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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 uses 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).

Type: Research paper

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1. Introduction

The effect of money supply on per capita economic growth has received limited attention in the context of Palestine, with most studies focusing on other countries. However, it is equally important to examine this relationship in Palestine to enable policymakers to effectively harness monetary tools to promote economic growth. In recent years, there has been growing interest in the interaction between money supply and production, particularly due to the critical roles they play in fostering growth, especially in emerging and industrialized economies (Haqq & Hussein, 2017).

Many economists have emphasized the importance of money in the economic growth process. Bagehot (1873) was among the first to highlight the role of the banking system in mobilizing financial resources and channeling them into major investment projects. Keynes (1936) later argued that monetary sector

equilibrium contributes to overall market equilibrium, noting that the absence of financial institutions and instruments hinders the conversion of savings into investments—thereby negatively affecting growth. Changes in the money supply influence real economic variables such as GDP and employment, primarily due to their effect on price stability and the imperfect flow of market information.

Friedman and Schwartz (1963) further emphasized the strong influence of money supply on money income and its growth, supporting the view that monetary expansion can drive economic performance. However, some studies have challenged this assertion. For instance, Adusei (2013) and Gatawa et al. (2017) found no significant effect of money supply on economic growth in the absence of sufficient credit availability and appropriate financial conditions.

The remainder of this paper is organized as follows. Section 2 provides an overview of the money supply and its impact on economic growth in Palestine. Section 3 reviews the relevant literature. Section 4 presents the research framework and hypotheses. Finally, Section 5 offers the conclusion.

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

The State of Palestine has an economy that is heavily dependent on the Israeli economy, which has deprived it of monetary sovereignty and underscored the limited role of the Palestinian Monetary Authority. This dependence is exacerbated by the absence of an independent Palestinian currency, which has led to a fragile monetary system. As a result, and following the 1996 Paris Economic Protocol signed between the Palestinian Authority and Israel under the Oslo Accords, the Palestinian economy operates with four foreign currencies. These include the Israeli shekel, used in daily transactions; the Jordanian dinar, often used in Islamic financial dealings; the U.S. dollar, dominant in foreign trade and banking activities in certain areas; and the euro, mainly used in trade with international entities (Palestinian Central Bureau of Statistics, 2021).

In light of this monetary complexity, Assaf (2018) highlighted the importance of the money supply in both the short and long term, noting that while the coexistence of multiple currencies may not directly harm economic growth, it entrenches economic dependency. The study emphasized the critical need for a sovereign Palestinian currency to foster sustainable growth and a more autonomous economic structure.

Since the establishment of the Palestinian Authority in 1994, the Palestinian economy experienced notable growth, particularly between 2010 and 2012. This was driven by Palestine's accession to observer status at the United Nations, which unlocked significant foreign aid and support. These developments facilitated a series of economic and financial reforms, bolstered by a temporary relaxation of Israeli restrictions on movement and trade. However, this growth trajectory reversed in 2013, reaching its lowest point in 2014, largely due to the Israeli military offensive on the Gaza Strip, compounded by internal political division, persistent occupation-related pressures, and declining donor aid.

Nevertheless, a modest recovery followed in 2015, supported by improved political conditions and an influx of international transfers and permits. Growth peaked at 8.8% in 2020 but began to decelerate again in 2017 and 2018, before

contracting sharply by 4.4% in 2020 due to the global outbreak of COVID-19 and its significant negative impact on the Palestinian economy.

Given the pivotal role of the money supply in influencing economic growth, this study investigates the dynamic relationship between broad money supply and economic growth in Palestine using the Autoregressive Distributed Lag (ARDL) cointegration approach for the period 2000 to 2020. The model includes four key macroeconomic variables: gross domestic product (GDP) per capita, broad money supply (M2), interest rate (INT), and inflation rate (INF).

3. Literature Review and Theoretical Background

Among the few studies that have attempted to analyze the relationship between money supply and economic growth, findings have been mixed. Some studies report a positive relationship, while others find no significant or even negative association between the variables. For instance, Haque and Hussain (2017) conducted a study on the effect of money supply on per capita GDP in Bangladesh and found a significant positive relationship. Similarly, Dingela and Hlalefang (2017), using the ARDL model, found that money supply had a positive effect on economic growth in South Africa. Chaitipa et al. (2015) also found a strong link between money supply and economic growth in the Open Area of Authorized Economic Operators (AEO), using an Autoregressive Distributed Lag (ARDL) model.

