868	0.0000
CPI	-0.032509	0.001135	-28.65167	0.0000

Table 22: Result of Fixed and Random effects models.

Effects Specification			
		S.D.	Rho
Cross-section random		1.726289	0.1873
Idiosyncratic random		3.596399	0.8127
Weighted Statistics			
R-squared	0.596079	Mean dependent var	7.572609
Adjusted R-squared	0.582704	S.D. dependent var	5.582467
S.E. of regression	3.604088	Sum squared resid	1961.407
F-statistic	44.56714	Durbin-Watson stat	1.010387
Prob(F-statistic)	0.000000		

Table 23: Statistical Indicators

Unweighted Statistics			
R-squared	0.620663	Mean dependent var	23.99776
Sum squared resid	2156.682	Durbin-Watson stat	0.918902

3.11. The Hausman test: the results of the linked random effects

The question of which model to pick after reviewing the models for consistent and random findings and future forecasts remains unanswered. The most important is Hausman's suggested disclosure test (1978). The differences between static and random effects models are validated using Hausman's (1978) experiment. It assesses changes in anticipated parameters and uses the results to see if the scores for random and strong impacts differ considerably. The test relies on a comparison of these two numbers. Both measurement procedures are congruent under the null hypothesis, thus identifying statistical disparities between them based on the differences between consistent and random measurement outcomes offers evidence against it. . Random and focused results

models produce different measurement results. The Hausman test has the following structure:

H0: Suitable model for single random effects (if p value exceeds 0.05)

Ha: Model suitable for single fixed effects (if p value is less than 0.05)

Table 24: Correlated Random Effects - Hausman Test

Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

** WARNING: The Assumptions of Hausman test variance computation may not be compatible with robust standard errors.

Table 25: Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LINVST	0.128565	0.061764	0.000666	0.0096
LMS2	0.040020	0.035872	0.000181	0.7576
IR	-0.001377	-0.003841	0.000008	0.3738
EX	0.000146	0.000117	-0.000000	NA
CPI	-0.031619	-0.032509	0.000000	0.0642

Cross-section random effects test equation:

- Dependent Variable: LGDP
- Method: Panel Least Squares
- Date: 06/16/21 Time: 15:06
- Sample: 1980 2019
- Periods included: 40
- Cross-sections included: 4
- Total panel (unbalanced) observations: 157

- White period standard errors & covariance (d.f. corrected)
- WARNING: The rank of the calculated coefficient covariance matrix has been lowered.

Table 26: Cross-section random effects test equation.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.11505	2.002455	12.04274	0.0000
LINVST	0.128565	0.056148	2.289751	0.0234
LMS2	0.040020	0.071142	0.562537	0.5746
IR	-0.001377	0.003864	-0.356401	0.7220
EX	0.000146	1.37E-05	10.65433	0.0000
CPI	-0.031619	0.001232	-25.65591	0.0000

Table 27: Statistical Indicators

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.659338	Mean dependent var	23.99776
Adjusted R-squared	0.640924	S.D. dependent var	6.036957
S.E. of regression	3.617525	Akaike info criterion	5.465073
Sum squared resid	1936.800	Schwarz criterion	5.640272
Log likelihood	-420.0082	Hannan-Quinn criter.	5.536228
F-statistic	35.80600	Durbin-Watson stat	1.012711
Prob(F-statistic)	0.000000		

The table's statistical results reveal that several variables are statistically significant at 1% and 5% rates. The findings of randomized controlled experiments, on the other hand, reveal that some variables are statistically significant at rates of 1% and 5%. The Hausman test results demonstrate that the random-effects model is mathematically and economically sound higher than 5%, most likely (1). The best method of measurement is the random results method.

CUSUM and CUSUMQ) for checking the problem:

