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The Impact of the Broad Money Supply (M2) on Economic Growth per Capita in Palestine

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Abstract: This study examines the effect of the broad money supply (M2) on the per capita economic growth in Palestine using time series data from 2000 to 2020. The study used autoregressive distributed lag model (ARDL), the cointegration approach and the error correction model to investigate the effect of money supply on gross domestic product (GDP) per capita. The model is determined by four macroeconomic variables, namely, gross domestic product (GDP) per capita, broad money supply (M2), gross fixed capital formation (GFCF), and inflation rate (INF). The results show that the money supply, the total capital formation, and the inflation rate have a positive impact on the economic growth in the short run. However, none of these variables affect the economic growth in the long term.
Keywords: Economic Growth, Money Supply, Inflation Rate, Gross Fixed Capital Formation, Autoregressive Distributed Lag Regression (ARDL).

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1. Introduction

The effect of money supply on per capita economic growth has received little coverage in the literature in the context of Palestine with most studies focusing on the same topic in other countries. However, it is equally important to determine the impact of the money supply on the economic growth in Palestine for policymakers to effectively harness and increase economic growth. Great interest has emerged recently between money supply and production, especially with the important role they play in achieving economic growth, especially in emerging economies and industrialized countries (Haqq and Hussein, 2017). Many economists found that the study of money affects the process of economic growth, and Bagehot (1873) were the first to see the importance of the banking system in collecting money and pumping it into financing major projects, and he explained (Keynes, 1936). The balance of the monetary sector leads to the balance of the market economy, as the absence of institutions and financial tools will prevent the transformation of savings into investments, which will lead to a negative impact on growth, as the change in the money supply affects real variables such as GDP and the level of employment due to price stability and information Flowing incomplete in the market. Money supply on economic growth is what he did (Friedman and Schwartz, 1963), where they emphasized

the strong influence of money supply on money income and its growth, and in contrast to the economic theory that money supply affects economic growth, some researchers differed in this saying taken from the likes (Adusei, 2013) and (Gatawa et al., 2017) as they found in their studies that there is no effect of money supply on economic growth without an adequate level of money. Supply, credit, and current conditions. Appropriate finances. The remainder of the paper is structured as follows. The second section provides an overview of the money supply and its impact on economic growth in Palestine. Section 3 reviews the relevant literature on the money supply and its effect on economic growth, in Section 4, we develop our hypotheses and research framework. Finally, Section 5 contains the conclusion.

2. Money Supply and its Impact on Economic Growth in Palestine

The State of Palestine is a country with an economy that depends on the Israeli economy, which led to depriving it of monetary sovereignty over its land and the size of the large role played by the Palestinian Monetary Authority. What made matters worse was the lack of an independent Palestinian currency, which led to the deterioration of the Palestinian monetary situation, forcing it to deal in four currencies for purchases, transfers, and capital following the Paris Economic Agreement signed in 1996 between the Palestinian Authority. Authority and Israel because of the Oslo Accords. These currencies consist of the Israeli shekel in daily dealings between citizens, the Jordanian dinar in Islamic rents and transactions, the US dollar in foreign trade rents, some banks in specific areas of Palestine, and the European euro in trade with international bodies (the Authority, Palestinian Monetary, 2021) in light of This great diversity found (Assaf, 2018) the importance of money supply in Palestine in the long and short term, as the four currencies do not pose a great risk to economic growth, but rather make it a dependent economy because it stressed the importance of having a Palestinian national currency to achieve higher growth rates and thus a free economy.

Since taking power in 1994, the Palestinian economy has witnessed a remarkable improvement in GDP during the period 2010-2012 because Palestine acceded to the membership of observers in the United Nations, which led to obtaining a lot of aid and assistance, which led to some financial and economic reforms implemented by the Palestinian government. It boosted domestic growth with the support of foreign aid, which helped improve the investment climate, while Israel reduced restrictions on the movement of people and trade. Which led to the opening of the Palestinian territories to the outside world, but growth quickly began to decline slightly in 2013, and reached its lowest level in 2014, due to the impact of the Israeli war on the Gaza Strip, which led to extreme poverty levels, in addition to the political situation Internally divided, the pressures of the occupation and little aid from donor countries are the main determinants of the growth of the Palestinian economy before it recovered slightly in 2014 due to the improvement of the political situation and the influx of international clearances and permits. Aoun funds achieved a strong start in growth of 8.8% in the year 20, after which it began to stabilize and grow slowly in 2017 and 2018, before returning to contraction by 4.4% by the end of 2020 due to the outbreak of the COVID-19 pandemic on the world and its impact on the Palestinian economy significantly.

