Impact of Money Supply and Domestic Credit on Economic Well-being: A Case of Pakistan

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Abstract

The role of money supply along with domestic credit to the private sector is considered very critical in an economy. It helps to improve economic growth and economic well-being of the inhabitants of a country. The purpose of this study is to determine the impact of money supply and domestic credit to the private sector on the economic well-being of the inhabitants of Pakistan using annual data set over the period from 1981 to 2018. Autoregressive Distributive Lag (ARDL) with Bound Testing and Error Correction Model (ECM) have been applied to analyse the model for the long run as well as short run. The findings of the study indicate that both money supply and domestic credit have a statistically significant and positive impact on economic well-being measured by GDP per capita. On the other hand, inflation and real effective exchange rate, both have a significant and negative impact on economic well-being. The study suggests an easy monetary policy to promote domestic consumption and domestic credit since both are important determinants of economic growth and well-being.

Keywords: Money Supply, Domestic Credit, ARDL, REER, Inflation

Introduction

In order to achieve the objective of maintaining unemployment and inflation at the desired level, monetarists and classical school of thought, the strong advocates of free-market economy propose the monetary measures. Such measures include the control of money supply, credit volume and interest rate. Monetary policy is a set of tools through which the central bank of a country controls the money supply in an economy. Central bank takes several monetary measures to maintain the level of money supply (broad money or M2), and interest rate so that the objectives of sustainable growth rate and high employment level be achieved (Ihsan & Anjum, 2013). On the other hand, flexible monetary measures lead to greater financial resources available to the private sector which can play a crucial rule in the economic development of an economy.

There have been diverse arguments of economists based on Classical, Monetarists and Keynesian considering the impact of money supply or money stock, yet all believe in the role of money supply impacting output and unemployment in the long run as well as short run in an economy. Nevertheless the relationship between money supply and economic growth has always been advocated in various economies in recent time (Hussain & Haque, 2017) and witnessed that contractionary measures such as the high-interest rate or lower volume of the money supply may lower the GDP by impacting on the volume of investment (Hina & Anayat, 2019).

In order to enhance private sector investment, the domestic credit to the private sector is gaining more importance (Edward, 2018) as it has always been recognized as a key determinant of economic growth in some earlier studies like one by (Shumpeter, 1911). Domestic credit is comprised of loans, overdrafts and advances to the private sector, and can be categorised as commercial

and banking sector credit (Olowofeso et al., 2015). The provision of finance through banking sector not only channelizes the domestic saving into productive investment by the private sector but it also improves the productivity of formal sectors of economy thereby playing an important role in economic growth (Nzomoi et al., 2012). A well established and well-functioning domestic credit system has proved to be a good alternative source of finance not only for investment purposes but also for financing the budget discrepancies and for better implementation of monetary measures (Mbate, 2013).

Domestic credit generates economic activities by transferring funds from financial intermediaries such as banks to households for private consumption and firms for private investment. The plays a very vital role in an economy by enhancing the productive capacity of an economy which in turn reduces unemployment and level of poverty (Begum & Aziz, 2019) and contributes to the financial sector development and economic growth (Masood et al., 2013).

The objective of this study is to examine the impact of money supply growth and domestic credit on the economic well-being of the inhabitants of Pakistan with the help of time series analysis.

Literature review

It is a worldly recognized issue by every economy that there is a significant association among money supply, economic growth and inflation. Many studies have observed the possibility of a causal association between economic growths, the supply of money and level of the inflation rate. However, the existing researched are indecisive about the role of monetary measures on economic performance in the general and economic wellbeing of the nationals of an economy in particular. Many earlier studies argue money supply as an important element to enhance economic growth nested with inflation as a weakness that hinders economic growth, whereas few have advocated contradictory shreds of evidence.

Suleman et al. (2009) have empirically investigated the role of money supply, inflation and government spending in economic growth in Pakistan by employing co-integration and causality analysis in the long run. The findings of the study suggested that in the long run, money supply (M2) has a positive impact on GDP growth whereas inflation and government spending both have a negative impact on economic growth.

Ahmed and Suliman (2011) have studied the association among money supply, inflation rate and Gross Domestic Product from 1960 to 2005 in Sudan by employing the Granger causality and co-integration test. They have established a long-run relationship among the variables under consideration. They have also found a unidirectional causality between money supply and inflation rate and real GDP and inflation rate by employing Granger causality framework but no reverse causation.

