Economic Stability in Lebanon: How the Interest rate and the Money Supply affect the Current Account Balance and the Trade Balance

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Abstract: The most important speech in Lebanon today is the economic stability that is going through new stage. Economic stability can be divided into three main categories: market stability of goods and services, monetary policy stability, and stability of the foreign exchange market. Monetary policy transmission channels through bank credit and capital play a constructive role for GDP growth, that will in return conduct the external balance. The goal of this study was to examine the long-term effect of the monetary policy on the external balance in Lebanon (2002-2020). The analysis adopted the Quantitative Method using Econometric techniques to achieve the main objective of this research. Although, the Johansen Test for cointegration, and Vector Error Correction Model was used to capture the long-term relationship among variables. Thus, the empirical findings indicate that the current account balance, the trade balance, the interest rate, and the Money Supply are co-integrated, indicating the presence of an equilibrium relationship that binds all these factors together. In addition, the findings of the Long-term show that the money supply, and interest rate have a negative significant impact on the Current Account Balance. On the contrary, the money supply has a negative significant impact on the trade balance, while the interest rate is negligible in affecting the Lebanese trade balance during the analysis period.

Keywords: Current Account Deficit, Trade Balance, Monetary policy, interest rate Lebanon, Cointegration, Vector Error Correction Model.

1. INTRODUCTION

Monetary policy is considered to be one of the most significant economic concerns facing many economic theorists and decision-makers in most countries around the world, and perhaps its significance lies in the degree to which it has an effect on the economic factors influencing people's lives, such as economic development, employment, inflation and external balance. In the framework of quantifiable economic policies, its importance arose and it took prominent position in the nineteenth century, as it was followed up by multiple economic schools, such as the classical school, the Kenzi school and the contemporary school.

It is defined as the mechanism through which the central bank, currency board or other professional monetary authority of a country that manages the amount of money in an economy and the networks by which new money is supplied, draws up, announces and implements a plan of action. Monetary policy consists of regulating the supply of money and interest rates in order to achieve macroeconomic goals such as inflation control, demand, growth and liquidity. This is done by steps such as adjusting the interest rate, purchasing or selling government bonds, controlling foreign exchange (forex) prices, and modifying the amount of money that banks are allowed to keep as reserves *(Staff, I. 2020).*

Monetary policy is essential in monitoring the supply of money and in managing the liquidity and credit of currency, so that monetary authorities can attain stated goal such as price stability and the balance of payments, which is among the most important objectives they are pursuing, since the balance of payments imbalance has a negative effect on economic activity, as it is perceived to be an important indicator of the strength and weakness of the national economy, toward outward.

Monetary policy issues to prepare, announce and execute an action plan in a country that controls the amount of money in the economy and the networks through which new money is supplied, taken by the central bank, the currency board, and other professional monetary entities. Monetary policy involves money supply management and interest rates designed to achieve macro-economic goals such as inflation control, consumption, growth, and liquidity *(Schiller and K. Gebhardt 2015).*

Bollard and Hunt (2005) argue that the central bank is concerned in the short-term volatility of economic variables, may contribute to economic well-being by providing a stable and safer atmosphere for the decision-making of private

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agents. In this respect, monetary policy affects the cycle not only by directly influencing aggregate demand and supply, but also by forming expectations. According to these authors, high and volatile inflation has negative implications for both welfare and development, creating a low and stable inflation environment is the first and foremost contribution that a central bank can make to long-term living standards. This is because increased volatility due to high and variable inflation is detrimental to the efficiency of the market system and could limit productivity and economic growth.

Theories have shown that a tighter monetary policy would result in higher inflation, which is likely to adversely affect long-term growth. As a result, central banks typically aim to maintain market stability by regulating the amount of money supply and interest rates. However, the reach of this position may be limited by the goal of achieving other goals, the nature of the transmission mechanisms for monetary policy or other factors such as the nature of fiscal and economic policies.

Monetary policy may have far-reaching implications for funding conditions of the economy by testing accessibility and credit prices. It also affects perceptions of future economic activities and prices and thus affects commodities, asset prices, exchange rates, demand and investment prices. In order to influence the climate for private sector decisions, in addition to the impact on investment and consumption, monetary policy may contribute to an effective allocation of the scarce resources of society. Finally, by using its balance sheet to adapt the allocation of bank credit, a central bank will impact real economic activity. A central bank may flow to the economic sectors more resources by lending to private sector companies or through the purchase of the securities of these entities.

The Balance of Payments (BOP) is a statement that records during any given time all the monetary transactions made between citizens of a country and the rest of the world. This declaration encompasses all transactions made by/to people, companies and the government and helps to monitor the flow of funds to grow the economy. When all the elements are correctly included in the BOP, in a perfect situation, it should add up to zero. This implies that funds' inflows and outflows should even out. This does not, however, ideally occur in most instances.

A country's BOP statement shows if a country has a surplus or a deficit of funds, i.e., when the export of a country is greater than its import, it is said that its BOP is in surplus. On the other hand, the BOP deficit means that imports from a country are greater than exports from that country. Tracking transactions under BOP is very similar to the accounting method of double entry. This ensures that a debit entry and a matching credit entry would be available for the entire transaction *(BOP, 2000).*

Equilibrium in the balance of payments is an important objective for the monetary policy. The increasing of deficit in the balance of payments reduces, the ability of an economy to achieve other objectives. Many less -developed countries have to restrict their imports which negatively effects development activities. Therefore, monetary authority makes efforts to maintain equilibrium in the balance of payments. The concept of external balance has garnered great attention on the part of economists, and its importance increased especially after the challenges that faced the economic environment at the beginning of the nineties of the twentieth century, and included internal and external imbalances, stagnant international economic growth, high inflation rates and the exacerbation of the external payment deficit.

Lebanon is one of the countries that experienced deteriorating economic conditions, especially at the end of the 1990s, which prompted them to adopt many reform policies aimed at laying the foundations for the market economy, represented in the preparation of monetary and financial bodies, where monetary policy constitutes an effective means in bringing about economic balance in general and achieving balance especially in the balance of payments. Economic recovery has been helped by a financially sound banking system and resilient small- and medium-scale manufacturers, with family remittances, banking services, manufactured and farm exports, and international aid as the main sources of foreign exchange*(Economy of Lebanon, 2020).*Owing to the unavailability of medium and long-term fiscal and economic policies, monetary policy in Lebanon plays a dominant role in shaping the monetary, banking, and financial system, as well as the economic aspect. Furthermore, Lebanon's monetary policy has two integral mechanisms: (1) targeting exchange rates and (2) introducing attractive interest rates to stimulate international financial inflows*(Awdeh, 2019).*

1.1. Objectives & the Scope of the Study

It is important to study how monetary policy can improve the deteriorating economic situation in Lebanon in light of all the existing changes. More importantly, how can this policy reduce the deficit in the balance of payments. This study objective contributes to the research of whether monetary policy can contribute to a positive or negative impact on the external balance, by exploiting a case study in Lebanon. By implementing co integration analysis and Vector Error Correction VEC model on monthly data covering the period January 2002 to April 2020 to find out that the execution of the monetary policy in Lebanon has a negative impact on current account balance and trade balance, directly through the adopted tools (interest rate and money supply). This suggests that monetary policy must pay attention to the consequences of the adopted strategies on long-term.

1.2. Statement of Problem

To reach the objective, the problem of which research is trying to explore answers would be formulated as**: "*What is the impact of monetary policy on the external balance in Lebanon?*"**

To answer this question, the following sub-questions must be answered:

1. Are the conducted monetary tools related to the current account balance?
2. Are the conducted monetary tools positively or negatively related to the trade balance?

I.3. Research Hypothesis

The hypothesis to be tested in this study include:

- *The null hypothesis*: The monetary policy has a significant impact on the external balance in Lebanon.
- *The alternative hypothesis*: The monetary policy has NO significant impact on the external balance in Lebanon.

2. LITERATURE REVIEW& CLASSIFICATION

2.1. Previous Studies

External balance occurs when the balance of international payments balance.Internal balance occurs when there is a balance in the domestic market (goods & labor markets) and money market. Government's objective has always wanted to achieve both a balance is reached together and if possible, also in a state of full-employment. To achieve these objectives the government can take monetary policy, fiscal, exchange rate, or a combination *(Nopirin, 2010).*

Anyanwu (1993) argues that an excess supply of money in the economy would lead to excess demand for goods and services, triggering price inflation and also impacting the status of the balance of payments. With the achievement of price stability, consumption and investment decisions would not be significantly impacted by the uncertainties of the general price level. Instead, economic agents can make long-term decisions about market adjustments in the macroeconomy without much hesitation.

Maintaining price stability, which is fundamental to achieving economic development, is the primary objective of monetary policy in every modern economy. The promotion of price stability inevitably implies the indirect pursuit of goals such as balance of payments (BOP) equilibrium, *(Nnanna, 2001)* noted.