Given the large role that money supply plays in the pursuit of economic growth, this study seeks to investigate the dynamic impact of broad money supply on economic growth using the Autoregressive Distribution Approach (ARDL) for cointegration in

Palestine during the period from 2000 to 2020. The model contains four macroeconomic variables, namely, gross domestic product (GDP) per capita, broad money supply (M2), interest rate (INT), and inflation (INF). The rest of the paper is defined as follows: Section II provides a brief review of the literature. The third section describes estimation techniques. The fourth section presents the results and analysis, while the fifth section concludes the study.

3. Literature Review and Theoretical Background

Among the few studies that have attempted to analyze the relationship between money supply and economic growth, results have been mixed. Some studies have found a positive relationship between money supply and economic growth, while others have found a non-significant relationship between these variables. (Haque & Hussain, 2017) conducted a study on the effect of money supply on per capita GDP in Bangladesh and found a significant positive effect of money supply on per capita GDP (Dingela & Hlalefang, 2017)found that they used the ARDL distributed time regression model. Moreover, they found a positive effect of money supply on economic growth in South Africa, and (Chaitipa et al, 2015) agreed when they studied the effect of money supply on the economic growth of the Open Area of Authorized Economic Operators (AEO), using the Autoregressive Distribution Model (ARDL). And they concluded that the money supply is distinctly linked to economic growth (Assaf, 2018) conducted a study on the impact of the money supply on the Palestinian economy and concluded that there is a positive effect of money supply and total capital formation on economic growth in Palestine in the long and short terms, and found (Babatunde & Shuaibu, 2011) The same positive effect in the significant relationship between economic growth and money supply in Nigeria using the ARDL model. (Chude & Chude, 2016) found a close relationship between the broad money supply and economic growth in Nigeria through the ARDL model, while (Bouatrous & Dahan, 2009) used the Johansson integration model.

They concluded that the money supply has a positive effect on economic growth. (Hameed & Amen, 2011) studied the impact of monetary policy on the GDP of Pakistan and found that the growth of money supply significantly affects the GDP (Ihsan & Anjum, 2013) found the effect of broad money supply on Pakistan's GDP, as (Zapodeanu & Cociuba, 2010) did when using the Engle-Granger and ARIMA model. They found a close relationship between money supply and GDP (Maitra, 2011) and using the cointegration model where it was discovered that money supply and production are related together (Aslam, 2011) also achieved a positive impact of money supply on the economy of Sri Lanka by using a multivariate econometric variable. In Algeria, (Bouatrous & Dahan, 2009) using the Johansson test, found the balance of the long-term relationship between the narrow and broad money supply and the GDP with a significant level of 5% and 1%, respectively. In the study of (Simwaka,, 2012), the ARDL test was used and found a relationship Positive relationship between money supply and economic growth

On the other hand, some researchers have found negative effects of money supply on growth, most notably (Abou El-Soud, 2014) who, through the use of a standard approach to Quarterly data for countries such as Bahrain, (Al-Fawwaz & Al-Sawaie, 2012) conclude that money supply does not help explain changes in GDP, suggesting that money supply in the strict sense does not have a short- or even long-term effect on the economy influences. Economic growth, and (Adusei, 2013) who uses fully modified least squares (FMOLS) and concludes that the money supply limits economic growth. In another study by (Gatawa & el at, 2017) using the VECM model, they concluded that

broad money is negatively correlated with economic growth, while in the study by (Ihsan & Anjum, 2013) they found that Money supply is negatively correlated concerning Pakistani GDP and (Ehigiamusoe, 2013) in his study of the relationship between financial markets and economic growth in Nigeria, using VECM, found that the relationship remains weak Money markets and the real economy.