Muhammadpour et al. (2012) in another study, have estimated the impact of monetary expansion on economic growth in Malaysian Economy by utilizing VECM and confirmed the existence of a long-run relationship between the real interest rate and GDP. The study has further added that money supply variables ((M1, M2, and M3), all are significantly affecting the economic growth of Malaysia in the long run, and have concluded that an expansionary monetary policy enhances the growth rate of the Malaysian economy.

Ihsan & Anjum, (2013) have conducted a regression analysis to determine the impact of money supply (through interest rate), CPI and inflation rate on Gross Domestic Product in Pakistan economy. The study has revealed that interest rate and CPI both have a positive and significant impact on GDP, whereas the inflation rate has negative and insignificant on the GDP of Pakistan.

Ahmed and Afzal (2016) have observed the relationship between monetary policy and economic growth by applying the autoregressive distributive lag model. They have found a significant association of money supply and economic growth as monetary expansion has a positive effect on economic growth. Hussain and Haque (2017) have also confirmed the positive association between money supply (Broad money) and gross domestic product per capita in the long run in Bangladesh by applying VECM.

Mahmood et al (2017) have presented a time series data analysis to find the long-run relationship between money supply (M2) and Gross Domestic Product for a data set from 1983 to 2013. They have confirmed that M2, government spending and inflation rate, all have a significant positive impact on GDP, whereas interest rate has a negative impact on economic growth which concludes that low-interest rate triggers economic growth. Aslam & Awan (2018) have also witnessed a strong relationship between broad money and real Gross domestic product.

Hina & Anayat (2019) have determined the importance of money supply in attracting FDI and enhancing GDP growth. The researchers have identified money supply as mediator which positively affect foreign direct investment which in turn enhances economic growth in a country like Pakistan.

Number of the studies have contradictory findings and they support contractionary monetary policy. Amassoma et al (2011) have conducted a correlation analysis to determine the impact of money supply and inflation on the Pakistan economy. This study has concluded that the excessive money supply in the form of high lending rate is the cause of the high inflation rate, whereas the inflation rate has a severe impact on economic growth.

Goldfajn and Gupta (2003) have examined the association between monetary policy and exchange rate using the data set of eighty countries. The outcome of the study indicates that contractionary monetary policy has a dual impact on the economy. It not only reduces the undervaluation of the exchange rate, but it also reduces the inflations rate thereby enhancing economic growth.

Ihsan and Anjum (2013) have observed that inflation has been a major cause of rising money supply since excessive money supply increases the domestic demand for goods and services, causing the domestic price level to rise. The study while examining time series annual data has advocated contractionary monetary policy as an effective tool which reduces inflation rate and stimulates productivity, and that CPI and interest rate, both have a significant relationship with GDP.

Few of the studies have also examined the role of domestic credit to the private sector along on economic growth, and have depicted a mixed conclusion. Masood et al. (2013) have examined the impact of domestic credit to the private sector and money supply (M2) on economic growth by conducting variable based sensitivity analysis. The authors have determined that domestic credit to the private sector has no significant impact on economic growth whereas money supply (M2) has a significant positive impact on economic growth in Pakistan. Edward (2018) has examined the dynamic linkage between domestic credit to the private sector and economic growth in Nigeria using Time series data set from 1970 to 2015. By applying VAR and Impulse response functions (IRFs), the researcher has also determined the positive but insignificant impact of domestic credit to the private sector on gross domestic product.

Olowofeso et al. (2015) have investigated the relationship between private sector credit and economic growth in the Nigerian economy using co-integration analysis in a quarterly data set. The study has confirmed the significant and positive impact of private sector credit on output growth, whereas the prime lending rate has a negative impact on economic growth.

Begum & Aziz (2019) have conducted an empirical analysis by employing VAR (Vector Autocorrelation) to determine the relationship between domestic credits to the private sector, domestic credit to the public sector on real Gross Domestic Product. They have concluded that domestic

credit to the private sector has a significant impact on the GDP of Bangladesh economy. Nzomoi et al. (2012) have also found a statistically significant and positive impact of private sector credit on sectoral GDP and real value-added in the Kenyan economy. After a thorough review of previous studies, there is a need to conduct a study to determine the relationship between money supply, domestic credit and economic well-being with the economy of Pakistan under consideration.

