A Theoretical Analysis for Money Demand and Money Market Equilibrium in Libya.

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Abstract

The building visual model was the main aim of this study that based on the Keynesian theory and the subsequent developments of demand for money, the visual model of the study adopted some hypotheses for money supply function that was mentioned in a previous study by Ben Taher (2021), the study is considered as first attempt for obtaining visual model has ability to explain the Libyan money market and interpret the effect of some economic policies conducted recently by the Libyan authorities.

The descriptive analysis method, mathematical equations and figures were used to examine four principle hypotheses proving the inability of the traditional formula to explain the economic variables affecting the Libyan money market. The main results of the theoretical investigation showed that the required amount of the Libyan dinar is changed positively with public expenditure and inversely with the exchange rate of the Libyan dinar in the black market. The study results were deferent of recent previous study conducted by Ben Taher (2021), where found that the change in the quantity of money supply depends on the Central Bank of Libya (CBL) decisions to print more banknotes to meet money demand surplus and also depends on the legislative authority's

decisions to authorize CBL to lend the government for funding the public budget deficit. The results also found that there is an inverse relationship between the lack of liquidity and the exchange rate of the Libyan dinar in the black market

Keywords: Money Market, Visual – Model, Libya

توزان سوق النقود في ليبيا: دراسة نظرية تحليلية,الطلب على النقود

المستخلص

تهدف الدراسة إلى محاولة بناء نموذج بياني يوضح التوازن في سوق النقود في الاقتصاد الليبي، حيث اعتمدت الدراسة في تصميم وبناء النموذج على التحليل الكينزي والتطورات التي لحقت بعدها، وكما اعتمدت الدراسة في تحليل التوازن في سوق النقود في ليبيا على دالة عرض النقود الخاصة بالحالة الليبية والتي وردت في دراسة سابقةلـ بن طاهر (2021)، وتعد محاولة بناء نموذج لسوق النقود في ليبيا هي الاولى من نوعها في الحصول على نموذج اقتصادي يعبر عن الحالة الليبية وله القدرة على فهم الاحداث والظواهر الاقتصادية التي يمر بها الاقتصاد الليبي، وله القدرة أيضاً على تفسير بعض السياسات التي تتبناها السلطات النقدية على الاقتصاد الكلي.

وقد استخدمت الدراسة التحليل الوصفي والاشكال البيانية والمعادلات الرياضية في تحليل وإثبات أربع فرضيات أساسية في بناء وتفسير العلاقة بين المتغيرات الاقتصادية المؤثرة في سوق النقود الليبي. حيث أظهرت النتائج بأن هناك علاقة موجبة بين الطلب على الدينار الليبي وحجم الإنفاق العام وعكسياً مع سعر صرفه في السوق الموازية. واختلفت الدراسة مع دراسة بن طاهر (2021)، حث توصلت إلى أن التغيير في كمية المعروضة من النقود تعتمد على قرارات مصرف ليبيا المركزي لطباعة المزيد من الأوراق النقدية لمواجهة الطلب المتزايد على الدينار

الليبي، وتعتمد أيضًا على قرارات السلطة التشريعية في منح الإذن للسلطة النقدية لإقراض الحكومة لتمويل الموازنة العامة. كما توصلت الدراسة أيضاً إلى أن هناك علاقة عكسية بين نقص السيولة وسعر صرف الدينار الليبي في السوق الموازية.

Introduction:

The importance of the study is conducting a theoretical investigation on the formulation of money market in Libya, as this study is the first attempt to introduce a visual model that determine the main factors affecting the money market in Libya, where the econometric models of previous studies based on models are reproduced from studies conducted on countries that enjoy a kind of economic stability different from Libya.

The study's model has been built basing on four principle hypotheses; i) the interest rate is not present in the Libyan economic model as a result of the law abolishing interest rate, No. (1) in 2013, ii) the public expenditure (Chapter 1 and Chapter 2)[1] is determinant presenting community income, iii) there is an inverse relationship between the lack of liquidity and the exchange rate of the Libyan dinar in the black market, iiii) the government debt is the main determinant of the money supply in the Libyan economy.

The study aims to provide economic literature with an visual model that explains the Libyan money market used by

[1] Libyan public budget includes four common types of expenditures that government uses called Chapters: (Ch1) recurrent , (Ch2) operational, (Ch4) developing, and (4) subsidiaries

academics interested in conducting studies about Libyan economy such as econometric studies that aiming to estimate economic relations and forecast the effects of some monetary policy on economic activities, as this model is the first real attempt to create a bridge between the academic efforts and the needs of the executive authorities for research advices when making macroeconomic decisions.

The study relied on descriptive analysis method using figures and mathematical equations in developing the Libyan money market model, considering that economic models are a set of economic variables relationships that describe the economy; it can be expressed in words, tables, charts and mathematical equations.

The previous studies:

The study is based on the Keynesian theory of demand for money and the subsequent developments that were conducted on the demand for money function in trying to building the money market model in the Libya, by making an amendment to the traditional model and include some economic variables affecting the demand amount of money according to the nature of the Libyan economy without changing the relationships of macroeconomic variables that mentioned in the economic literature, in order to come up with an economic model that expresses the Libyan case and has the ability to understand the economic events and phenomena that the Libyan economy is

going through, and give the interpretation of the effects of the policies adopted by the monetary authorities on the macroeconomic level.

This part of the study is to review recent studies that used models of the demand and supply for money functions that express some of the economic variables in Libya and the most important results that they have reached. This paper is an extension of literature review and does not complement to previous studies, nor deny or confirm the findings of the studies that have been interesting in studying money supply in Libya.

Study conducted by Masoud and Sassi (2015) "Estimating the demand for money functions in the Libyan economy 1970-2012.". The study aimed to estimate the determinants of money demand and identified the most significant impact on the Libyan economy. The estimated model of the study was based on listing all the variables that were repeatedly used in the previous studies for estimating the real value of money amount in both definitions narrow and broad:

$M1 \ \& \ M2 = f(Y, EXR, V, R, INF, D1)$

(M1) narrow definition of money, (M2) broad definition of money, (Y) real income, (EXR) official exchange rate of the Libyan dinar against the US dollar, (V) money velocity rate, (R) interest rate, (INF) inflation rate (D1) is a dummy variable that expresses the period of the economic siege. The results showed that the demand for money function (measured by the

real money supply in the broad definition) is more able to analyze the factors affecting the demand for money in the Libyan economy.