4. Conceptual Framework and Development of Hypothesis

A set of empirical formulas has been tested to track and analyze causality and try to explain the relationship between money supply and economic growth referred to as per capita GDP by mixing money supply in a total production function used by many studies, the most important of which are (Dingela & Hlalefang, 2017) (Haque & Hussain, 2017) (Chaitipa, Chokethaworna, & Chaiboonsrib, 2015) (Assaf, 2018)(Babatunde & Shuaibu, 2011)(Chude & Chude, 2016)(Maitra, 2011)(Aslam, 2011)(Simwaka,, 2012) (Narayan & Smyth, 2008)(Gatawa & et al, 2017)(Ehigiamusoe, 2013)and (Odhiambo, 2008)and the equation is given for the ARDL boundary specification of the model

ARDL Specifications for Form 1 (GDP, M3, GFCF, and INF)

$$\Delta GDPt = \alpha 0 + \sum_{i=1}^{n} \alpha 1\, \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha 2\, \Delta M2_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta GFCF_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta INF_{(t-i)} + \beta 1 GDP_{t-i} + 2\beta 1 M_{t-i} + \beta 1 GFCF_{t-i} + \beta 1 INF_{t-i} + \mu 1 t \ldots\ldots\ldots\ldots (1)$$

$$M2t = \alpha 0 + \sum_{i=1}^{n} \alpha 1\, \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha 2\, \Delta M2_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta GFCF_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta INF_{t-i} + \beta 1 GDP_{t-i} + \beta 1 M2_{t-i} + \beta 1 GFCF_{t-i} + \beta 1 INF_{t-i} + \mu 2 t \ldots\ldots\ldots\ldots (2)$$

$$GFCFt = \alpha 0 + \sum_{i=1}^{n} \alpha 1\, \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha 2\, \Delta M2_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta GFCF_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta INF_{t-i} + \beta 1 GDP_{t-i} + \beta 1 M2_{t-i} + \beta 1 GFCF_{t-i} + \beta 1 INF_{t-i} + \mu 3 t \ldots\ldots\ldots\ldots\ldots (3)$$

$$INFt = \alpha 0 + \sum_{i=1}^{n} \alpha 1\, \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha 2\, \Delta M2_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta GFCF_{t-i} + \sum_{i=1}^{n} \alpha 3\, \Delta INF_{t-i} + \beta 1 GDP_{t-i} + \beta 1 M2_{t-i} + \beta 1 GFCF_{t-i} + \beta 1 INF_{t-i} + \mu 4 t \ldots\ldots\ldots\ldots (4)$$

Where is α0 a constant, α1- α4 and are regression coefficients, μ1-μ4 and are white noise error terms

β : measures long-term coefficients

GDP: GDP per capita

M2: Money supply in its broadest sense

GFCF: Gross fixed capital formation

INF: Inflation rate

Based on prior literature, the following hypotheses have been formulated:

H01: There is a negative relationship between Money supply and GDP per capita.

H02: There is a negative relationship between Gross fixed capital formation and GDP per capita.

H03: There is a negative association between the Inflation rate and GDP per capita.

5. Empirical Analysis

5.1.Test for Unit Root

We had to check if the variables had a unit root or not. Therefore, this was tested using the Dickey-Fuller Extended Root Unit Tests and Phillips and Peronne tests for the four variables. The results are shown in Table 3.

Table 1: Tests for Unit Root ADF&PP

	Level		1st difference	
Variable	**ADF**	**PP**	**ADF**	**PP**
Log(GDP)	-1.788465	1.580944	-6.920924*	2.336196-**
Log(m2)	-4.301687**	-10.00560**	NA	NA
log(gfcf)	-0.562978	-0.651831	-3.380029**	-3.361215**
Inf	-0.562978	-0.651831	-3.380029**	-3.361215**

*,**,***represent 1%,5% & 10% significance levels, respectively

The above results show that we accept the null hypothesis, which states that the data are stable and static, and reject the null hypothesis, which states that they are unstable. In general, using the Dickey-Fuller test (ADF) and the Phillips-Perwin (PP) test, the results confirm the appropriateness of performing a restrictive causality test and an ARDL co-integration test.

5.2.ARDL-Bound Test Approach to Co-integration

After the results appear and the four variables are stable, the next step is to analyze the long-run relationship between economic growth, money supply, interest rates, inflation, and total fixed capital. However, before that, the ideal delay length must be determined and several criteria are used to find the ideal delay length. As reviewing the results of the Akaike information criteria (AIC), Schwarz Criterion (SC), and Hannan–Quinn information criterion (HQ), we can say that the appropriate delay period is the fourth as shown in Table 2.