Methodology

It is the time series data analysis of impact of monetary growth and domestic credit on economic wellbeing in Pakistan from 1980 to 2018 that is for the period of 39 years. GDP per capita has been taken as the proxy of economic wellbeing, whereas trade Money Supply (M2), Domestic Credit, Inflation rate and Real Effective Exchange Rate have been taken as explanatory variables. The data is annual and have been obtained from Pakistan Economic Survey and WDI (World Bank).

Model

GDP per Capita = f (M$_{oney}$ Supply, Domestic Credit, Inflation, Real Effective Exchange Rate) It is log-log model that is all series has been taken in natural logarithmic form.

$$lnGCAP = f(lnM2, lnDOMCR, lnINF, lnREER)$$

where $lnGCAP$, $lnM2$, $lnDOMCR$, $lnINF$, $lnREER$ are the natural log of GDP per Capita, Money Supply, Domestic Credit, Inflation and Real Effective Exchange Rate respectively.

Data Specifications

The annual data set over the period of 1980 to 2018 has been obtained from Pakistan Economic Survey various editions and WDI 2019 (World Bank data source).

Variable Specifications

GDP per Capita: "GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources."(World Bank). The variable LnGDP has be obtained by taking natural lag of GDP per capita

Money Supply (M2): Monetary asset (M2) includes currency in circulation, demand deposits, time deposits and resident's foreign currency deposits (Pakistan Economic Survey, 2019). "It is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveller's checks; and other securities such as certificates of deposit and commercial paper" (World Bank).

Domestic Credit: Domestic Credit to private sector consists of all credits to the private sector which are provided by banking and non-banking financial institutions and financial cooperation, such as leasing and insurance companies, money lenders, forex companies and pension funds. (World Bank, 2019)

Inflation Rate: It is calculated from Consumer Price Index (CPI). Consumer Price Index (CPI) is the most commonly used price index used to calculate inflation rate monthly. It measures the cost of living of the inhabitants of a country by computing the value of fixed basket of goods and services consumed by a typical consumer. The Laspeyres formula is generally used (PBS, 2012). CPI is calculated with the help of following formula:-

$$\text{Consumer Price Index (CPI)} = \frac{\text{Cost of goods and services basket in the current year}}{\text{Cost of goods and services basket in the base year}} \times 100$$

Inflation rate is usually calculated with the help of Lespeyres formula

$$\text{Inflation rate} = \frac{(\text{Consumer Price Index}_{\text{current year}} - \text{Consumer Price Index}_{\text{base year}})}{\text{Consumer Price Index}_{\text{base year}}} X\ 100$$

Real Effective Exchange Rate (REER): Real effective exchange rate is calculated as index (2010=100). "Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs". (World Bank, 2019)

Econometric Methodology

In order to determine the long run associations and dynamic interaction among the dependent and independent variables, Autoregressive Distributed Lag (ARDL) Bound Testing approach has been applied. ARDL cointegration procedure has been developed by Pesaran et al. (2001) which has number of advantages over the other testing approaches. It is procedurally simple, efficient, and its bound testing is not affecting by the order of integration of variables whether at I(0), or I(1) or mutually co-integrated.

In ARDL Bound testing analysis, F-statistics is applied to establish the long run relationship among the variable of the model, and is confirmed if F-statistic exceeds the critical value band. The major advantage of this approach lies in its identification of the co integrating vectors where there are multiple co integrating vectors. The procedure would however crash in the presence of I (2) series. It is used to overcome the stationary problem in the time-series regression.

Results and Discussion

Unit Root Test

Two tests have been employed to test whether the variables are stationary or not-stationary, which are Augmented Dickey Fuller (ADF) test and Phillips Peron (P-P) test. If stationary at level the series are integrated of order zero, I(0) and if stationary at first difference and second difference, the series are integrated of order one and two respectively. The null hypothesis (H_o) for both the test states that the data series under discussion has unit root while alternative hypothesis (H_1) claims that there is no unit root implying the series is stationary.

Table 1. Unit Root Test

Variables	t-statistics	ADF Test Statistic Order of Integration	Phillip-Perron Test Statistic t-statistics	1st Difference
LnGCAP	(-3.653106) 0.0387**	I(1)	(-3.652864) 0.0387**	I(1)
LnM2	(-4.718562) 0.0028*	I(1)	(-4.651597) 0.0034*	I(1)
LnDOMCR	(-5.099067) 0.0002*	I(1)	(-5.064372) 0.0002*	I(1)
LnINF	(-4.593099) 0.0009*	I(0)	(-2.701583) 0.0831***	I(0)
LnREER	(-4.823196) 0.0004*	I(1)	(-4.889351) 0.0003*	I(1)

Source: Prepared by authors.