*Moussaoui (2016)*tracking of the monetary policy in Algeria during the extended period after the Monetary and Loan Law, it indicates that the monetary authorities have always sought to fight inflation and achieve stability in general levels of prices as the most important internal goal, and to preserve the value of the protected currency at the external level, through the stability of the exchange rate at Its natural limits as its most important external goal. However, the stability of the exchange rate is not due to the effectiveness of the monetary policy, but rather to the direct intervention of the monetary authorities in reducing its value and the decline in the exchange rate. Rather, it indicates the validity of the application of the flexible exchange rate system managed by external decisions. The monetary policy adopted by the Bank of Algeria did not reach the desired level of effectiveness in achieving external economic balance.

As part of its monetary policy, the Bank of Lebanon (BDL) focuses on stabilizing the Lebanese pound (LBP) that has been pegged to the US dollar since December 1997. This allows BDL to maintain adequate foreign currency reserves to interfere, if necessary, in the foreign exchange market, where those reserves amounted to $36.77 billion in October 2017. Representing about 75% of Lebanon's GDP, these large reserves have boosted confidence in the banking system and increased its capacity to attract a growing number of foreign deposits *(Awdeh, 2018).*

BDL also carries out its monetary policy by identifying two operational objectives: (1) the spread between foreign currency deposit rates and international market deposit rates in order to attract the country's capital to fund the current account deficit and external debt; (2) the gap between LBP interest rates and Lebanon's dollar interest rates, and the promotion of LBP deposits *(Poddar et al., 2006).*Foreign financial inflows have contributed to an expansion of the base of bank deposits, which has been a crucial factor in ensuring that government funding continues. Their continued funding is a significant indicator of the viability of the Lebanese financing model, with high government debt reaching 140% of GDP and mainly owned by domestic commercial banks, funded primarily by deposits *(Finger and Hesse, 2009).*

2.1.1. Conceptual Framework of Balance of Payments

According to *(Marsha, 1994),* in dealing with balance of payments issues, two kinds of policy interventions are used. There are strategies for switching expenditures and policies for reducing expenditure. Policy reduction of spending refers to fiscal policy (conducted by changing government expenditure and/or taxes) and monetary policy, which refers to adjustments in the supply of money that influence interest rates in turn. Expenditure swapping policies refer to the devaluation of the currency of the country (depreciation) and revaluation (appreciation). Policy expenditure reduction aims to reduce domestic consumption expenditure and increase investment expenditure, thus freeing products and services for exports while leaving unchanged aggregate production. The aim of expenditure shifting policies is to move domestic demand from imported products to home-made products. The degree to which expenditure switching strategies are achieved, however, depends on supply elasticity and demand for tradable goods. If the depreciation of the nominal exchange rate were to be balanced by wage, absorption and inflation rises, the actual exchange rate would not depreciate and the balance of payments would not be strengthened. Expenditure reduction strategies, however, have costs in terms of production reductions, expenditure and jobs. If capital can be conveniently transferred to the tradable goods market, the losses can be reduced. Alternatively, it may lead to maintaining investment and production by bridging external loans.

2.1.2. Balance of Payments Theories

Two fundamental theories have been suggested to fix the disparity in the balance of payments, including:Inflationary theory: inflation is a condition in which the general price level tends to increase and the value of money thereby decreases. It is a malignant disease that absorbs accumulated resources and diverts the economy's energies. Structural Theory: This theory argues that balance of payments disequilibrium abates due to an inherently inefficient or imbalanced economy *Gbosi (2002).*

Abinet (2014) examined the shock to the Ethiopian trade balance in monetary and exchange rates policy. Policymakers can use this paper to decide whether expansionary monetary policies have negative or positive consequences on the

Ethiopian trade balance, whether they occur through expending or revenues channels and if they have positive effects, they may make use of expansionary monetary policy.

Trade balances respond to monetary and exchange rates by improving the trade balance in the short term and decline in the longer term, whereas expansionary and depreciative exchange rates deteriorate the commercial balance in the short term and, consequently, strengthen it in the longer term, as demonstrated by the J curve. The J curve illustrates that the effect of currency depreciation on trade balance, which is initially at equilibrium, is it moves towards deficit and then it improves after certain periods.

The results of the stimulus reactions show that the appreciation of the exchange rate improves shortly the trade balance and long-term depreciation supporting the J curve impact. However, the expansionist monetary policy does not accept the presence of the J curve trend; rather it has a cyclical pattern. Expansionary monetary policy dominates the impact of the change in the Ethiopian trade balance potentially.

Imoisi, Olatunji, & Ekpenyong (2013) examined the monetary policy efficiency of the balance of payments stability of Nigeria from 1980 to 2010. One of the stabilization policies of Nigeria's government is the monetary policy approach. The responsibility for setting up and enforcing Nigerian monetary policy lies with the Nigerian Central Bank (CBN). As an interference policy of the CBN monetary policy key objective is to maintain price stability and balanced payments (BOP) while encouraging economic growth and full employment. The core determination of the study was to examine the relationship between Nigeria's balance of payments and monetary policy in the country.

The research was launched using multi-regression models of the Ordinary Least Squares (OLS) system, using statistical time series data from 1980 to 2010. This equation shows that independent variables are favorable to the dependent variable (balance of payments). (Supply of capital, currency and interest rate).In specific, there was a substantial balance of payment relationship between the amount of the money supply and the interest rate, while the exchange rate was not statistically significant. Consequently, on the basis of the results, the Government was advised to promote the export of Nigerian products, in particular non-oil products, as this would lead to more foreign exchanges entering the country, increasing production and improving the balance of payments of Nigeria. Successful financial policies to foster economic growth and development in the economies of Nigeria are also sponsored by the Central Bank of Nigeria, complementary to the monetary policies adopted there.

Sultana (2018) examined the effect of money supply, inflation rate and interest rate on the economic growth of Bangladesh using time series data from 1981 to 2016 for the past 36 years. The Autoregressive Distributive Lag (ARDL) model together with the Error Correction Model (ECM) model was used to do this. The empirical analysis shows that there is a long-term correlation with economic growth in the large supply of money, the inflation rate and the interest rate. A clear and optimistic relationship exists between the large supply of money and economic growth, whereas inflation and long-term economic growth have a positive yet negligible relationship. In addition, because of the decline of investment in the economy, the interest rate has been inversely associated to economic growth in the long run. This research also suggests that the assigned variables do not have a strong short-term correlation. In the short term, however, massive supplies of cash and inflation rates, with the exception of interest rates, have a negative impact on economic development. The models for short and long-term economic growth are free of serial correlations and are stable from the Cumulative Description of Recursive Residues test over the Bangladesh sample period (CUSUM).

Mahruf, Ekhtear, Mostafa, Mayisha, and Fakhurddin (2017) numerous monetary policy tools have been shown to have a significant effect on economic development, with a low variable reserve ratio, large cash flow, inflation, interest rate flexibility and lower lending margin requirements being the most important determinants of policy. They found that the quantitative and qualitative monetary policy instruments for sustainable economic growth and controlled inflation were taken into account by the Bangladesh Bank. Among these indicators, the credit growth rate and interest rate are more efficient than other economic growth instruments, and during the issuance and implementation of monetary policy, the central bank should take these two monetary policy instruments more into account in order to stimulate economic growth. However, the statistically important monetary policy instruments considered in this review have been found.

Rădulescu (2007) discusses the key monetary factors that influence the balance of payments and the manner in which such an effect is achieved. The findings can also illustrate the impact on the current and capital account balance of payments of the NBR monetary policy. In the first decade, the monetary policy of the NBR was focused on certain very restrictive instruments, such as maintaining a high discount rate and a high minimum reserve rate for a long period of time. Compared to other economies in transition, their high level has contributed to the continuation of high interest rates in the banking system, and this has not improved the economy and domestic investment. Furthermore, these high rates have failed to attract foreign investment, which, owing to domestic economic and political conditions, deteriorated sharply after the boom of the early 1990s.

The result is that the National Board of Revenue in Bangladesh NBR's monetary policy did not help attempts to revive the economy. Almost throughout the decade, monetary policy has been aggressive, restrictive, essentially geared to managing inflation, neglecting other macroeconomic variables, such as local savings discouraged by high inflation and expenditure that would boost economic growth. This has created significant macroeconomic imbalances, which have been expressed at all levels of the economy. Among these imbalances, the external one was the most critical and the one that lasted the longest period. The reorientation of the NBR strategy at the beginning of the new decade intended to Support both the goal of the domestic balance and the goal of the external balance.

Awdeh (2018) checked the impact of the 1994 exchange rate policy to improve foreign financial inflows, to achieve short-term and long-term economic success and well-being. The strategy requires that adequate foreign currency reserves be

maintained in such a way that the central bank uses spreads to draw foreign flows between national and international interest rates. In attracting massive financial inflows that have accumulated banking deposits, increased central bank reserves and strengthened the balance sheet for more than two decades, this trend has proved extremely successful. This strategy, however, has had major consequences for economic growth in Lebanon. Empirical research was conducted to detect the influence of the economic growth strategy for central banks via two channels: directly by monetary instruments and banking factors, and indirectly from the combination of financial inflows and certain macroeconomic variables.