A study applied by Ali and Nooruddin (2020), "The stability of the money demand function in Libya." The study analyzed the demand for money function in a broad definition for the period 1980-2018, and examined its stability and role in choosing the appropriate monetary policy. The study was adopted in formulating the money demand function according to the economic theory suggesting that the demand for real balances is a function of scale variable and a set of opportunity cost variables.

The study was following Alhota (2016) by using ARDL to measure the relationship between money demand (M2) as dependent variable and GDP, inflation (CPI), velocity of money (V), and real exchange rate of LYD (REX):

$M2 = f(GDP, CPI, V, R, EX)$

M2) money for real balance in a broad definition, (GDP) real gross domestic product, (REX) the real exchange rate of the Libyan dinar against the US dollar, (V) money velocity rate, (CPI) inflation rate (the GDP deflator at 2003 prices), The results of the study showed that the demand for money function is unstable, which makes it an inappropriate tool for implementing an effective monetary policy. The study did not recommend using the money supply as a tool for monetary policy and must

seek for alternative Islamic financial instruments such as sukuk islamia (Islamic bonds). The study recommended conducting further studies on money demand in Libya to obtain more accurate results.

Before three years, in (2017) Muhammad used the same above function for estimating the demand for money in Libya, during the period (1970-2010)," the econometric study basically aimed to estimate the demand for money according to the broad definition of money and measure the manner of demand in terms of there is stability or not. The most important result is that the estimated model was stable in the long run and has high quality. The study recommended the need for institutional and functional independence for the Central Bank of Libya in order to enable to follow a flexible monetary policy towards the money supply in line with fluctuations in cash income.

Study conducted by Ali (2017) "Estimating the demand for money in Libya: An application of the Lagrange multiplier structural break unit root test and the ARDL cointegration approach". The study examined the demand for money in Libya using annual data for the period 1970 – 2010, the study applied long - run model following Bahmani - Oskooee (1996) and Bahmani - Oskooee, Rehman (2005), the model is based on the specification that real money balances, proxied by M1, is

a linear function of real income (y), inflation rate (π) and nominal exchange rate (exch):

$$M1 = f(y, \mu, exch)$$

The results of the study confirmed that a stable, long-run relationship exists between demand for money and its fundamental determinants; namely, real income, inflation rate and nominal exchange rate.

Before proceed to money supply literature review, it can be concluded above previous studies that were conducted on the demand for money function in Libya that the gross domestic product (GDP), the exchange rate (EXCH) and inflation rate (INF) in addition to interest rate (R) and velocity of money rate (V) were used as the main variables in their econometric models, whether to measure the stability of the function or to identify the determinants affecting the demand for money.

The study relies on analyzing the equilibrium of the money market on the money supply function that was mentioned in a previous study by Ben Taher (2021) :

$$Ms = f(COG, exch)$$

(Ms) money supply in narrow definition, (COG) commitments on government, (exch) exchange rate of the Libyan dinar in the black market and the study has proven that the money supply function in Libya differs from the money supply function mentioned in the literature and also differs on the econometric models that were used to estimate the money supply multiplier

in Libya (Bazina 2020) and measure the causal relationship between money supply in Libya with few economic variables (Noureddine 2013 & Hamida and Mahfouz 2019).

The two main reasons for that difference are; the interest rate abolition law No 1 (2013), which led to the abolition of the role of commercial banks in the process of creating money, and the financial crisis that the government is going through during study period, led to the Central Bank's decision to expand the monetary base to serve the objectives of financial policies, not monetary policy.

Key determinants of money demand:

The study attempts not to expand on the theoretical issues of money demand and focus on its main goal of providing economists with model of the demand function and the balance of the money market in Libya that is appropriate and capable of explaining economic phenomena and helps to understand the monetary situation in the Libyan economy, but it is useful in a short way explain some theoretical concepts that will be covered in the analysis part of the study, especially the study's model depends on the Keynesian theory and post Keynesians developments.

Keynesian theory distinguishes between three motives for holding cash: the transactions – motive, the precautions –motive, and the speculations–motive. In line with Keynes' view it was assumed that money required for transactions depends

only on income in the short run and the demand for money driven by transactions does not in fact represent a major deference from classical economists thought.

The classical economists believed that people holding cash for transactions and also believed that people would not keep more than they needed to cross the gap between income and expenditure, while Keynes provided two additional motives for holding cash: the precautionary-motive and the speculation-motive. Keynes showed that people demands money for precautions in addition to transactions, in order to meet emergency conditions, he assumed that the demand money for precautions is determined by the level of income and the interest rate.

The demand of money for precautions-motive is also not a major deference from classical thought, because it is similar to the transactions-motive. However, the demand of money for speculations-motive is consisted really a new addition, as Keynes explained that type of demand money is determined by the interest rate. According to Keynes's view, there is a direct positive relationship between the demand for money and income and that means, any increase in income leads to an increase in the demand for money motivated by transactions and speculative demand for money inversely related to the rate of interest. Keynes assumes that the amount of money required for precautions purposes in the short term is

inversely related to the rate of interest and positively related to income.

New Keynesian economists have added other determinants related to the transactions demand for money, such as William Baumol and James Tobin, proved relationship between the transactions demand for money and the interest rate, they explained that the distribution of capital between assets and liquidity depends on the return obtained from assets then the amount of money required for transactions in the short term changes positively with income and inversely with the interest rate. This does not mean that the transactions demand for money function and precaution demand for money function are the same, Dimand (2014).

Furthermore, there are monetarists such as Milton Friedman extended the income concept as determinant of the demand for money. Friedman's theory of money demand is partly Keynesian and partly non-Keynesian. He assumed the total wealth not the income only, and the wealth includes the financial and monetary assets (non-human wealth) and human wealth. Friedman used the term opportunity cost on the factors affecting holding cash rather than investing it (Friedman 1959). Using this approach, Friedman specifies the following as the key determinants of this demand for money:

$$Md = f(Rb, Rg, Pe, W) \longrightarrow (1)$$

$$(W = Y + H)$$

(Rb, Rg), are the expected rate of return on bonds and assets, Pe expected inflation rate, W wealth equals the sum of total financial and monetary assets (Y) and human wealth (H).