Table 2: Selection order criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3.253598	NA	2.76e-05	0.853365	1.049415	0.872852
1	51.78531	77.70198*	3.00e-07	-3.739448	-2.759197	-3.642009
2	64.99390	12.43161	6.26e-07	-3.411047	-1.646595	-3.235657
3	117.2846	24.60737	3.78e-08*	-7.680535	-5.131883	-7.427194
4	1616.677	0.000000	NA	-182.1973*	-178.8644*	-181.8660*

Table 3: Bound F-test for Cointegration

Predictor variable	Function	F-Statistic	Cointegration Results
LGDP	F(LGDP|LM2,LGFCF,INF)	6.530960	Cointegrated
LM2	F(LM2 |LGDP, LGFCF, INF)	1.869553	not Cointegrated
LGFCF	F(LGFCF |LGDP,LM2,INF)	6.988531	Cointegrated
INF	F(INF|LGDP, LM2,LGFCF)	3.447437	Cointegrated

Critical Value Bounds			
Pesaran et al. (2001:300)	**Significance**	**I0 Bound**	**I1 Bound**
	10%	2.72	3.77

critical values, Table: CI(iii) Case(III)	5%	3.23	4.35
	2.5%	3.69	4.89
	1%	4.29	5.61

Note: *, ** and *** denote stationary at 10%, 5% and 1%significance levels respectively.

The ARDL bounds tests were used to examine the existence of a co-integration relationship between the variables and the results shown in the table. Table 3 below shows the evidence for the existence of an integrative relationship between money supply and economic growth at a significance of 1%. The results of the F-statistics of the function show that there is a co-integration relationship between money supply and economic growth, as the F-statistics of 6.530960 are above the upper limit of the critical value of 5.61. Then we conclude that there is an integrative relationship in the first equation between money supply and economic growth in Palestine.

Table 4: Long-run result**s**

Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LGFCF	0.636761	0.541684	1.175521	0.2646
LM2	-0.110314	0.708392	-0.155724	0.8791
INF	0.050008	0.035182	1.421416	0.1829
C	2.666354	1.527099	1.746026	0.1086

Estimated transactions indicate that the money supply does not have a positive, statistically significant effect on economic growth, which is in line with the argument that the money supply does not affect economic growth. More specifically, the results are consistent with those of Al-Saud et al. (2014) Al-Fawaz and Al-Sawi (2012) Adusei (2013) Gatawa, Abdulgafar and Olarinde (2017) Ehsan and Anjem (2013) and Ehigiamusoe (2013)

Table 5: Short-run results

Cointegrating Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LM2)	0.492685	0.156002	3.158193	0.0091***
D(LGFCF)	0.298060	0.071594	4.163182	0.0016***
D(INF)	0.008215	0.003768	2.179990	0.0519
CointEq(-1)	-0.164277	0.119478	-1.374957	0.1965
R-squared	0.992881			
Durbin-Watson stat	2.347352			

***, **, * Significant levels at 1%, 5% and 10% respectively

The previous results show that at the 1% level, there is a strong positive effect between the money supply and economic growth in the short run, more specifically, the short-run elasticity of the money supply is 0.49, which means that the money supply increase. A 1% increase in the money supply leads to a 0.49% economic growth, the remaining variables are stable, and total fixed capital is formed, as this is found to have a positive effect on economic growth at the 5% significance level, due to a 1% increase in the other variables. In the stable case, economic growth will increase by 26%, and in the 1% case, there is no positive effect between inflation and growth in the short run level, indicating that the increase in inflation is increasing leading to a 0.29% increase in economic growth because it not significant effect as is shown in Table (5). Based on the

results shown in Table 7, the estimated coefficient of CointEq -1 is -0.16. Since the error correction term is negative and insignificant, this means that the results do not support a large distance between the variables.

Table 6: Short-run diagnostics

Test	F-statistics	P-value
Normality	0.931106	0.627788
Breusch-Godfrey Serial Correlation LM Test	1.764393	0.2257
Heteroskedasticity Test	0.632766	0.6047

The results of the diagnostic tests are shown in the table. It has been verified that the error terms of the short-run models are free of heterogeneity, have no serial correlation, and are normally distributed. It was discovered that Durbin Watson's stats are greater than R2, which means that the short-term models are not spurious.