As for the direct channel, for some time, monetary instruments (interest rates and money supply) have had a negative impact on economic growth. As a result, the rise in interest rates and government borrowing costs would have impeded both expenditure and consumption (defining the channel interest rate). Moreover, high inflation may have been caused by the availability of capital, impeding economic growth. The negative effect of the supply of money may also be associated with a high degree of economic leakage (i.e., money received but not placed into the economy), where a large proportion of bank deposits are held by the central bank.

As for the indirect channel, as a result of the inflow of foreign capital, economic activity declined. This has been done because of the negative relationship between private sector deposits and short- and long-term economic growth. The relationship has also been supplemented by the long-term negative effects of public debt and imports on GDP growth. Such conclusions could require consideration of the impact on economic growth and the balance between the security of monetary stability and the development of the economy and the well-being of the monetary strategies adopted.

After this, it must be recognized that in a dollarized economy, the asymmetrical shock cannot be corrected not only by monetary policy or exchange policy changes, especially if fiscal policy is not a counter-cyclical factor in shaping this adjustment.

Twinoburyo & Odhiambo (2017) examines the theoretical and empirical literature on the connection between economic and monetary policy. It also provides a summary of how monetary policy is communicated to economic development. Although the relationship between monetary and economic growth is wide-ranging, the relationship between both remains inconclusive. Overall, the results in this paper indicate that most of the previous studies appear to support a positive economic growth effect from monetary policy, primarily in economies with reasonably autonomous central banks that are financially established. The relationship in emerging economies is typically poor and weakly integrated into global markets with undeveloped financial markets.The study showed that the size and competitiveness of the finance sector, currency and exchange rates and the extent of transparency are a significant cause of the association between economic growth and monetary policy. This paper concludes that, despite the uncertain relationship that prevails, monetary policy is critical for growth both short and long-term. The paper proposes intensive financial growth initiatives and structural reforms for developed countries in order to counter deficits on the supply side.

Bollard and Hunt (2005) suggests that New Zealand's monetary policy regime is likely to have played a role in improving economic efficiency, along with many other factors, especially broad economic reforms. The article discusses how economic growth can be influenced by inflation and summarizes some of the empirical literature briefly. It also acknowledges the benefits of stabilizing the business cycle, which may be a result of inflation in the economic literature, which is the topic of some discussion. New Zealand has dramatically improved its economic performance over the past decade, both due to higher real average GDP growth and lower macroeconomic uncertainty, as New Zealand began to narrow the comparative per capita living gap between itself and the rest of the OECD from the mid-1980s to the early 1990s after a long period of suffering.

The output of growth supports the conventional view that an inflation climate that is low and stable is conducive to improved growth efficiency. If economic agents, knowing that capital will retain its value, are in a position to make savings and investment decisions, then the results are as follows. It is possible to totally realize any microeconomic transition. For any economy, whether developed or developing, this general lesson about the relationship between inflation and economic growth holds. The nature and the learning that has accompanied the evolving inflation targeting framework suggests that a flexible approach to price stability is appropriate. However, flexibility is focused on well-founded inflation expectations, so the degree to which policymakers can exploit this flexibility is limited. Although inflation targeting appears to have produced better economic results, it is only possible to note this in the picture.New Zealand's experience brings to mind that monetary policy is just a small part of the economic fortunes of a country. We have seen the advantages of commodities and labor reform in our case, which have helped stabilize the economy and respond to economic shocks. Ultimately, long-term per capita growth determines the accumulation and production of physical and human capital.

Garg and Gupta (2013) aim to study the changing role and importance of selected monetary tools in India and to assess the effectiveness of monetary policy in maintaining price stability. Besides, to evaluate the degree to which monetary policy encouraged economic growth in India and its overall effect in the post-reform period.

The opening-up of the Indian economy was the key factor that contributed to India's post-1990 GDP growth. Markets have been opened; the Government has leveraged private investment. As a result, more money has poured into the markets. Monetary policy laws can be active or passive.

The passive rule is to keep the money supply constant, reminiscent of Milton Friedman’s rule of money growth. The second, called the market stability law, is to adjust the supply of money in response to changes in aggregate supply or demand in order to maintain the price level stable. The idea of an active rule is to keep the price level and therefore inflation in check. In India, this law governs our monetary policy.

*Krušković (2017)*shows that the exchange rate is an essential monetary policy transmission mechanism because inflation

and aggregate demand, especially in a small open economy, are affected, depending on how shocks are generated. There is an exchange rate, foreign currency and interest rate correlation. The connection between monetary and exchange rates can be seen by the volatility of exchange rate. Contrary to developing countries, emerging countries tend to concentrate more on the stability of exchange rates, since they have less credibility in managing the low level of inflation. Another way of researching the connection between exchange rate and monetary policy is to determine the role of exchange rates in developing monetary policy laws. Monetary policy reacts strongly to the exchange rate in most developing countries.

A domestic interest rate rise in relation to the international interest rate contributes to foreign capital inflows, leading to the currency appreciation. Growing domestic prices relative to foreign prices, however, results in a change in demand for foreign goods, leading to depreciation of exchange rates. The exchange rate and foreign reserves have repercussions. However, high currency reserve volatility can lead to currency instability. Monetary institutions avoid inflationary effects of currency inflows by accumulating reserves, reducing their impacts on money supply. Inflation pressure and the appreciation of the real exchange rate are minimized and restrictions on home supply are avoided in the central bank intervention.

A high level of foreign currency reserves is required for central bank exchange interventions to avoid monetary depreciation. It should be borne in mind that the measures are minimal. If poor fundamentals lead to a depreciation of the exchange rate, intervention will not permanently stabilize the exchange rate until the central bank raises its rate of interest. Nevertheless, stabilization is not assured even then. Efforts to avoid depreciation by foreign exchange measures may also become unsuccessful due to high budget deficits.

Precious & Palesa (2014) discussed the role played in the South African economic growth in the period 2000-2010 by monetary policy. The research uses root tests for enhanced stationary in time series from the Enhanced Dickey-Fuller and Phillips Perron units. In order to evaluate the longer, short-term dynamics between these factors, the Johansen cointegration and error correction mechanism are used. The analysis indicates that the variables have a long-term relationship. The study also reveals the insignificant monetary policies tools that drive growth in South Africa while inflation is important, as well as the supply of capital, repo, and the exchange rate. Therefore, the study suggests that monetary policy be used to establish an investment environment conducive to domestic and foreign investment, thereby fostering unsustainable economic growth. The government should also increase government spending to support economic growth in the productive sectors of the economy, because monetary policy alone cannot effectively stimulate economic growth.

The effect of monetary policy on exchange rates during financial crises is discussed in this article. Some observatory has maintained that a tighter currency policy is required to stabilize the exchange rate, restate confidence and set the foundation on which economic activity will eventually recover. Others maintained that rising interest rates would further reduce investors' confidence by decreasing borrowers' ability to reimburse loans and thereby undermine the banking system. This question has remained unresolved and was heavily burdened throughout the Asian crisis. One main explanation is that, since exchange rate and investor expectations are endogenous, statistical analysis is difficult to use to define the exchange rate effects of monetary policy. They used foreign lending spreads and domestic stock prices in our research as proxies for investor concerns creditworthiness and country risk to enhance the recognition of the exchange rate effects of monetary policies.

They have found that loan spreads and stock prices have substantial effects on exchange rates in financial crises, using weekly data from Indonesia, Korea, Malaysia, the Philippines, Thailand, and Mexico, but interest rates are not yet estimated to have major impacts. They concluded that while monetary policy possibly affects exchange rates significantly, this most likely happens slowly, because central banks are attempting to build legitimacy and over longer time periods than can be taken into account in our studies.

Hameed & Ume (2011) focuses on monetary policy's effect on GDP. The monetary policy of the State is certainly influenced by GDP. In this regard, research papers from different authors were studied to prove the hypothesis and the relationship between the two was identified after a detailed review, by applying the technique of Regression Analysis.

The data from Pakistan over the last 30 years have been used to lead the way. The study showed, however, that interest rates have a minor relationship to GDP, but the increase in the supply of cash has a significant effect on the GDP of an economy. Money supply growth has an immense effect on GDP. This study can also be used for economic growth development initiatives, improvements in efficiency, household production, the underground economy, health and life expectancy, the environment, political immunity, and ethnic justice.

Sailaja and Harsha (2018) analyze the effect on inflation and GDP because of monetary policy that has an impact on growth in India. Monetary policy is the mechanism by which the regulatory authorities, the government and the country's central bank regulate the rate of inflation, the supply of money and the rate of interest in order to achieve a collection of objectives that are beneficial to the power, stability and development of the economy.

This study was prompted by recent findings in the literature on the relationship between inflation and growth, and by the obvious opposite evidence for the developed and developing economies. The results of this study indicate that inflation and economic growth are negatively linked. Second, inflation's responsiveness to changes in growth rates is greater than that of growth to changes in inflation rates.

Mehdi and el Amine (2017) focuses on the effect of monetary policy on GDP. GDP is certainly influenced by the monetary policy of the state. Study papers by different authors were analyzed in this context to prove the theory and, after a detailed review using a regression analysis method, they were observed that there is a partnership between the two. The data from Algeria from 1990 to 2012 were used to conclude. The study has shown that monetary policy has a

direct effect on the GDP of the economy. It is clear that numerous unknown factors also influence the GDP. The rise in the supply of money has a huge effect on GDP. The research study can also be used for development projects aimed at economic growth, improving the quality of household production, the underground economy, health and life expectancy, the climate, and political immunity.