Friedman hypothesises the fraction of total wealth that is in the form of non-human wealth is important variable, because the demand for money is function of the non-human wealth fraction as it is much easier to sell or purchase non-human than human wealth. So income is generally used as a surrogate for wealth. Income (Y) includes both property income and labour income.

$$Md = f(Rb, Rg, Pe, Y) \longrightarrow (2)$$

Many economists combined the transactions and precaution demand for money in order to simplify the analysis. Moreover, they assumed in diagrams analysis that the combined demand for money for transactions and precaution are affected only by income, while the speculation demand for money is affected by the interest rate. However, in recent years the relationship between the demand for money and the rate of interest has developed, as economists have realized that the three types of demand for money are affected on the interest rate (Edgmand, 1983).

$$Md = f(Y, i, Pe) \longrightarrow (3)$$

$$(Rb \ \& \ Rg = f(i))$$

Where (Md) real amount of money demand, (Y) real income, (i) interest rate, (Pe) the expected rate of inflation.

The real amount of money demand has positive relation with real income and inverse relation with both interest rate and expected level of inflation, so any increase in income leads to the increase in the required amount of money, while the increase in the interest rate and expectations of an increase in inflation levels have the opposite effect. In the long term, the real amount of money demanded varies as a result of an increase in population and expected returns from assets such as real estate and durable goods, and also as a result of financial innovation.

Money demand for Libya:

Identifying the certain determinants of the demand for money in the Libyan economy helps decision-makers to realize the potential of achieving stability of money demand function and the latter is very important for the monetary authority as the stability enables to predict the required liquidity of money demand and thus helps in reaching to the appropriate amount of money supply, in other words, the stability of money demand function facilitates the work of the central bank in managing monetary policy.

However, when analyzing the economic variables composing function no (3) and measuring its ability to explain the Libyan economic situation, it can be found the following conclusions:

The real amount (not nominal amount) of required money for transactions is dependent on the demand of foreign currency not the Libyan dinar, considering the majority of goods and services supplying in the local markets are imported from outside the country.

There is neglected role for stock and bond markets in the Libyan economy and the interest rate on loans granted by commercial banks is almost constant for a long period of time before canceled by Law No. (1) 2013, according to (J, Tobin) the money demand for speculation will disappear when the interest rate not exist or the expectation of the interest rate will remain constant (Edgmand, 1983).

The real income in the Libyan case is represented in the volume of oil revenues, considering oil exports are the only source of foreign exchange, and as indicated in the previous point, the real values of the Libyan economy are measured in the foreign currency.

The consumer price index (CPI) is inaccurate and does not reflect expectations of inflation rates in the Libyan economy (Pe) that referred to in the literature, rather, it reflects the change in the prices of a group of goods and services as a result of the decrease and increase in the value of the Libyan dinar against foreign currencies.

As a result of these conclusions, there is no opportunity for applying the money demand function that mentioned in the

literature, in the Libyan case, therefore using the determinants of function (3) in estimating the money demand for Libya does not have a theoretical basis explaining the economic relations between the components of the function. However, the theoretical model for the money demand (function (3)) can be modified to be appropriate in determining the factors affecting the required amount of Libyan dinar not the real required amount of money.

4.1 Determinants of the money demand for Libya:

Building a model for the money demand function for the Libyan currency helps decision-makers to identify the stability of the demand function by knowing the factors affecting the required amount of the Libyan currency balances, considering the stability of the demand for money function is a precondition for the effectiveness of monetary policy and prerequisite for the monetary authorities to be able targeting the appropriate instruments to achieve equilibrium in the money market.

Since the economic model that reflects the money demand function for Libya is based on the literature, the study develops function (3) as it is considered the most recent function:

$$Md = f(Y, i, Pe) \longrightarrow (3)$$

The theoretical interpretation of the impact of the money demand's determinants differs completely on the Libyan money demand function. Because of the law no (1) 2013, regarding abolishing interest rate dealings in Libyan banks the previous function is inapplicable, and thus the function (3) can be modified in the form of the following function:

$$MD = f(Y, Pe) \longrightarrow (4)$$
$$(i = 0)$$

As mentioned in the previous part that the real income of the Libyan economy is expressed by the volume of the oil revenues. Since this paper attempts to build a realistic monetary model that reflect the Libyan economy, to be closer to reality it must calculating the income affecting the required amount of the Libyan dinar balances through the expenditures of chapters (1&2) of the public budget, due to the following considerations:

The number of public sector employees is approximately 2 million employees[2] and this number is large in a country with a population of nearly 6.5 million people. These figures indicate

[2] According to the statement of the Minister of Finance of GNA in the press conference held on March 3, 2020, the number of public sector employees reached 2 million employees, including 1.8 million employees in ministries and government agencies and the legislative authority and 2 hundred thousand in Parastatal Companies (companies owned by government).

that the overwhelming majority of the Libyan heads' households are employees in the public sector, and therefore the amount of income (Y) for these families mainly equalise to amount of expenditure that allocated in Chapter (1) of public budget and,

Public expenditure of Chapter (2) can be added to the values of the income (Y), considering the allocated amounts in Chapter (2) are consumed by the public sector in the domestic markets.

The amount of money required for transactions actually depends on the values of total spending on goods and services instead of GDP, because the concept of total spending is more comprehensive than GDP, as the former includes the purchase of intermediate and final goods and also includes used goods, while the gross domestic product (GDP) calculates only the final products.

The share of private sector activity out of the total activity of Libyan economy does not exceed 13%. So it can be concluded that the volume of total demand for goods and services in the local market for investment does not exceed 3% of the aggregate demand in Libya, (Ben Taher 2020).

$$MD = f(G, Pe) \longrightarrow \quad (5)$$

$$(G = G1 + G2)$$

Where G is public expenditure (Chapter1 = G1 & Chapter2 = G2) of the public budget), there is positive

relationship between money demand and public expenditure, that means, any increase in amount of G leads to an increase in the required amount of money (Libyan dinar).