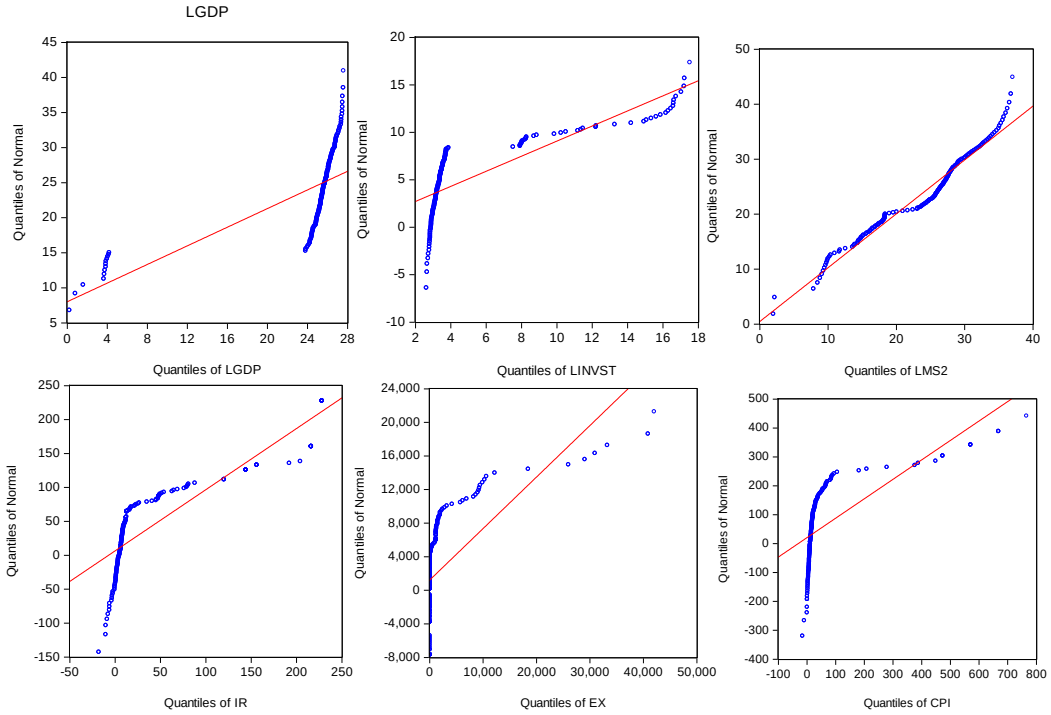

Figure 1: The frequency distribution of data in the countries

CONCLUSION

The results of the study are presented in chapter four. Furthermore, based on the collected results, the study's primary results and economic suggestions for policymakers and planners are highlighted in this chapter. Finally, this chapter also discusses the study's weaknesses and recommends further research.

This study uses an empirical determination approach to consider the impact of money supply on economic development in four distinct nations (Iraq, Turkey, Iran, and Egypt). The descriptive statistics illustrate that the sequence distribution under investigations is normal. The qualities of the sequences were investigated using the unit root test, and all of the series were discovered to be integrating of order one. Furthermore, to determine the long-term association between variables, the Johansen co-integration test was performed, and the findings revealed a long-term association among or between variables. Long run relation shows that both LMS2L and LINVST have proper or strong relations (positive) with the global GDP variable.

Nonetheless, LMS2 and LINVST have a positive and statistically important effect on GDP (0.88 and 0.53), respectively. More clearly, in the case of changing LMS2 by 1%, GDP value rise by 0.88% and increasing LINVST by 1% will lead to raising GDP by 0.53%. On the contrary, however, there was a negative and statistically significant influence of IR, CPI and EX on economic growth.

Furthermore, Cointeq (-1) is an error correction term (-0.35) that is statistically significant (1 per cent and 5%).

Depending on the obtained conclusion, this study recommends the following points to expand and affect economic growth; the Central Bank will fully comprehend the character and role of the money supply and will adopt monetary policies to guarantee that the money supply directs the economy appropriately and effectively to assure economic growth.

To know the confident influence of a stable monetary policy, the government must offer the necessity of a financial structure that is more precise and richer than the present ones.

The monetary authorities should devise a steady monetary policy to move the economy in the right direction.

The government should strengthen its commitment to abide by the rules, which are anti-inflationary in nature so that the monetary policy objective is not derailed.

In this study met some limitations. These limitations can be summarized as follows:

First: Because of the violence and financial crisis in Iraq, this study's most evident constraint and the problem was missing information or partial data for specific periods. However, these issues and difficulties didn't impact the review examination and determination to reach a high-level measurement strategy that accomplished a profoundly precise assessment. So, to reach and collect much clear outcome. This review recommends utilizing total information without missing any data of any period. It may not be straightforward and impossible with having the government and the authorities of Iraq support.

Second: no unified indexes among selected countries have been utilized in this research, and dissimilar GDP and exchange rate measures could be mentioned as another limitation. As it is known, utilizing accurate GDP and the real exchange rate is not easy, but it is possible. Due to that, information regarding the variables can be collected in other studies that may perform in the future.

Third: the ARDL method (Fixed and Random) effect method was utilized to choose selected countries as a sample in this research. Therefore, in future researches, other methods can apply with utilizing dissimilar approaches like GLS, GMM, DOLS and FMOLS. in addition, all selected countries can be used with same data, but with applying mentioned different approaches and periods to realize, determine, and the rate of accuracy compared to this study outcomes.

Fourth: due to having limited data, this study shows a short outcome or description on (Iraq, Turkey, Iran, and Egypt). So, performing further projects utilizing more data of the countries will lead to having more extended and clear results, and more research may lead to clarifying the issue of money supply on financial development in other countries around us.

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