Using quarterly time series data from 2000 to 2012, this study applied a multiple regression model to examine the impact of money supply and the interest rate on GDP growth in Cambodia. Because through its policy instruments, is likely to have played an active role in contributing to GDP growth, which averaged around 8 percent per year during the study period; however, as the economy is affected by De Facto dollarization and most transactions are made in cash.

Results show that the availability of money is good for GDP growth but its impact level is relatively small, while interest rate change over the period under review has not influenced economic growth, so interest rates do not have a major effect on GDP growth. The study, therefore, indicates that the introduction of a single monetary policy should be considered so that monetary policy can be used more efficiently to regulate economic activities. In addition, because only the foreign loan interest rate is used in the report, it is proposed that a further report on the money supply and GDP should include the exchange rate in the research in the future.

Kim (2000) provides empirical proof of the influence on the trade balance of small European open countries (Italy, France, and the United Kingdom) during the last era of monetary policy shocks. Firstly, we record empirical proof of the impact on the trade balance over time of monetary policy shocks. Secondly, to better understand comprehensive monetary transmission mechanisms, we look at the impact of monetary policy shocks on relevant variables, including trade terms, actual exchange rates, and nominal exchange rates. Thirdly, we look at the degree to which monetary policy shocks lead to trade Statistics. Based on facts, we are finally addressing a range of issues of interest to macro- and monetary-economic academics and policymakers.

The findings indicate the following: The monetary expansion leads to nominal exchange-rate depreciation and a worsening of trading conditions, which increases the trade balance — the impact of spending adjustment. The monetary expansion also, however, boosts domestic demand, which can cause imports to rise, and the trade balance to worsen, the impact of income absorption. The trade balance shifts in the opposite direction with these two results. Overall, the effect of expenditure switching tends to overpower the effect of income absorption. The impulses are compatible with the expenditure switching effect. The fall in the nominal exchange rate and trade terms (unit value) lead to monetary expansion. As a result, the trade deficit is increasing in amount. The J-curve effect indicates that the depreciation in the exchange rate may result in an initial trade deficit in the face of nominal trade balance (in domestic monetary terms) because the value effects were immediate but volume effects were delayed. To conclude, In France, Italy, UK, the effects of monetary policy shocks on trade balance are consistent with the expenditure-switching effect, but there is little evidence of the J-curve effect.

*Lestano (2009)*explores the effect on trade on monetary policy Indonesia Balance. They have calculated the SVAR model for three full studies, pre-crisis and post-crisis episodes, using monthly data on eight variables to analyze this question. Evidence from impulse responses to the full sample model suggests that a monetary contraction worsens the trade balance. The income-absorption effect is presently controlled by the expenditure-switching effect. This result is in line with postcrisis estimation. However, the impact of reversing dominance occurred in the pre-crisis study, and the result was an increase in the trade balance. The impulse responses of other associated variables are compatible with the economic theory for all models, except that we find price puzzles. The results of the decomposition of the trade balance due to the forecast error variance show that actual production is a major function, whereas an exchange rate playing a part in the pre- and postcrisis model trade balance variance. It is also found that commodity prices are a primary source of explanation for trade balance fluctuations.

Hjortsoe (2018) observes the issue of how does the current account reacts to the monetary policy expansion. Their results indicate that the current account influence of monetary policy depends on the nature of the economy in question. This may explain why studies that take into account various times or countries did not find a consistent reply as to whether monetary policy contributes to change or a decline in current account. The effect for macro-economic policy is relevant if policymakers prefer to use monetary policy in order to correct broad and persistent current account imbalances to the degree that they are deemed unwanted. This research implies that policy makers need to carefully focus on the degree of financial market regulation in order to predict how monetary policy can affect the current account. For the monetary politicians in the euro area this is especially relevant as research shows that the ECB's monetary policy action is likely to have different qualitative effects on the various countries of the area's current accounts. In practice, the research indicates that any country-by-country evaluation, using only time-series data, of the current account impact of monetary policy cannot be used to analyze the effect of monetary policy on the current account unless the regulatory trend is unchanged.

Ferrero (2008) research the impact of various monetary policy regimes under two different adjustment scenarios: a "slow burn," in which changes are smooth and takes place over a long period of time, and a "quick burn," where a rapid revision of the domestic versus foreign country 's relative growth prospects results in a sharp reversal of the current account. The key observation was that, for domestic variables (for example, production and inflation), the monetary policy mechanism has significant implications but, far worse, for foreign variables (for example, current account and real exchange levels). Among the policy rules, the central bank accepts the effect of currency depreciation on import price inflation and instead focuses on adjusting interest rates to keep consumer prices stable. As a result, inflation is usually very low during the slow burn (because the share of import demand is small) and total production equates to the potential value of inflation. During rapid burning, every central bank has changed its policy rate quick to compensate for the country 's sudden restructuring of demand. This greatly

diminishes the effects on total production and inflation. In comparison, during a change in the current account, two sorts of monetary regimes operate very badly: targeting the consumer price inflation and targeting the exchange rate. Every strategy leads the Central Bank to substantially increase interest rates to avoid depreciation of the currency. This sharp rise in interest rates in turn results in a significant contraction in aggregate domestic economic activity. In the non-tradable goods sector, the contraction is especially extreme and the sectorial relocation is inefficient.

To come to an end, monetary policy seeks to regulate the supply of money in order to combat all negative economic trends, which may include: unemployment, inflation, slow economic growth or balance of payments imbalance. Based on the previous studies, we can find out that some researchers found out that the monetary policy is not playing a major role in affecting the balance of payments, others found out that the monetary policy under some conditions (imperfect capital mobility and flexible exchange rate) can affect the external balance. While if the exchange rate system was under fixed rate, the monetary policy can do nothing. To shed the light for the literature that was relying on the GDP it's also important because as mentioned in chapter one, it is one of the main components in the BOP equation. Based on the whole literature stated, it is easy to choose the variables that will make my study efficient. Deposit rate, money supply, current account & trade balance are the most indicators used, by *Anyanwu, Imoisi, Olatunji, Ekpenyong&Krušković and many others.*

3. METHODOLOGY

3.1. Research Method

Research could be applied using either qualitative or quantitative methods or the combination of both. In numbers and graphs, quantitative analysis is expressed. It is used to test hypotheses and conclusions or to validate them. It is possible to use this form of research to evaluate generalizable facts about a topic. Qualitative analysis is articulated in phrases. It is used to identify concepts, ideas or experiences. This method of study helps you to gather in-depth perspectives on subjects that are not well-known. In each study, the qualitative approach penetrates deeper, focusing on variables that are more difficult to define and quantify. The primary objective of qualitative research is to develop a deeper understanding of quantitative methods than the inadequate knowledge given. The primary distinction between both approaches is that the quantitative approach reverses the data collected into numbers.

In order to obtain a better understanding of the research goal and try to prove my findings using quantitative methods or econometrics tools and that entails a deductive approach to the relationship between theory and research, in which the accent is placed on the testing of theories.

3.2. Data Collection

In this research, the empirical study investigates the impact of monetary policy on external balance in Lebanon. Data are collected over a period of 18 years from January 2002 to March 2020, using monthly time series data.

To collect study variable data, literature and previous studies, articles and other resources have been checked.

BDL (Banque Du Liban) official site was used to get the data. The data was set in excel sheets in order to be examined by eviews.

3.3. Variables Description

1. **Deposit Rates:** The Deposit Rate is the paid average rate to companies or individuals by commercial banks on deposits. The deposit rate on Lebanese pounds is the independent variable as a proxy for the monetary policy.
2. **Money Supply:** The money supply in the economy of a nation on the date calculated would be all the currency and other liquid instruments. The supply of money approximately encompasses all cash and deposits that can be used just as simply as cash. Money supply on Lebanese pounds M2 is other independent variable as a proxy for the monetary policy.
3. **Current Account:** The current account is the dependent variable in first model stands as a proxy for the external balance. It is balance of payments' one half
4. **Trade Balance:** The trade balance is another dependent variable in the second model which also stands for the external balance. It is difference between Lebanon imports and exports for a specific time and it's one of the Balance of Payment's largest component.

3.4. Research Hypotheses

The following null hypotheses are formulated to analyze the impact of deposit rate and money supply on both current account and trade balance at a significant level of $\alpha < 0.5$ in Lebanon.

H0(1): There is no statistically significant short run relationship between deposit rate and current account

H0(2): There is no statistically significant long run relationship between deposit rate and current account.

H0(3): There is no statistically significant short run relationship between money supply and current account

H0(4): There is no statistically significant long run relationship between money supply and current account.

H0(5): There is no statistically significant short run relationship between deposit rate and trade balance.

H0(6): There is no statistically significant long run relationship between deposit rate and trade balance.

H0(7): There is no statistically significant short run relationship between money supply and trade balance.

H0(8): There is no statistically significant long run relationship between money supply and trade balance.