The study also used the exchange rate of the Libyan dinar on the black market (ER) as an economic variable that expresses the expected inflation rates (Pe), instead of the consumer price index (CPI) or the official exchange rate of the Libyan dinar, which were used as variables affecting the money demand for Libya in few previous studies (ex: Alhouta (2016), Yousif and Noradeen (2020) and Masoud and Sassi (2015)). The study used (ER) due to the following considerations:

The consumer price index (CPI) is inaccurate, especially post-2013, as it shows the relative changes that occur on the prices of limited groups of goods and services during a certain period of time, and covers only Tripoli area, Majeed (2016).

The official exchange rate of the Libyan dinar not reflect the real value of the Libyan dinar, especially post-2013, as the big difference between the official rate adopted by the monetary authorities and the unofficial exchange rate are circulating in black market.

The consumer price index (CPI) does not represent the expected rates of inflation, but rather reflects the current level of prices for a group of goods and services, while the current exchange rate of Libyan dinar in the black market is more

realistic in representing the expected increase or decrease of general price level.

The most of productions supply in the Libyan market are goods and services imported from abroad, thus the aggregate supply does not depend on the labour component[3] and any other local factors of production but rather depends on Libyan dinar exchange rates in foreign exchange market, as the main determinant of import costs, (Hasen model 2020). In other words, in the Libyan case, the exchange rate of the Libyan dinar in the black market (ER) represents the expected inflation rates at a general price level is more realistic than the official exchange rate and the consumer price index (CPI)

$$MD = f(G, ER) \longrightarrow \quad (6)$$

Where ER is the exchange rate of the Libyan dinar in the black market, the relationship between the money demanded of the Libyan dinar and the exchange rate is characterized by a kind of ambiguity, as the nature of the relationship between them depends on the purpose of the demand for money, and the following is an explanation of the nature of the relationship between them:

4.2 The exchange rate of Libyan dinar and the money demand:

[3] The role of the labor market is absent in the Libyan economy, due to the ineffectiveness of the productivity and wage in controlling the market.

As mentioned in the literature, there are three motives for the money demand: the purpose for transactions, precaution, and speculation, the relationship of exchange rate of the Libyan dinar in the black market to its required quantity depends on those purposes. Before precede the analysis, the research reconfirm that this study is concerned with the nominal (not actual) demand for the Libyan dinar, as people increase holding cash for the transactions purpose as a result of increase general price level, this relationship does not differ on what it was mentioned in previous studies, where, there is an inverse relation between the money required for transactions and the exchange rate of the dinar in the black market (ER).

However, the relationship between the money held for precautionary and speculative motives are deferent from what is stated in the literature, as the individuals keeping the Libyan dinar for the speculation and precaution purposes are related to their expectation of the profits that can be achieved by keeping the Libyan dinar instead of another foreign currency for the purpose of reselling it at a higher exchange rate on the black market (for speculation), or other non-monetary assets for preserving the real value of their assets (for precaution).

Practically, in the short term people maintain cash balances for transactions and precaution, specifically, the amount of money required for precaution purposes(to meet

unforeseen circumstances) is directly proportional to income and inversely to the exchange rate of the Libyan dinar in the black market, as in the money demand for transactions. However, in the case of instability of the Libyan dinar exchange rate, people may resort to adding foreign currencies or other non-monetary assets, including durable goods, instead of the Libyan dinar when they expect the Libyan dinar exchange rate goes to be lower and lower and vice versa.

People holding cash for transaction and precaution does not earn profits, which leads them to keep additional cash if they expect that the exchange rate of the Libyan dinar will rise in the future, by keeping the Libyan dinar, they can get the advantage of higher rate for the exchange of the Libyan dinar.

To explain the demand for the Libyan dinar for speculation:

Since individuals differ in their forecasting of future changes in the exchange rate of the Libyan dinar, the overall relationship between the Libyan dinar demand for speculation and the exchange rate will be inverse, that means, at lower exchange rates, people expect higher exchange rates in the future, and then the required quantity of the Libyan dinar for speculative purposes will increase more and more, and vice versa.

4.3 The exchange rate of Libyan dinar and general price level:

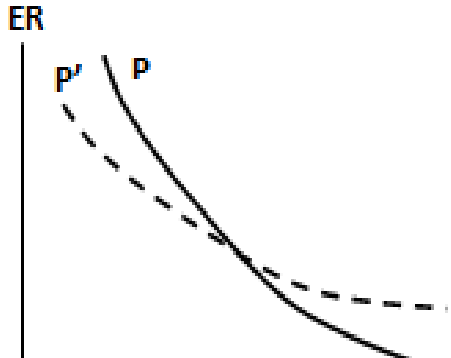
According to Ben Taher (2020) study, the general price level (P) is correlated directly with the exchange rate (ER) through money market and not products market. The study proved that the hypothesis that the importers tendency to changing prices as result to changing exchange rate is smaller when latter is increase than the decrease, because the importers usually have a tendency to change prices less if the dinar exchange rate rises than decreases in the foreign exchange market.

$$(p < p')$$

(p) The importers tendency to changing prices when (er) increase and (p') when (er) decrease.

The shape of the price curve is downward sloping from left to right and convex with respect to the origin. In other words, it is steeper on the left and flatter on the right. The downward slope of the price curve means the demand for the LYD currency will decrease as measures the value of goods and services in low levels of (ER) and in lower levels the LYD currency will collapse and loses its function as an intermediary for exchange in domestic market.