*, **and *** shows the level of significance at 1%, 5% and 10% respectively.

In parentheses are the t-statistics values and p-values are without parenthesis.

The results in Table 1 show that the variables are stationary at I(0) and I(1). Dependant variable lnGDAP is stationary at 1st difference I(1) whereas independent variables LnM2, LnDOMCR, and LnREER are stationary at level I(1) but LnINF is stationary at I(0). The unit root tests results which suggest a long run associations between the dependent and independent variables, and hence approve that ARDL can be applied to estimate the model.

Lag Length Criteria

The lag length criteria using unstructured VAR has been determined and it has taken lag of 2 to estimate ARDL as suggested by LR Test, Final Prediction Error (FPE), and Akaike information criteria (AIC). We have adopted automatic lag selection provided by statistical software (EViews 9.0) based on AIC which has adopted lag 2 for dependent and 4,2,2,2 for independent variables.

Table 2. Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	50.81342	NA	5.02e-08	-2.617910	-2.395717	-2.541209
1	262.7802	351.2592	1.17e-12	-13.30173	-11.96857*	-12.84152*
2	291.3414	39.16968*	1.05e-12*	-13.50522*	-11.06111	-12.66151
3	311.7258	22.13166	1.76e-12	-13.24148	-9.686395	-12.01426
4	330.0299	14.64324	4.55e-12	-12.85885	-8.192807	-11.24813

* indicates lag order suggested by the criterion

ARDL Bound Test

After selecting a proper lag, the ARDL bound test has been performed to test the existence of long run relationship between dependant variable and independent variables. The results of Bound Test have been presented in table 3. From the table 3 it is shown that calculated F-static value (F-static = 5.142743) is greater than the upper bound critical values at all levels of significance. So we reject the null hypothesis that there is no long run cointegration, and accept the alternative hypothesis that there is long run cointegration present in the model.

Table 3. F-Statistic of Co-integration relationship

Test Statistic	Value	Lag	Level of Significance	Bound Critical Values	
F-Statistic	5.142743**	4		I(0)	I(1)
			1%	2.45	3.52
			5%	2.86	4.01
			2.5%	3.25	4.49
			10%	3.74	5.06

Source: Prepared by authors.

*, **and *** shows the level of significance at 1%, 5% and 10% respectively.

Long run Estimates

In the long run ARDL estimation analysis, the impact of independent variables on dependant variable has been determined. The results have been presented in table 4.

The results indicate that money supply, domestic credit, inflation rate and real effective exchange rate, all have significant impact on gross domestic product per capita at 5% level of significance. The findings indicate positive and highly significant impact of money supply (Broad Money) on GDP per capita. The findings are very much in line with findings of Suleman et al. (2009);

Ahmed and Suliman (2011) Hussain and Haque (2017); Mahmood et al. (2017); Aslam & Awan (2018); Hina & Anayat (2019) The findings further indicates that Domestic Credit also has strong positive and significant impact on GDP per capita very much similar to the findings of Masood et al. (2013); Olowofeso et al. (2015) and Begum & Aziz (2019). These results suggest that increase in money supply and domestic credit increases financial resources of the general public helping them purchase more goods and services and thus make them better off.

Table 4. Long Run Relationship Model

Independent Variables	Dependent Variable: LnGCAP	
	Coefficient	**t-statistic**
LnM2	0.110499**	24.642741
LnDOMCR	0.358289**	7.638298
LnINF	-0.046359**	-2.951336
LnREER	-0.078767**	-2.278011
C	2.718193**	9.182569

Note: ** indicates significant at the level of 5%.

The table 4 also indicates strong negative and significant impact of inflation and real effective exchange rate on GDP per capita. Continuous rise in price level reduces the purchasing power of the common man and thus negatively affect the affordability of general public make them worse off. The negative impact of Real Effective Exchange Rate on GDP per capita advocates that fall in Real Exchange rate implies an appreciation in the value of domestic currency which could reduce exports and induce imports, having negative impact on Gross Domestic Product per capita or economic wellbeing.

Short run Estimates: Error Correction Model (ECM) Results

Error Correction Model (ECM) equation has been estimated under ARDL to determine the short run relationship between dependant variable and independent variables.