3.5. Models Specification

The performing study purpose is to examine the impact of monetary policy on the external balance, so this implies the 2 following models:

Research Model 1:

$$CA = \alpha_0 + \alpha_1 \sum_{i=0}^{n} DR_{i,t} + \alpha_2 \sum_{i=0}^{n} MS_{i,t} + \varepsilon_{i,t}$$

Research Model 2

$$TB = \beta_0 + \beta_1 \sum_{i=0}^{n} DR_{i,t} + \beta_2 \sum_{i=0}^{n} MS_{i,t} + u_{i,t}$$

CA: Lebanon Current Account

DR: Deposit rate in Lebanon

MS: Money supply (M2) in Lebanon

TB: Lebanon trade balance

α_0, β_0**:** Intercepts

α_1: Measures the effect of interest rate as a proxy of deposit rate in Lebanese pound % on the Current Balance Account.

α_2: Measures the effect of Money supply as a proxy of M2 on the Current Balance Account.

β_1:Measures the effect of interest rate as a proxy of deposit rate in Lebanese pound % on the Trade Balance Account.

β_2:Measures the effect of Money supply as a proxy of M2 on the Trade Balance Account.

ε, u: Error **t:** Time

3.6. Research Methodology

This study used specific econometric tests, including unit root test, vector auto regression test (VAR), cointegration test, vector error correction mode, due to a series of previous studies.

3.6.1. Correlation Matrix

According to *(Dohoo & Ducrot, 1997)* multicollinearity refers to a state of very high intercorrelations or interassociations among the independent variables. It arises from the inclusion of highly correlated independent variables. A correlation matrix is a table showing correlation coefficients between sets of variables. Each random variable (Xi) in the table is correlated with each of the other values in the table (Xj). This allows us to see which pairs have the highest correlation. Thus, the aim of the correlation matrix is to detect multicollinearity.

3.6.2. Unit Root Test

A unit root test in statistics regulates whether a parameter in the time series is non-stationary and has a unit root. In overall, the null hypothesis is considered as the presence of a unit root and the alternative hypothesis would be either stationary, trend stationary or explosive root based on the test used.

The unit root testing method assumes that the time-series for testing $(Yt)_{t=1}^{T}$can be represented as,

$Y_t = D_t + z_t + \varepsilon_t$

D_t**:** Deterministic Component

z_t**:** Stochastic Component

ε_t**:** Stationary Error Process

The purpose of the test is to specify if the stochastic component has root unit or stationarity *(Bhargava, 1986).*

The aim of the test is to decide whether the stochastic element includes unit root or it is stationary in order to avoid the spurious effects.

when a series is mean reverting which means that the series return continuously to its mean and has no tendency drift, therefore time series are called stationary. So, if the series mean and variance are constant continuously, whereas the covariance value between the two periods relies on the difference between the periods only and not on the original time at which the covariance is measured, the series is then stationary. Nevertheless, the series will be non-stationary, if any of the above conditions are not met *(Akway & Paramiah, 2008).*

Many methods are available to check the existence of unit roots. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) are the most commonly used approaches.

The ADF test is used to specify whether the data series is stationary (does not have a unit root) or is not, since most of macroeconomic time-series have often been considered not stationary, and that by measuring the respective statistics and p-values in level, if all the variables at level are

not stationary, the first difference is taken, which means that they should be integrated in order 1.

(Gujarati D. N., 1995). The ADF test testing procedure is applied to model:

$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta 1 \Delta y_{t-1} + \cdots + \delta p{-}1\ \Delta y_{t-p+1} + \varepsilon t$

α:Constant

β:Coefficient on a Time Trend

ε_t:White Noise Error Term

And Δ:Number of Lag Difference Term determined empirically.

The null hypothesis is $\gamma = 0$ and the alternative is $\gamma < 0$.

Compared with ADC, PP test checks the serial correlation of the higher order. The PP test uses non-parametric statistical techniques to avoid the use of lagged differential terms like in the

ADF test. For the PP sample, β1= 0 is the null hypothesis. The PP test is rather better, but in case of MA processes it has such a poor scale *(Fanara, Mahone, & Jeong, 2002).*

3.6.3. Vector Auto Regression (VAR)

The implication is that the lag period should be carefully selected for the number of lagers, which implies, that I perform (VAR) the appropriate lag length for inclusion in my test with the different lag selection criteria which are, Akaike Information Criterion (AIC), Schwarz Criterion (SC), Final Prediction Error (FPE), Hannan Quinn Criterion (HQ), and sequential modified LR test. The better the model, the lower the value of the corresponding criteria.

3.6.4. Cointegration

We carry out the cointegration analysis once the order of integration for each variable has been formed. The study will determine whether a stationary process in linear combination is shown in the time series of these variables. Cointegration implies that, while the data from a linear combination of two variables are individually nonstationary, they can be stationary *(Gujarati D. N., 1995).*

Cointegration tests describe long-term and stable relationships between variables sets. However, if the test failed to find a relation of this kind, there is no evidence that one doesn't exist, but only suggests that it doesn't exist*(Rao, 2007).*

When there is at least one cointegrating relationship between the variables, the causal relationship between these variables can be defined by assessing the VECM which will be discussed later.

There are three of the most common tests:

1. Engle-Granger
2. Phillips-Ouliaris
3. Johansen Test

1. **Engle-Granger:** The Engle-Granger method first builds residuals (errors) on the basis of static regression. Residuals are tested with ADF or a similar test for the presence of unit roots. The residuals would be practically stationary if a time series are cointegrated. A major problem with the Engle-Granger approach is that selecting the dependent variable can lead to different results, a problem that has been solved with more tests including Johansen's and PhillipsOuliaris (Armstrong, 2001).

The null hypothesis is, no cointegration exists and the alternative hypothesis is, cointegration exists.

2. **Philips-Qualiaris:** A residual unit-root test is the Philips-Ouliaris (1990). Tests for cointegration function on the premise, prior to 1987, that regression errors are independent of specific variances, a fact that is rarely true in the real world. It came as an improvement for the Engle-Granger test *(Chaovalitwongse, 2010).*

The Philips-Ouliaris test includes additional uncertainty (due to the fact that residuals are projections rather than the real parameter values). In addition, the tests are symmetric for cointegration relationship normalization (which variable is taken into account to be the dependent).

The null and the alternative hypothesis are the same as the Engle-Granger.

3. **Johansen Test:** The test of Johansen is another development in comparison to the Engle & Granger test. It prevents the selection of a dependent variable and even issues if errors are carried from step to step. As just that, multiple cointegrated vectors can be identified.

The Johansen test employs two tests to find the number of vectors that co-integrate which are the Maximum Eigenvalue test and the Likelihood Ratio Trace test *(Adebiyi, 2007).*

The Maximum Eigenvalue test is expressed as:

$$\mathbf{ME} = -\mathbf{T}\ \mathbf{ln}(\mathbf{1} - \boldsymbol{\mu}_{\mathbf{r}})$$

The null hypothesis is r cointegrating vector, and the alternative hypothesis is the r + 1 cointegrating vector.

The Likelihood Ratio Trace test is formulated as:

$$\mathbf{LRT} = -\mathbf{T}\sum_{\mathbf{i}}^{\mathbf{n}} \mathbf{ln}(\mathbf{1} - \boldsymbol{\mu}_{\mathbf{i}})$$

The null hypothesis is, the number of cointegrated vectors less than or equal to r where $r \in N$

The alternative hypothesis is r = n

3.6.5. Vector Error Correction Model (VECM)

VECM offers the option of applying the Vector Autoregressive Model (VAR) on integrated time series multivariate. There are some issues in the textbooks when implementing a VAR to the integrated time series.

The VECM estimation process consists essentially of the following three phases:

1. VAR model defining and estimation for integrated multivariate time series.
2. Compute likelihood ratio tests to estimate the number of co-integration relationships.
3. Estimate the VECM after calculating the number of cointegrations.

When the VECM model calculated, we use two short run dynamic analyzes for our paper named Variance Decompositions (VDCs) and Impulse Response Functions (IRFs).

The two analyses enable us to examine the behavior of error shock for each variable in terms of its future dynamics and the future dynamics for other variables in the VECM model. VDCs are used to identify the variables causal relationships. It describes the level to which the shocks in all the variables in the system explain a variable *(Mishra, 2004).*

To detect the complex interaction between variables, the response function is used. In order to compute the IRFs, the system variables must be in order and the system must be represented by a moving average process.

4. DATA ANALYSIS& FINDINGS

This part aims to examine the empirical model for evaluating the effect of monetary policy on Lebanon's external balance from April 2002 to March 2020. Two models will be independently tested in order to verify this hypothesis, in which the impact of the same explanatory variables with two variables, including the supply of money and the rate of deposit on Lebanese pounds, will be verified on two external balance proxies, the first on the current account, and the second on the trade balance account using the Econometrics Test Collection.

4.1. Descriptive Statistics

Descriptive statistics help in defining the characteristics of basis data, Table 4 shows the descriptive statistics of each variable in the two models among its mean, median, minimum, maximum, kurtosis and skewness.

Table 4. 1. Descriptive Statistics.