Figure (1) the LYD exchange rate and the general price level



4.4 Deriving the money demand curve:

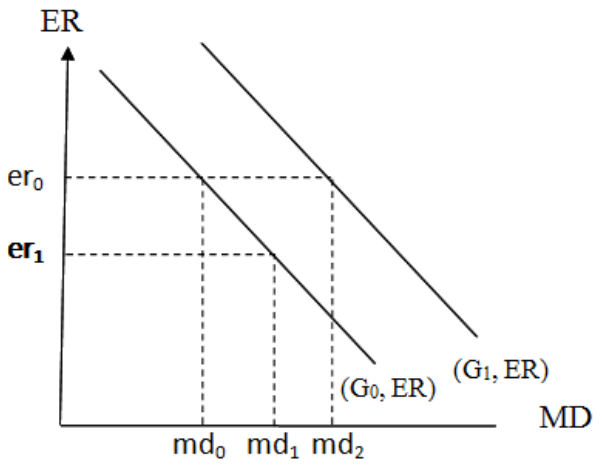
The money demand curve can be derived based on three variables: the required amount of the Libyan dinar (LYD), public expenditure on chapters (1&2) and the exchange rate of LYD on the black market. To derive Libyan MD curve, it be assumed that the exchange rate of the Libyan dinar on the black market (ER) is measured on the vertical axis and the required amount of cash balances of the Libyan dinar (Md) is measured on the horizontal axis and public expenditure is fixed at (G_0).

The Figure (2) represents the demand function for the Libyan dinar (MD = f (G, ER)), where the graph illustrates that the public expenditure fixed at level (G_0), the black market exchange rate (er_0) and the required quantity of the Libyan dinar is (md_0), then, if the exchange rate of the Libyan dinar decreased to (er_1) with the fixed public expenditure, the quantity demanded on the Libyan dinar would increase to (md_1) explaining the inverse relationship between MD & ER. The MD curve is plotted with the exchange rate on the vertical axis and

LYD quantity demand on the horizontal axis. Each point on the MD curve represents a particular changing in (er & md).

If public expenditure increases from (G_0) to (G_1), then the Libyan dinar demand curve shifts to the right from (G_0, ER) to (G_1, ER), explaining that the increase in public expenditure leads to an increase in the quantity demanded on the Libyan dinar from (md_0) to (md_2) at the same level of the exchange rate (er_0)., as the result to positive relationship between MD & G.

Figure (2) the Libyan dinar demand curve



Money supply for Libya:

When analyzing the money market equilibrium, it can be confirmed the assumption that the money supply is an exogenous variable (not endogenous variable) depends on decisions of monetary authorities, not on economic effects. In other words, the change in the quantity of money supply

depends on the CBL decisions to print more banknotes to meet money demand surplus and also depends on the legislative authority's decisions to authorize CBL to lend the government for funding the budget deficit or payment the public debt with CBL.

Money market equilibrium in Libya:

This part of the study concerned with the money market equilibrium in Libya and assumed that the nominal money supply (MS) is an exogenous variable not endogenous variable. (according to Ben Taher's study hypothesis), where the exchange rate of the Libyan dinar on the vertical axis and the quantity of the Libyan dinar on the horizontal axis and it can be derived the money supply form a vertical straight line curve that reflects the volume of ms_0, where, the nominal money supply is an exogenous variable that is not affected by economic variables and will remain at ms_0 until the Central Bank makes decision to change its balance.

Since the required amount of the Libyan dinar (md), changes positively with public expenditure (G) and inversely with the exchange rate of the Libyan dinar in the black market (ER), which was shown in function (6) and figure (2). The money demand curve at public expenditure (G_0) can be presented in Figure (3), and to complete the money market in Libya visual model, money market equilibrium occurs at the exchange rate

(ER) at which the quantity of money demanded is equal to the quantity of money supplied. Figure (3) combines demand and supply curves for money to illustrate equilibrium in the market for money. The equilibrium can be expressed mathematically in the following equation:

$$Ms = Md$$

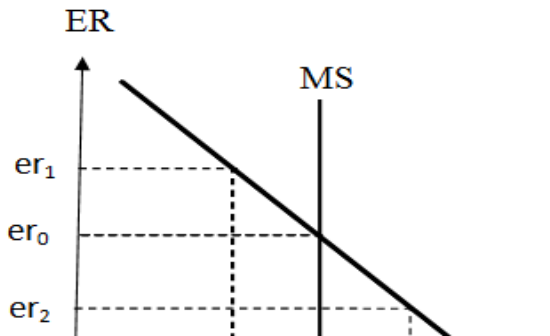
If the equilibrium is not achieved at a certain combination of public expenditure and the exchange rate of the Libyan dinar in the black market, then the money market in Libya is characterized by disequilibrium and the exchange rate for Libyan dinar in the black market tends to change in order to achieve equilibrium. To clarify that, we assume the money market is equilibrium in combination (G_0, er_0, md_0, ms_0) as shown in Figure (3), in order to prove that the exchange rate of the Libyan dinar on the black market (er_0) reflects the equilibrium value of the Libyan dinar at the level of (G_0), assumed that there are two other rates for the exchange Libyan dinar (er_1 & er_2):

Figure (3) shown that the amount of money demanded md_1 is less than the amount of money supplied ms_0, at level er_1, and there is a surplus in money supply, with this combination, the households and businessmen try to get rid of the surplus money in their possession by changing the Libyan dinar with another foreign exchange (e.g. US dollars) or by buying fixed assets or selling their holding Libyan dinars on the black market in order

to speculate in anticipation of a decrease in its exchange rate. As result to the inverse relationship between the foreign currency demand and the exchange rate of the Libyan dinar (LYD) in the black market, the exchange rate LYD will trend to decline. In this scenario, the exchange rate will continue to decline until reaching to er_0, which is the equilibrium level at which the quantity of money demanded is equal to the quantity of money supplied.

The amount of money demanded md_2 exceeds the amount of money supplied ms_0 at the exchange rate of the Libyan dinar er_2 therefore there is a surplus in the money demanded. Since there is a surplus the households and businessmen add more Libyan dinars to their possession by selling foreign currency or other non-monetary assets for speculation purposes in anticipation of a rise in the exchange rate of the Libyan dinar in the future As result to the inverse relationship between the foreign currency demand and the exchange rate of the Libyan dinar (LYD) in the black market, the exchange rate LYD will trend to increase. In this scenario, the exchange rate will continue to rise until return to the equilibrium at level er_0.