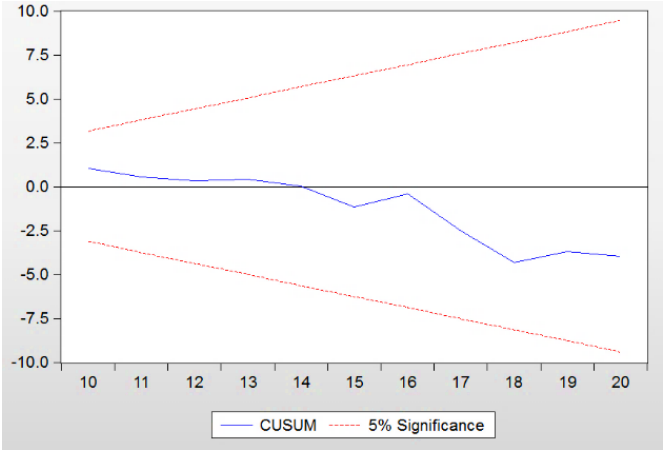

Figure 1: CUSUM test

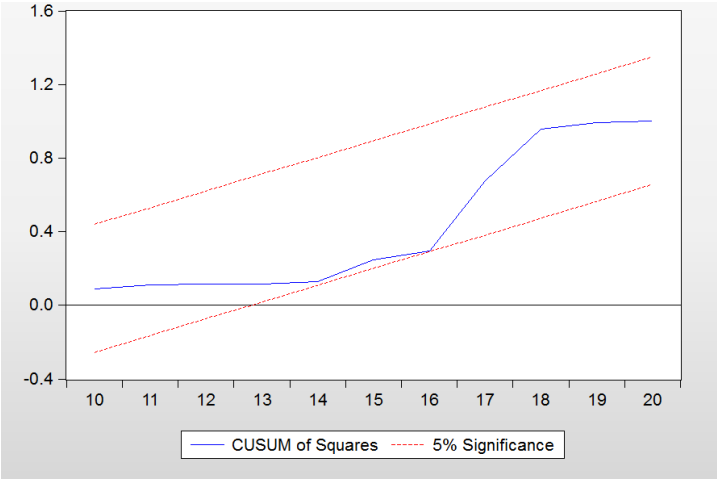

Figure 2: CUSUMQ test

The stability of the long-run coefficients was tested using the cumulative sum of recursive residuals (CUSUM) and CUSUM of recursive squares (CUSUMQ). The results are shown in Figures 1 and 2 below. The results succeeded in rejecting the null hypothesis

at the 5% significance level because the test schemes fall within critical limits. Therefore, it can be realized that our specific ARDL model is stable.

6. Conclusion

This paper examined the impact of money supply (M2) on economic growth (GDP) in Palestine using time series data from 2000-2020. The study used the recently developed Autoregressive Distributed Lag (ARDL) modeling approach to estimate both short and long-term resilience. The range of the selected macroeconomic variables (GDP per capita, broad money supply (M2), gross fixed capital formation (GFGC), inflation rate (INF). The results of the study revealed that there is a statistically significant positive relationship A statistic between money supply and economic growth, as well as a strong positive effect of total capital formation on economic growth in Palestine, and a positive effect of the inflation rate on economic growth in the short term, and no effect of the previous variables on economic growth in the long term. During many other studies. These results are important for the Palestinian state as they are important for the financial policymakers represented by the Monetary Authority, where the Palestinian government must follow a policy of what is known as Taylor's rule, which are reduced approximate formulas that respond to the nominal interest rate as determined by central banks to changes in inflation, production, or any economic condition We aim here, through this rule, to increase the money supply at a fixed rate to keep pace with long-term growth after the study proved successful in the short term due to the policies of the Monetary Authority that keep pace with political events, and also the government must coordinate with the Israeli side to ensure a safe environment that allows the flow of short and long-term investments. Which will be converted into cash quickly and will reduce unemployment and poverty rampant in the areas of the West Bank and Gaza Strip, as this paper shows that the money supply if the government can use it in the long term, will lead to the transfer of the national economy in the right direction

One of the negative aspects of this study is that it relied on World Bank data to identify inflation rates and total fixed capital formation, while the data on per capita GDP from the Palestinian Central Bureau of Statistics and money supply in its broad sense. From the Palestinian Monetary Authority. On the reasonableness of this data. Therefore, we recommend a follow-up study using a data set collected by a different but equally reliable institution. In addition, our study focused on Palestine, the only country in the world under occupation that lacks the most important requirement for a national currency, which is sovereignty over the land. It is necessary to know how the Palestinian Monetary Authority deals with three currencies within the economy of an occupying power. Therefore, it would be advisable for future researchers to consider using our methodology on other study variables. Despite these limitations, the paper makes a significant contribution to monetary policymakers.

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