	CA	TB	DR	MS
Mean	-614.905	-730.180	6.830	33,917.01
Median	-616.730	-745.850	6.810	37,681.86
Maximum	451.680	440.900	10.650	55,518.67
Minimum	-2052.450	-2157.930	5.130	10,504.94
Std. Dev.	426.679	410.175	1.368	15,459.46
Skewness	-0.330	-0.222	0.875	-0.120
Kurtosis	3.246	3.064	3.135	1.402
Observations	219	219	219	219

(Source: By author).

The mean is a standard measure of the average of data in statistical analysis. The average value of the current account, trade balance, deposit rate and money supply are -614.905m, -730.180m, 6.83%, 33,917m respectively. The maximum and the minimum values show the highest and the lowest variable data value. Standard deviation shows how spread out are the data about means.

The skewness shows the non-symmetrical degree of data set. Current account, trade balance, money supply, are skewed to the left (for the negative sign), while deposit rate is skewed to the right (positive sign). All the data variables are considered normally distributed.

4.2. Correlation Matrix

The correlation between variables reveals how much one variable explained by other, its value is between (-1 and +1). The matrix of correlation between variables of research is shown in Table **4**.

Table 4.2. Correlation Matrix.

Probability	CA	TB	DR	MS
CA	1	0.881	0.359	-0.685
TB	0.881	1	0.484	-0.777
DR	0.359	0.484	1	-0.635
MS	-0.685	-0.777	-0.635	1

(Source: By author).

Table **5** shows a significant negative relationship between Lebanese money supply(M2) and both the current account and trade balance, while it shows a positive relationship between Lebanese deposit rate and both the current account and trade balance. The correlation between the independent variables is much less than 0.8 which shows that would not be multi-collinearity between these variables.

4.3. Unit Root Test Results

The results of the unit root test for the series of variables. The null hypothesis is "the variable has a unit root, or data series is not stationary", and the alternative hypothesis is "there is no unit root, or the data series is stationary".

The data series is stationary is appropriate and the unit root is not appropriate.

Model 1:

Table 4.3. Model 1 Unit Root Table at Level.

	Model with constant and trend (1)		Model with constant but without trend (2)		Model without constant or trend (3)	
	ADF	Prob.	ADF	Prob.	ADF	Prob.
CA	-2.4203	0.1373	-6.9525	0.0000	-0.8370	0.352
DR	-2.6046	0.0936	-1.502962	0.1243	-2.855207	0.1794
MS	-1.5364	0.5133	1.1277	0.9999	-95527	0.908

(Source: By author).

Table 4.4. Model 1 Unit Root Table at First Difference.

	Model with constant and trend (1)		Model with constant but without trend (2)		Model without constant or trend (3)	
	ADF	Prob.	ADF	Prob.	ADF	Prob.
CA	-11.370	0.0000	-11.357	0.0000	-11.396	0.0000
DR	-10.051	0.0000	-10.035	0.0000	-9.9938	0.0000
MS	-8.4686	0.0000	-8.7524	0.0000	-8.2450	0.0000

(Source: By author)

At level 5% of significance, we found from the table 6 that no variables are stationary at the level as all probabilities are greater than 5% of significance level. It is crucial to note that since 2 out of 3 cases are greater than 5 percent in the current account balance, then it is considered not stationary at the level. Therefore, we conclude that the stationary assumption for all the variables is not met.

In order to prevent misleading conclusions and spurious problems with non-stationary variables, the same test was performed at first difference tabulated in table **7**. From table 7, we confirmed that all variables after differentiation appeared to be stationary, indicating that they are correlated at I (1).

Model 2:

Table 4. 5. Model 2 Unit Root Table at Level.

	Model with constant and trend (1)		Model with constant but without trend (2)		Model without constant or trend (3)	
	ADF	**Prob.**	**ADF**	**Prob.**	**ADF**	**Prob.**
CA	-1.914238	0.3253	-0.5432	0.4808	-3.343281	0.0622
DR	-2.6046	0.0936	-1.5029	0.1243	-2.855207	0.1794
MS	-1.5364	0.5133	1.1277	0.9999	-95527	0.908

(Source: By author)

Table 4. 6. Model 1 Unit Root Table at First Difference.

	Model with constant and trend (1)		Model with constant but without trend (2)		Model without constant or trend (3)	
	ADF	**Prob.**	**ADF**	**Prob.**	**ADF**	**Prob.**
CA	-14.00911	0.0000	-14.03633	0.0000	-13.99555	0.0000
DR	-10.051	0.0000	-10.035	0.0000	-9.9938	0.0000
MS	-8.4686	0.0000	-8.7524	0.0000	-8.2450	0.0000

(Source: By author).

Similarly, as in the previous explanation, but now we take account of the Trade Balance Account as a dependent variable rather than the Current Account balance in the model. As before will draw our conclusions at level 5 percent, so we observed from table 8 that not all variables are stationary if all probabilities are more than 5 percent of importance level. We therefore conclude that the assumption of stationary is not fulfilled for all the variables.

In order to avoid misleading findings and invalid concerns with non-stationary variables, the first discrepancy tabulated in table **9** will be checked in the same manner. We confirmed from table 9 that all variables tended to be stationary after differentiation, due to the comparison the P-value's (0.0000) with the level of significance (0.05) indicating that they were integrated with I. (1).

4.4. VAR Lag Order Selection Criteria

Since we have found that the data series are not stationary in level but stationary in the first difference, next step is to choose the optimum lags used for the cointegration Johansen test. The goal is to pick the parameters number that reduce the value of the information criteria.

Tables **10** and **11** show test results Statistics and selection criteria for choosing the VAR model order, lag selection criteria consist of: sequential modified LR test, Final Prediction Error (FPE), Akaike Information Criterion AIC, Hannan Quinn Criterion (HQ), and Schwarz Criterion (SC).

We take the lag selection of AIC or SC, here we take the Lag chosen by SC, HQ which is lag 2.

Model 1:

Table 4. 7. Model 1 Optimal Lag Information Criteria.

Lag	Log	LR	FPE	AIC	SC	HQ
0	-4134.937	NA	217e+13	39.22215	39.26981	39.24141
1	-3144.049	1994.206	1.97e+09	29.91516	30.10578	29.99221
2	-3086.533	111.2168	1.24e+09	29.45528	29.78888*	29.59013*
3	-3079.681	13.05446	1.27e+09	29.47565	29.95221	29.66828
4	-3062.375	32.47925	1.17e+09	29.39692	30.01645	29.64735
5	-3053.816	15.81872	1.18e+09	29.40110	30.16361	29.70932

(Source: By author).

Model 2:

Table 4. 8. Model 2 Optimal Lag Information Criteria.

Lag	Log	LR	FPE	AIC	**SC**	**HQ**
0	-4097.227	NA	1.52e+13	38.86471	38.91236	38.88397
1	-3107.002	1942.905	1.39e+09	29.56400	29.75463	29.64105
2	-3049.035	112.0881	8.72e+08	29.09985*	29.43345*	29.23470*
3	-3040.442	16.37092	8.75e+08	29.10372	29.58028	29.29635
4	-3023.544	31.71304	8.13e+08	29.02886	29.64839	29.27929
5	-3014.952	15.87702	8.16e+08	29.03274	29.79525	29.34096

(Source: By author).

According to the Schwarz Information Criteria (SC), and the Hannan-Quinn information criterion (HQ) in tables **10** and **11**, the optimal lag is the second lag. The results of the data provided by Schwarz and Hannan-Quinn are taken into account in this study, which means that the optimum lag is 2 at the 5 percent significance level in the 2 models.

4.5. Model Selection Analysis

We found that all variables are incorporated at the first difference after the unit root test was applied, meaning that Jo-

hansen Co-integration and VECM are the best model to achieve our core objective. This helps us to assess the long-term relationship between the independent variables (predictors); Money supply determined by M2 in this case, as well as the Deposit rate as an interest rate proxy reflecting the key measures of monetary policy, and the current account, as an external balance proxy is the dependent variable in model 1, and the trade balance as an external proxy is the dependent variable in model 2.

4.6. Cointegration

We used the Johansen Cointegration Test in the next step to assess the long-term relationship between the dependent and the independent variables Johansen cointegration test results are reported in Table **12** and **13**.

In Tables **12** and **13** the results of Trace show that there are two cointegration at level 5 %, thus we may conclude that there is two long-run equilibrium relationship between variables. Therefore, we can apply now the vector error correction model VECM.

Model 1:

Table 4. 9. Model 1 Johansen Cointegration Test.

Unrestricted Cointegration Rank Test (Trace)					
Hypothesized		**Trace**	**0.05**		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	**Prob.****	
None *	0.239845	77.85681	29.7970	7	0.0000
At most 1 *	0.068414	18.62250	15.4947	1	0.0163
At most 2	0.015232	3.315376	3.84146	6	0.0686
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level					
* denotes rejection of the hypothesis at the 0.05 level					
**MacKinnon-Haug-Michelis (1999) p-values					
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)					
Hypothesized		Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	**Prob.****	
None *	0.239845	59.23431	21.13162	0.0000	
At most 1 *	0.068414	15.30712	14.26460	0.0341	
At most 2	0.015232	3.315376	3.841466	0.0686	
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level					
* denotes rejection of the hypothesis at the 0.05 level					
**MacKinnon-Haug-Michelis (1999) p-values					

(Source: By author).