Figure (3) the money market equilibrium in Libya



Applications of Libyan money market model:

7-1 The fiscal policy (expansion and austerity measures):

The public expenditure is one of the fiscal policy tools and its estimated volume is determined by budget law. Measuring the public expenditure impact on the money market equilibrium is one of the most important goals of economic policy, and measuring the model's ability to interpret and describe the economic effects resulting from public expenditure on the value of the Libyan dinar and then on the level of general prices and the real aggregate income, is part of the main objectives of this study.

If the Libyan money market is equilibrium in combination (er_0 & md_0 & ms_0 & G_0) as shown in Figure (4), any change in the volume of public expenditure, assume that economic policies are constant, will shift the market to another equilibrium point, because public expenditure is the primary determinant of money demand represents the income in the Libyan economy, as discussed in the previous parts of this study. However, the effect of changing the public expenditure depends on the

sources of financing the public budget. The following are two scenarios for the impact of public expenditure on the money market equilibrium:

If the government adopts **an expansionary fiscal policy** by raising the level of public expenditure to (G_1) by increasing the allocations of oil revenues to finance expenditure in Chapter 1 and Chapter 2 of the public budget, the new level (G_1) is greater than the level of public expenditure (G_0) that achieves equilibrium money market. The nominal incomes of the individuals will be increased and as a result of the positive relationship between income and money demand, the money demand curve shifts entirely to the right from MD_0 to MD_1, with a fixed amount equal to the volume of the difference between (G_0 & G_1). At level MD_1, with holding all other factors constant, the Libyan dinar exchange rate rises to the level er_1, and then the purchasing power of individuals increase through the increase in nominal incomes and also in real incomes with a decrease in the general level of prices of goods and services.

$(G_1 > G_0)$ & $(er_1 > er_0)$ & $(p_1 < p_0)$ & $\longrightarrow (md = ms$ Δmd & $\Delta ms = 0)$

On the contrary, if the government decreases the public expenditure to the level (G_2) as a result of **the austerity fiscal policy** due to the decrease in oil revenues, the new level (G_2)

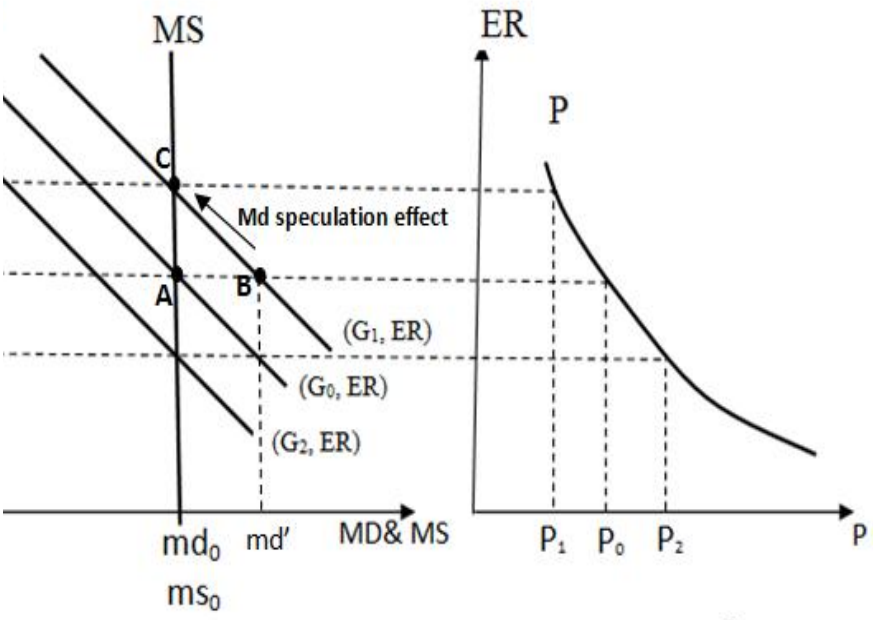
is less than the level of public expenditure that achieves the equilibrium (G_0), the nominal income of the individuals will be declined and leads to a decrease in the money demand due to the positive relationship between them, which leads to the shift of the entire money demand curve to the left with a constant amount that reflects the value of the decrease in expenditure from MD_0 to MD_2. At new level MD_2, with holding all other factors constant, the Libyan dinar exchange rate declines to the level er_2, and then the purchasing power of individuals fail through the decrease in nominal incomes and also in real incomes with an increase in the general level of prices of goods and services.

$(G_2 < G_0)$ & $(er_2 < er_0)$ & $(p_2 > p_0) \rightarrow (md = ms$ & Δmd & $\Delta ms = 0)$

Despite the positive effects of the expansionary fiscal policy on the Libyan economy, the expanding public expenditure is dependent on the availability of oil revenues, which do not guarantee the continuation of their flow due to the vulnerability of global crude oil prices and the sensitivity of oil production to political and tribal conflicts. Furthermore, the fiscal authorities have limited ability to reduce the public expenditure, especially chapters $(1\&2)$, when the oil revenues are shortage to cover the budget, and therefore the expansionary fiscal policy must

depend on recurrent financing sources such as taxes and trade & services fees.

Figure (4) Public expenditure and the money market equilibrium in Libyan economy



The policy of reducing expenditure as a result of the decrease in public revenue is often faced with many objections and political and social pressures especially chapter (1 & 2) linked to household's incomes as well as to the services provided by the government to the people. In most cases, when the public revenues are shortage to cover public spending, the government resorts to financing the public budget with deficits.

To illustrate the effect of financing the public deficit on the money market equilibrium in Libya – it is assumed that the allocations of Chapter (1&2) of public budget are decreased as a result of the decrease in oil revenues, and the inability of the fiscal authorities to compensate this shortage through the increase in the volume of other sovereign revenues, and in light of the inflexibility of reducing this type of public expenditure, the fiscal authority decided to finance the public budget deficit (PBD) from external sources by:

7.2.1 The central bank of Libya financing the deficit:

When the public expenditures excess the revenues (the Government budget deficit occurs), economic authorities finance the deficit by borrowing from the Libyan central bank (CBL) to maintain the level of public expenditure (G_0) or because of the inability to reduce expenditure, will lead to increase the volume of government debt to the central bank. When they cannot finance the deficit by issuing bonds and must resort to printing money, the money supply curve shifts entirely to the right, which leads to the increase in the money supply from (ms_0) to (ms_1), as a result of the proportional relationship between government debts (COG) and money supply (MS) as shown in Figure (5).