Assaf (2018), in his study on the Palestinian economy, concluded that the money supply and total capital formation had a positive impact on economic growth in both the short and long run. Babatunde and Shuaibu (2011) also reported a significant positive relationship between economic growth and money supply in Nigeria using the ARDL model. Chude and Chude (2016) confirmed this close relationship using the same approach, while Bouatrous and Dahan (2009), through the Johansen cointegration model, also affirmed a positive long-term effect of the money supply on economic growth.

Hameed and Amen (2011) studied the impact of monetary policy on GDP in Pakistan and found that the growth of the money supply significantly affected GDP. Ihsan and Anjum (2013) further confirmed this effect of broad money supply on Pakistan's GDP. Similarly, Zapodeanu and Cociuba (2010), using the Engle-Granger and ARIMA models, established a close relationship between money supply and GDP. Maitra (2011), using a cointegration model, found that money supply and production were positively related. Aslam (2011), using a multivariate econometric approach, also reported a positive impact of money supply on Sri Lanka's economy. In Algeria, Bouatrous and Dahan (2009), using the Johansen test, found a long-term equilibrium relationship between narrow and broad money supply and GDP, with significance levels of 5% and 1%, respectively. Similarly, Simwaka (2012), using the ARDL test, found a positive relationship between money supply and economic growth.

On the other hand, some researchers have found a negative or insignificant impact of money supply on growth. For example, Abou El-Soud (2014), analyzing quarterly data for Bahrain using a standard econometric approach, found no evidence that money supply explains changes in GDP. Al-Fawwaz and Al-Sawaie (2012) concluded that money supply, in the narrow sense, does not influence economic growth in either the short or long term. Adusei (2013), using the Fully

Modified Ordinary Least Squares (FMOLS) method, argued that money supply might even constrain economic growth. Gatawa et al. (2017), using the Vector Error Correction Model (VECM), found that broad money is negatively correlated with economic growth. Likewise, Ihsan and Anjum (2013), in another analysis, reported a negative relationship between money supply and Pakistan's GDP. Finally, Ehigiamusoe (2013), examining the link between financial markets and economic growth in Nigeria using VECM, found that the relationship between money markets and the real economy remains weak.

4. Conceptual Framework and Development of Hypothesis

A set of empirical models has been tested to track and analyze causality and to explain the relationship between the money supply and economic growth, commonly measured by per capita GDP. This has been achieved by incorporating the money supply into an aggregate production function—a methodology adopted by numerous studies, including those by Dingela and Hlalefang (2017), Haque and Hussain (2017), Chaitipa et al., (2015), Assaf (2018), Babatunde and Shuaibu (2011), Chude and Chude (2016), Maitra (2011), Aslam (2011), Simwaka (2012), Narayan and Smyth (2008), Gatawa et al. (2017), Ehigiamusoe (2013), and Odhiambo (2008).

The following equation presents the ARDL bounds testing specification used in this model: ARDL Specification for Model 1 (GDP, M3, GFCF, and INF)

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

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

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

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

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 Peronn tests for the four variables. The results are shown in Table 1.

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			
	Significance	**I0 Bound**	**I1 Bound**
Pesaran et al. (2001)	10%	2.72	3.77
	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-Fawwaz and Al-Sawaie (2012), Aboalsoaoud (2014), Adusei (2013), Gatawa et al. (2017), Ihsan and Anjum (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 results indicate a statistically significant and positive relationship between money supply and economic growth in the short run at the 1% significance level. Specifically, the short-run elasticity of the money supply is 0.49 (Table 5), implying that a 1% increase in the money supply leads to a 0.49%

increase in economic growth, holding other variables constant. Additionally, gross fixed capital formation is found to have a positive and significant impact on economic growth at the 5% level; a 1% increase in capital formation corresponds to an estimated 0.26% rise in economic growth.

Conversely, inflation does not have a statistically significant effect on short-run growth at the 1% level. Although a 1% increase in inflation is associated with a 0.29% increase in economic growth, the result is not significant, as shown in Table 5.

Regarding long-run dynamics, the estimated coefficient of the error correction term (CointEq−1) is −0.16. While the negative sign confirms the model's adjustment toward equilibrium, its statistical insignificance suggests a weak correction mechanism and limited evidence of a long-term equilibrium relationship among 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 presented in Table 6. The findings confirm that the residuals of the short-run models are free from heteroscedasticity, exhibit no serial correlation, and are normally distributed. Furthermore, the Durbin-Watson statistic exceeds the coefficient of determination (R^2), indicating that the estimated short-run models are not spurious and are statistically valid.