Model 2:

Table 4. 10. Model 2 Johansen Cointegration Test.

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.245991	79.70567	29.79707	0.0000
At most 1 *	0.068717	18.71777	15.49471	0.0158
At most 2	0.015345	3.340193	3.841466	0.0676
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.245991	60.98790	21.13162	0.0000
At most 1 *	0.068717	15.37758	14.26460	0.0332
At most 2	0.015345	3.340193	3.841466	0.0676
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

(Source: By author).

The findings of trace and maximum Eigen value of co-integration tests in the tables 12 and 13 demonstrate the presence of two co-integration relationships between the variables. This outcome does not mean exactly, which of these variables is the dependent variable and which can be regarded as exogenous. We have repeated the co-integration test to ensure the reliability of our results, considering one of the variables used as a dependent variable at each time. The results obtained agree with validating the presence of a double co-integration relationship between the variables included in both modes, regardless of the selected "dependent variable."

4.7. Vector Error Correction Model VECM

MODEL 1:

The VEC estimates provide short and long-term projections and show that the error correction coefficient (-0.83) from table 16, measures the speed of adjustment to long-run equilibrium carries the negative sign expected. However, It is noted that R^2 is (46%) from table 14, it explains the model's predictive fit and shows that 46% of the variation of the Current Account Balance is explained by the Deposit rate and money supply.

Table 4. 11. Model 1 Stat.

R-squared	**0.460813**
Adj. R-squared	0.442668
Sum sq. resids	19190145
S.E. equation	303.7438
F-statistic	25.39518
Log likelihood	-1537.111
Akaike AIC	14.30658
Schwarz SC	14.43159
Mean dependent	-0.457639
S.D. dependent	406.8650

(Source: By author).

Model 1 Estimation

The Long Run:

The VECM parameter estimations in Long run and the relative t-statistics are presented in table **15**.

The model estimation:

CA (-1) = – 59.9*DR (-1) – 0.02*MS (-1) + 564.41

Table 15 shows t-statistic of DR in long run is 2.41 which is significant in comparison with 1.96 at level 5%, therefore there is a negative relationship between deposit rate and current account in the long run, this means that as the Deposit rate in Lebanese pound of previous lag increase by 1 % the current account balance decreases by 59.91339 units. Table 15 also shows t-statistic of MS in long run is 10.53 which is significant in comparison with 1.96 at level 5%, therefore there is a negative long run relationship between money supply and current account, which means that as the money supply in Lebanese pound of previous lag increase by 1 unit the current account balance decreases by 0.022 units.

The monetary policy measured by the proxies of Deposit rate and M2 have a negative statistically significant impact on the current account balance at 5%.

Table 4. 12. Model 1 VECM in Long Run.

Cointegrating Eq:	**CointEq1**
CA (-1)	1.000000
DR (-1)	59.91339 [2.41331]
MS (-1)	0.022715 [10.5310]
C	-564.4096

(Source: By author).

The Adjustment Dynamic

The mechanism of short-run change reveals how the endogenous variable CA, converges to the relationships of cointegration. This demonstrates how the CA returns to its long-term equilibrium value. In other words, it shows the d(CA) model that enables the long-term balance to be rich. In the short run, the VECM figures are described for table 16 in their relative t-statistics.

Table 4. 13. Model 1 Adjustment Dynamic Estimation.

Error Correction:	**D(CA)**	**D(DR)**	**D(MS)**
CointEq1	-0.833335 [-7.97957]	-3.83E-05 [-0.50410]	-0.306654 [-1.70594]
D (CA (-1))	-0.038306 [-0.41412]	2.40E-05 [0.35678]	0.002211 [0.01389]
D (CA (-2))	0.083668 [1.21786]	-1.76E-05 [-0.35171]	0.024985 [0.21128]
D (DR (-1))	-91.77544 [-0.96537]	0.274144 [3.96708]	497.7240 [3.04165]
D (DR (-2))	34.76867 [0.34391]	0.216951 [2.95216]	-101.1312 [-0.58116]
D (MS (-1))	-0.069044 [-1.65727]	-6.07E-05 [-2.00508]	0.530534 [7.39832]
D (MS (-2))	-0.047273 [-1.11177]	5.52E-05 [1.78694]	0.009587 [0.13100]
C	13.68021 [0.64039]	-0.013759 [-0.88604]	69.47222 [1.88937]

(Source: By author).

The Error correction coefficient indicates the speed at which variables are adjusted into equilibrium and is intended to have a coefficient with a statistically significant negative sign. As seen in table the above, the error correction coefficient appears to be statistically significant with a negative sign at a 5 percent level since t statistics (-7.97957) is above the t-critical (-1.96), ensuring that the long-run equilibrium is achieved. This means that even if the current account balance significantly deviates slightly from the long-term balance, it would slowly converge to its equilibrium. The error correction period of - 0.833335indicates that 83.33335% of the current account balance deviation from its equilibrium value is removed per month.

Referring to the current equilibrium equation D(CB), the lack of a significant correlation between the current balance and the other variables is noted. We note that the lagged balance of the current account, the supply of money, and the deposit rate are negligible in triggering the 5 percent level of the current account balance.

The results show that the deposit rate is -induced by itself when considering the D(DR) regression, and at the 5 percent stage this causality is positive and significant. Similarly, at the 5 percent level, the M2 lagging coefficient of orders 1 and 2 showed significant correlation with the DR.

We note that money supply affects itself at lag 2 with regard to the D(M2) equation. The findings also show that the DR of lag 1 showed that there was an immediate positive impact on M2, on the contrary, the other predictor variables showed no significant impact on the supply of capital. Therefore, the impact of monetary policy on the current account deficit in Lebanon is not clear on short run in which there were any association among variables.

Residuals Diagnostics

The null hypothesis of autocorrelation is that there is no serial correlation, while the null hypothesis in heteroscedasticity is that there is no heteroscedasticity. And when the obs*Rsquared is greater than 0.05 then we fail to reject the null hypothesis. The residuals are normally distributed if the Jarque-Bera probability is greater than 0.05.

The estimated model does not have a serial correlation in residuals as the probability of all lags above the lag 2 is greater than 0.05 (Table **19**). The model has no heteroscedasticity as the results of the heteroscedasticity test in table **18** below suggest that the chi-sq prob is 0.4299>0.05 (5% level). Finally, the residuals are normally distributed 0.1686>0.05 (5% level) as shown in table **17**.

Table 4.14. Model 1 Residuals Normality Test.

Component	Jarque-Bera	df	Prob.
1	19.07531	2	0.1621
2	11.31039	2	0.6615
3	10.29419	2	0.7404
Joint	23.59886	6	0.1686

(Source: By author).

Table 4.15. Model 1 Residuals Heteroskedasticity Test.

Joint test:		
Chi-sq	df	Prob.
14.26849	84	0.4299

(Source: By author).

Table 4.16. Model 1 Residuals Autocorrelation Test.

Lags	Q-Stat	Prob.*	Adj Q-Stat	Prob.*	df
1	0.646157	---	0.649162	---	---
2	7.945276	---	8.016498	---	---
3	108.6660	0.1777	111.6892	0.1306	15
4	113.7211	0.2638	117.0680	0.1981	24
5	127.1245	0.1890	131.4004	0.1267	33
6	133.3856	0.2462	138.1287	0.1661	42
7	142.6713	0.2480	148.1573	0.1593	51
8	154.4752	0.2068	160.9695	0.1197	60
9	160.9610	0.2558	168.0449	0.1490	69
10	172.3183	0.2224	180.4976	0.1166	78
11	174.6002	0.3476	183.0123	0.2027	87
12	180.5218	0.4124	189.5717	0.2457	96

(Source: By author).

Economic Justification Model 1:

The model estimation in the long run shows a negative relationship between deposit rate as a proxy for interest rate and current account as a proxy for external balance, which means that when the interest rate increases by 1%, the current account decreases by 59.9 units, which means it worsen the current account and that when interest rate increases lead to the flows of hot money. This leads to the appreciation of exchange rate, which makes imports cheaper and exports more expensive (higher quantity of imports and less quantity of exports); all this would worsen the current account so it decreases (with the assumption of relatively pricing elastic demand).

The model also shows that there is negative long run relationship between money supply and current account which means that when money supply increases by 1 unit the current account decreases by 0.22 units and that would have a reason in a country like Lebanon, and that because when the money supply is increased by printing more money by the government and this leads to higher inflation than competitors which make imports more competitive and exports less competitive and that causes a current account deterioration.

Model 2:

The VEC estimates provide short and long-term projections and show that the error correction coefficient (-0.84) from table 22, measures the speed of adjustment to long-run equilibrium carries the negative sign expected. However, it is noted that R^2 is (49%) from table 20, it explains the model's predictive fit and shows that 49% of the variation of the Trade balance is explained by the Deposit rate and money supply.

Table 4. 17. Model 2 Stat.