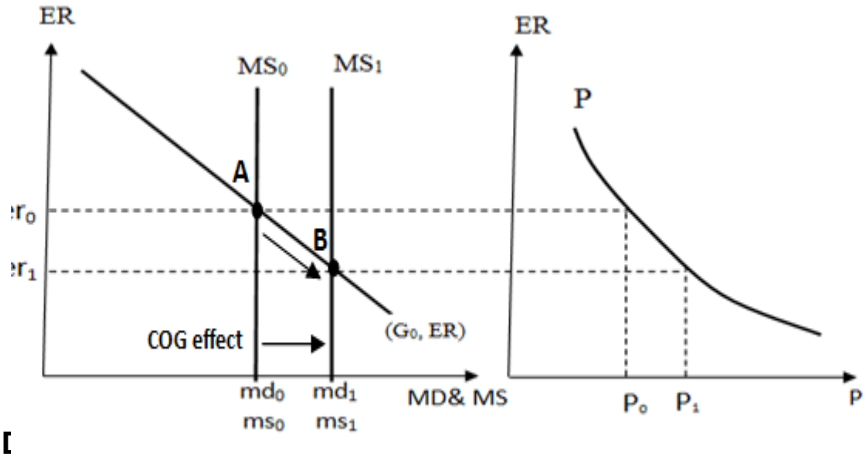
At the new level of money supply (MS_1) there is a surplus in the money supply and at the combination (ms_1 & md_0

& er_0), the households and businessmen try to abandon the surplus money (Libyan dinar) in their possession through buying a foreign currency or through buying non-monetary assets or selling their possession of the Libyan dinars in the black market in order to speculate in the expectation of a decrease in its exchange rate. The logic of these conclusions about the money people hold and exchange rate of LYD in black market depends on the people's expectation of profit (or not loose) for holding money. Because of the inverse relationship between the money demanded (md) and the exchange rate of the Libyan dinar on the black market (er), the exchange rate continues to decline until achieves a new equilibrium point at level er_1.The logic conclusions about the new equilibrium level can be presented below:

$(ms_1 > ms_0)$ & $(er_1 < er_0)$ & $(p_1 > p_0) \longrightarrow$ & $(\Delta G_0 = 0$ $G = G1 + G2)$

The money market is stabilized at the new level of the exchange rate (er_1) with holding all other factors constant, the new equilibrium is less than the previous equilibrium level (er_0), thus the nominal income of the people stabilized at (G_0), but the real income decreases as a result of a decrease in purchasing power due to the rise in the general level of prices of goods and services.

Figure (5) Government debt and money market equilibrium



7.2.2 [illegible]

This part of the study is concerned with analyzing the ability of the money market model in measuring and explaining the impact of financing the budget deficit from other unusual sources. Government of National Accord (GNA) issued decrees imposing fees on foreign exchange sales to use its revenues to finance the public budget deficit and also to pay back the accumulated public debt as a result of the central bank financing the budget deficits in previous years. The following are two scenarios for the impact of using the fees' revenues on the money market equilibrium:

If the portion of the fee revenues have been allocated to finance the public budget deficit (PBD), the effect of this policy on the money market equilibrium has the same effect as an expansionary fiscal policy that financed by oil revenues source as shown in visual model figure (2), considering the fees'

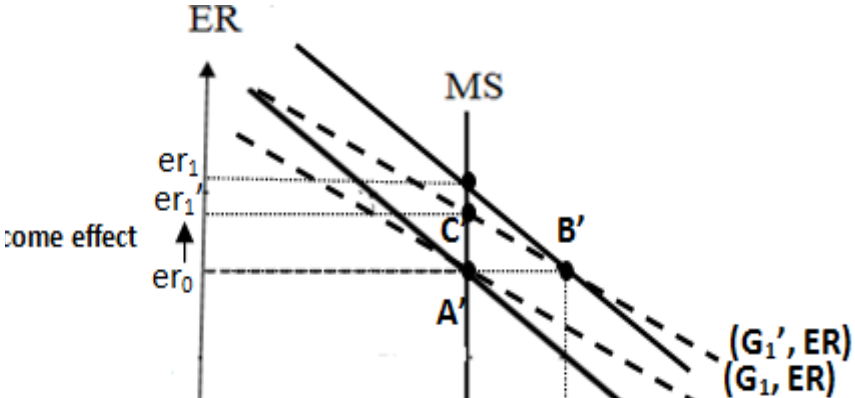
revenues is oil income just revaluated at a different exchange rate.

$$e_1 = \frac{e_0}{(1+ pxfee)} \longrightarrow$$

(e_0) formal exchange rate, (e_1) value of the new exchange rate, (pxfee) the percentage of fees charged for selling foreign exchange.

However, the only difference is that the elasticity of the money demand curve (G_0, ER)' is less than (G_0, ER), and this is explained by the fact that at the government income from oil revenues has a greater effect on the real quantity of money demand than the effect of fee revenues at the same level of exchange rate of the Libyan dinar in the black market, due to the real income of the government from oil revenues is greater than the fees revenues, and therefore the increase in the real quantity required of money is greater when the general level of prices is constant (md_0 < md_1). Figure (6) is showing that difference.

Figure (6) the impact of fee revenues and oil revenues on money demand



If the portion of the revenues from fees imposed on selling foreign exchange have been allocated for the public debt payment as per the agreement of the government with the Central Bank, this will lead to a decrease in the balance of government debt with the Central Bank (COG), which leads to the shift of the entire money supply curve to the left, from (MS_0) to (MS_1) and the quantity of money supply decreases to (ms_1) as a result of the positive relationship between (COG & MS).