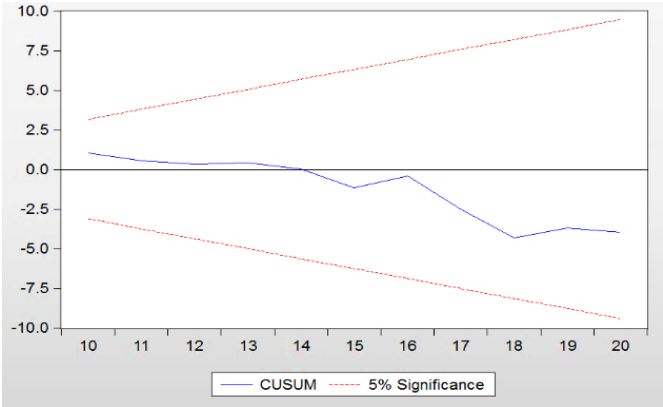

Figure 1: CUSUM test

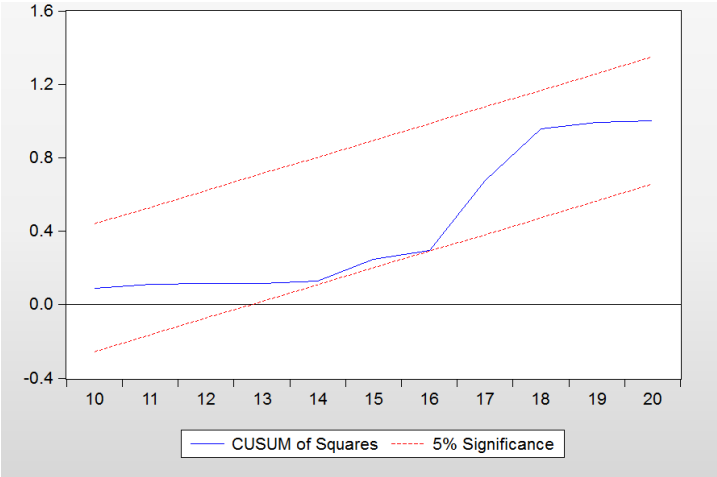

Figure 2: CUSUMQ test

The stability of the long-run coefficients was tested using the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMQ). The results, presented in Figures 1 and 2 below, indicate that the test statistics lie within the 5% significance boundaries. This leads to the rejection of the null hypothesis of parameter instability. Accordingly, it can be concluded that the estimated ARDL model is structurally stable over the sample period.

6. Conclusion

This paper examined the impact of the money supply (M2) on economic growth (GDP) in Palestine using time series data from 2000 to 2020. The study employed the recently developed Autoregressive Distributed Lag (ARDL) modeling approach to estimate both short- and long-term relationships. The model included key macroeconomic variables: GDP per capita, broad money supply (M2), gross fixed capital formation (GFCF), and the inflation rate (INF).

The findings reveal a statistically significant and positive relationship between the money supply and economic growth, as well as a strong positive effect of gross fixed capital formation on economic growth in Palestine. Additionally, inflation was found to have a positive effect on economic growth in the short term, while none of the examined variables had a significant long-term impact on GDP. These results are consistent with several previous studies.

The findings carry important implications for Palestinian policymakers, particularly the Palestinian Monetary Authority. The government should consider adopting a policy framework based on Taylor's Rule—an interest rate-based guideline for monetary policy that adjusts nominal interest rates in response to deviations in inflation and output. Specifically, a steady increase in the money supply could help align monetary growth with long-term output expansion. This is particularly relevant given the study's confirmation of short-term policy effectiveness, driven by responsive monetary interventions aligned with political

developments. Moreover, coordinated efforts with the Israeli authorities are essential to create a stable environment that attracts both short- and long-term investments, which could, in turn, boost liquidity, reduce unemployment, and alleviate poverty in the West Bank and Gaza Strip. As the results suggest, strategic use of the money supply over the long term could help steer the Palestinian economy in a more sustainable direction.

One limitation of this study is its reliance on secondary data. Inflation and gross fixed capital formation were obtained from the World Bank (2021), GDP per capita data from the Palestinian Central Bureau of Statistics, and broad money supply figures from the Palestinian Monetary Authority. While these are credible sources, we recommend future research employ alternative datasets from equally reputable institutions to validate the robustness of these findings.

Moreover, this study focuses on Palestine—an economy under occupation without monetary sovereignty and operating without a national currency. The Palestinian Monetary Authority functions within a unique environment characterized by the use of three foreign currencies: the Israeli shekel, the Jordanian dinar, and the US dollar. Future studies might explore how this currency mix impacts macroeconomic outcomes or apply this methodology to other variables and countries with similar monetary constraints.

Despite these limitations, the paper offers a meaningful contribution to the literature and provides valuable insights for monetary policymakers in Palestine and other developing economies facing similar constraints.

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