R-squared	0.487669
Adj. R-squared	0.470427
Sum sq. resids	13294151
S.E. equation	252.8126
F-statistic	28.28389
Log likelihood	-1497.467

Akaike AIC	13.93951
Schwarz SC	14.06452
Mean dependent	-1.580694
S.D. dependent	347.4046

(Source: By author).

Model 2 Estimation:

The Long Run:

The VECM parameter estimations in Long run and the relative t-statistics are presented in table **21**. The model estimation:

TB (-1) = – 19.08*DR (-1) – 0.02*MS (-1) + 153.24

Table **21** shows t-statistic of DR in long run is 0.93 which is not significant in comparison with 1.96 at level 5%, therefore there no relationship between deposit rate and trade balance in the long run. Table **21** also shows t-statistic of MS in long run is 12.54 which is significant in comparison with 1.96 at level 5%, therefore there is a negative long run relationship between money supply and trade balance, which means that as the money supply in Lebanese pound of previous lag increase by 1 unit the trade balance decreases by 0.022 units.

The monetary policy measured by the proxy of money supply M2 has a negative statistically significant impact on the trade balance at 5%. While deposit rate has no statistically significant impact on the trade balance at 5%.

Table 4.18. Model 2 VECM in Long Run.

Cointegrating Eq:	CointEq1
TB (-1)	1.000000
DR (-1)	19.08236 [0.93680]
MS (-1)	0.022193 [12.5435]
C	-153.2359

(Source: By author).

The Adjustment Dynamic

Once all the variables are associated with I (1), it is determined that there is a VECM with two cointegrating relationships and two lags in each equation. In the dynamic model, the coefficient of error term is defined as the speed of adjustment to restore the balance of return from the short to the long term. The second equation is the Error Correction Model that represent the short run fluctuation, which explains how long the dynamic model takes to return to equilibrium. The first difference is used to estimate the variables in the ECM model:

Table 4.19. Model 2 Adjustment Dynamic Estimation.

Error Correction:	D(TB)	D(DR)	D(M2)
CointEq1	-0.843760 [-8.09152]	-3.89E-05 [-0.42821]	-0.504321 [-2.34622]
D (TB (-1))	-0.048938 [-0.51908]	5.46E-06 [0.06652]	0.145179 [0.74704]
D (TB (-2))	0.140468 [2.04551]	-5.35E-05 [-0.89492]	0.062794 [0.44360]
D (DR (-1))	-45.57683 [-0.57520]	0.273598 [3.96364]	492.2270 [3.01362]
D (DR (-2))	-12.34524 [-0.14665]	0.219226 [2.98942]	-91.10217 [-0.52501]
D (MS (-1))	-0.038318 [-1.10730]	-5.99E-05 [-1.98736]	0.518233 [7.26506]
D (MS (-2))	-0.039558 [-1.12853]	5.60E-05 [1.83538]	0.027489 [0.38044]
C	7.740801 [0.43534]	-0.013999 [-0.90376]	68.93094 [1.88065]

(Source: By author).

The results show that at the 5 percent level of significance with negative sign, the coefficient of the Error Correction term (the previous residuals) or the restored force coefficient is significantly different from zero. The presence of a long-term relationship between the variables is reinforced by this outcome. The economic understanding of this outcome is that if there is a divergence from the long-term relationship that unites the two factors, the trade balance constitutes the adjustment element that enables the balance to be restored.The adjustment value shows that about 84.376 percent of the time disparity (t-h) is adjusted in the period (t).

Referring to the current equilibrium equation D(TB), the lack of a significant correlation between the current balance and the other variables is noted, except the second lag of the trade balance it is a statistically significant in affecting the current period of trade balance. On the contrary, the money supply and the deposit rate are negligible in triggering the 5 percent level of the Trade balance.

The results show that the deposit rate is induced by itself when considering the D(DR) regression, and at the 5 percent level this relationship is positive and significant. On the contrary the M2 lagging coefficient of orders 1 and 2 showed significant correlation with the DR similarly as model

1. Similarly, as the first model, we notice that the first lag of money supply has a positive significant impact with regard to the D(M2) equation. The findings also show that the DR

of lag 1 showed that there was an immediate positive impact on M2, on the contrary, the other predictor variables in the system showed no significant impact on the money supply variable.

Residuals Diagnostics:

The estimated model does not have a serial correlation in residuals as the probability of all lags above the lag 2 is greater than 0.05 (Table **25**). The model has no heteroscedasticity as the results of the heteroscedasticity test in table 24 below suggest that the chi-sq prob is 0.7393>0.05 (5% level). Finally, the residuals are normally distributed 0.4531>0.05 (5% level) as shown in table **23**.

Table 4.20. Model 2 Residuals Normality Test.

Component	Jarque-Bera	df	Prob.
1	11.57950	2	0.6400
2	11.08904	2	0.8905
3	14.39644	2	0.7029
Joint	18.03840	6	0.4531

(Source: By author).

Table 4.21. Model 2 Residuals Heteroskedasticity Test.

Joint test:		
Chi-sq	df	Prob.
10.30864	84	0.7393

(Source: By author).

Table 4. 22. Model 2 Residuals Autocorrelation Test.

Lags	Q-Stat	Prob.*	Adj Q-Stat	Prob.*	df
1	0.693850	---	0.697077	---	---
2	7.673996	---	7.742458	---	---
3	119.5075	0.1577	123.3226	0.1070	15
4	125.2324	0.2223	129.4443	0.1530	24
5	131.7237	0.2790	136.4199	0.1926	33
6	139.7358	0.3057	145.0731	0.2061	42
7	152.8590	0.2337	159.3173	0.1387	51
8	161.0808	0.2537	168.2865	0.1460	60
9	169.0004	0.2787	176.9699	0.1565	69
10	172.7040	0.3857	181.0515	0.2325	78
11	176.4660	0.4972	185.2186	0.3208	87
12	187.8484	0.4483	197.8918	0.2616	96

(Source: By author).

Economic Justification Model 2:

The model estimation in the long run shows no relationship between deposit rate as a proxy for interest rate and trade balance as a proxy for external balance, which could summarize that the change in interest rate has no effect on the exchange rate. so it doesn't affect the imports and the exports of the country, therefore no relationship with the trade balance.

The model also shows that there is negative long run relationship between money supply and trade balance which means that when money supply increases by 1 unit the trade balance decreases by 0.22 units and that would have a reason in a country like Lebanon, and that because when the money supply is increased by printing more money by the government and this leads to higher inflation than competitors which make imports more competitive and exports less competitive and that causes a decrease in trade balance.

5. CONCLUSION

In Lebanon, the monetary policy plays a major role in shaping currency, financing and economic environment due to the absence of medium- and long-term fiscal and economic policies. The Lebanese central bank introduced exchange rate targets in 1994 and since the end of 1997; the Lebanese pound has been linked with the US Dollar. As a result, in addition to some recent untraditional activities, the central bank utilizes the gap between local and international interest rates to draw foreign financial inflows.

As a conclusion, the study was made to see if they conducted tools of the monetary policy by the central bank helped in maintaining external balance stability in Lebanon. For this reason, the study was conducted firstly to examine the effect of money supply and deposit rate on the current account balance, and secondly to test the effect of these two variables on the trade balance. In order to meet the primary purpose of such research the analysis aimed at studying the long-term impact of monetary policy on the external balance in the Lebanon period between January 2002 and March 2020. The Johansen Cointegration Test and the Vector Correction Model were used to capture the long-term relation between variables.

Regarding model 1, the monetary tools (money supply and deposit rate) show to have negative impact on current account balance. The exchange rate will be appreciated and imports will be cheaper and exports costly. This will intensify current account so that it will decline when expected to have a reasonably priced elastic market. The model also indicates that there is a long-term negative relationship between money supply and the current account. As money supply is increased by printing more government money, this leads to higher inflation than rivals do, which makes imports more competitive and exports less competitive and causes the current account to deteriorate.

As for model 2, no relationship is detected between deposit rate and trade balance which shows that the deposit rate has no effect on the imports and exports of a country. On the contrary, the findings show a negative relationship between

money supply and trade balance. The negative impact means that the demand for foreign currency will increase. This will result in an increase in the price of foreign currency compared to the Lebanese pound, which will make the government print more money. The more money the government prints, the more likely the economy would be to report a trade deficit.

These findings may call for considering the repercussions of the adopted monetary strategies on current account and trade balance, and suggest the necessity to balance between preserving currency stability and improving economic performance.

RECOMMENDATIONS

Following the results reported in the preceding section, the following recommendations are made:

1. The government should protect infant industries through the following ways: By raising high tariff on those goods that are produced outside the country; Encourage import substitution; Support local industries and manufacturing sector by giving them incentives such as; Tax holiday etc.
2. The BDL should make monetary policy the preferred efficient provider of a favorable environment for the implementation of sufficient money supply, interest rate, inflation rate, etc. with a view to attracting both domestic and foreign direct investment that will generate jobs and provide work for the unemployed and, in the long run, contribute to an increase in total production in the real sector.
3. Production expansion – Economic development can be accomplished if monetary policy is correctly implemented by Lebanon's monetary authorities, both in the short and long term.

Furthermore, in order for monetary policy to be effective in maintaining stability in the external balance position of the economy, it should be complemented by an effective fiscal policy.

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