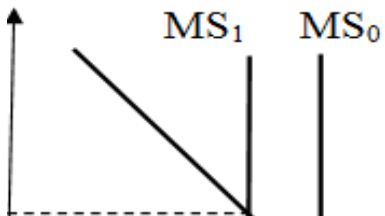
Figure (7) illustrates that at the level of the Libyan dinar exchange rate er_0, the quantity of money demanded md_0 is greater than the quantity of money supplied ms_1, and since there is a surplus of money demanded, the households and businessmen are motivated to add more Libyan dinars to their possession of saving money by selling foreign currency or other non-monetary assets for speculation purposes in anticipation of a rise in the exchange rate of the Libyan dinar in the future. As result to the inverse relationship between the foreign currency demand and the exchange rate of the Libyan dinar (LYD) in the black market, the exchange rate LYD will trend to increase/ In

this scenario, the exchange rate will continue to rise until return to the equilibrium at level er_1, which is the demanded and supplied quantity of the Libyan dinar is even. The logic conclusions about the new equilibrium level can be presented below:

$(ms_1 < ms_0)$ & $(er_1 > er_0)$ & $(p_1 < p_0)$ & $\overrightarrow{(\Delta G_0 = 0}$ G = G1 + G2)

At the new equilibrium level of the exchange rate er_1 (and with all other factors are constant) the money market is stable, which is greater than the previous equilibrium level er_0, and the people nominal income stabilizes at the level (G_0), but the real income increased by decline in the general price level of goods and services.

Figure (7) the impact of fee revenues on money market equilibrium



7.3 Illiquidity in the Libyan Banking System:

This part of the study attempts to measure the model's ability to explain the phenomenon of the lack of liquidity in Libyan commercial banks that appeared during recent years, and as it was mentioned in the steps of building the model that there is an inverse relationship between money demanded for speculation and exchange rate, that means at lower and lower level of the exchange rates, the individuals expect the exchange rate of the dinar to rise more and more in the future, therefore at low levels of the Libyan dinar exchange rate, the quantity required of LYD for speculation will increase more and more.

Since there are other external factors have a direct impact on money market, represented in political and military conflicts, which led to economic and security instability and

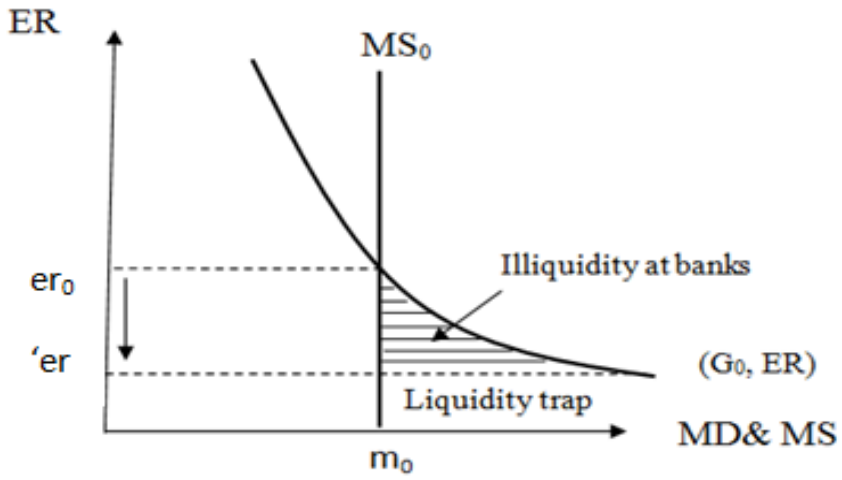
reflected on the value of the Libyan dinar in particular and pushed the exchange rate to fall below the its economic level in the black market, at same time, there is the prevailing belief that exchange rates of Libyan dinar could rise soon, at this contradictory economic situation the changing in money demanded for speculation will be more flexible at the low levels of the dinar exchange rate and the continuing situation of instability, individuals prefer to keep their money outside banks, which led to a lack of liquidity in banks.

If the external factors continue (affect negatively on the value of Libyan dinar), the money demand function may reach complete elastic and the monetary policy becomes ineffective due to very low exchange rates of Libyan dinar in black market combined with individuals who sought to acquire Libyan dinar in exchange for assets. In other words, the Libyan money market model refers to a situation in which an increase in the money supply does not result in a fall in the exchange rate in black market but merely in an addition to idle balances.

This situation of the money market might be similar to the liquidity trap that mentioned by Keynes when the rate of interest is very low, the money demand curve becomes completely elastic (horizontal). Figure (8) illustrates the horizontal portion of the money demand curve is referred to as the liquidity trap. In this portion of the curve, the demand for money is infinitely elastic with respect to the exchange rate.

Reductions in er', in this portion only, increases individuals' desire to hold cash balances out banking system.

Figure (8) Lack of cash liquidity at Libyan banks



Conclusion:

The attempt to formulate a money market model customizing the Libyan case and reflecting the economic relations affecting the demand and supply of money may be subjected to many criticisms, as this study is considered the first attempt in Libya adopting a different method and not reproduce some models that were used in previous studies that do not contain the specificity of the Libyan economy.

The study reformulated the money demand function basing on three hypotheses that the interest rate is not present in the Libyan economic model as a result of the law abolishing interest rate, No. (1) in 2013, and public expenditure (Chapter 1 and Chapter 2), is determinant presenting community income. The study added a new determinant that was not indicated in the theory and not used in previous studies that conducted on the Libyan economy, which is the Libyan dinar exchange rate in the black market. The study used the money supply function that found by Ben Taher (2020), which adopts government debt as a main determinant of the money supply in the Libyan economy. After building the money market model for Libya based on theory and redesigned on Libyan situation, the study carried out several applications to test the model's ability to explain the effect of some economic policies on the balance of the money market.

The visual model showed its ability to measure the public expenditure impact on the money market equilibrium is one of the most important goals of economic policy, and its ability to describe the economic effects resulting from public expenditure on the value of the Libyan dinar and then on the level of general prices and the real aggregate income. The model also succeeded to interpret the phenomenon of the lack of liquidity in Libyan commercial banks that appeared during recent years.

By these results, the study achieved its goal which is building a theoretical model for the money market in Libya that has the ability to explain the effects of economic variables helping decision-makers to realize the potential of achieving stability in money market and that is very important for the monetary authority as the stability enables to predict the required liquidity of money demand and thus helps in reaching to the appropriate amount of money supply, and also the study provides academics interested in the Libyan issue with a theoretical model that explains the Libyan case.

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