Table 5: Error Correction Model for GDP per Capita

Independent Variables	Dependent Variable: $d(LnGCAP)_t$	
	Coefficient	**t-statistic**
$d(LnGCAP)_{t-1}$	0.276454	1.534263
$d(LnINF)_t$	0.008573	1.190743
$d(LnINF)_{t-1}$	0.024133**	3.151252
$d(LnINF)_{t-2}$	-0.007199	-0.880681
$d(LnINF)_{t-3}$	0.018555**	2.456928
$d(LnM2)_t$	0.186474**	3.838988
$d(LnM2)_{t-1}$	-0.096892**	-2.132878
$d(LnDOMCR)_t$	0.185534**	4.189095
$d(LnDOMCR)_{t-1}$	-0.130289**	-2.580648
$d(LnREER)_t$	0.046618	0.971783
$d(LnREER)_{t-1}$	0.067171	1.173952
ECT_{t-1}	-0.632390*	-3.767031

Note: * and ** indicates significant at the level of 1% level and 5% respectively.

The results in table 5 show value of Error Correction (ECM) term (-0.632390) is negative and highly significant. It indicates that there are 63.23% probabilities that the model would converge to the short run equilibrium. It also indicates that it will take 2.719 years to converge the model towards the equilibrium.

Post Estimation Diagnostics

In order to confirm the reliability and authenticity of the estimated model and estimation results, number of diagnostic test have been applied presented in table 6 and table 7.

Table 6. Diagnostic Test

S. No.	Diagnostic Tests.	Test Statistic	value	P-value
1	Coefficient of Determination	R-Square	0.997735	-
2	Coefficient of Variation	F-Statistic	495.5316	0.0000
3	Serial Correlation Test	LM Test	1.871418	0.3923
4	Heteroscedasticity Test	Breusch-Pagan-Godfrey	8.589026	0.9294
5	Test of Normality	Jarque-Bera	2.8889	0.2358
6	Specification Error Test	Remsey-RESET (F-test)	1.422378	0.2494

Diagnostic test results shown in table 6 strengthen the reliability of the estimation analysis. Coefficient of determination (R-Square) is 0.997735, which is too good to prove strong fitness of model. The model is statistically significant as F-statistic indicates. The higher p-value (p-value>0.05) confirms the absence of problems both serial correlation and heteroskedasticity. The data series comes from normal distribution as Jarque-Bera test static confirms. Furthermore there is no model specification error, as confirmed by Remsay-RESET test.

Table 7. TOL and VIF Values

Variable	R^2_j	TOL (1- R^2_j)	VIF
LINFCPI	0.099664	0.900336	1.11069
LM2	0.598206	0.401794	2.48884
LDOMCTG	0.181579	0.818421	1.22186
LREER	0.629649	0.370351	2.70014

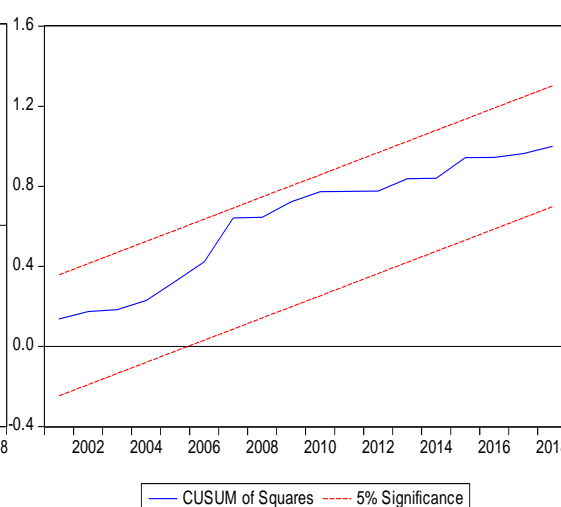**Figure 1. CUSUM Test Result**   **Figure 2. CUSUM-Q Test**

Table 7 reports the tests results of TOL (Tolerance Factor) and VIF (Variance Inflation Factor). Both test results validate the absence of the multicollinearity among the dependant variables.

Stability Tests

CUSUM and CUSUM-Q tests have been employed to check the stability of the model. CUSUM and CUSUM-Q tests images are shown in figure 1and figure 2 which confirm the stability of the model under consideration.

In light of the post-estimation diagnostics test results, it is confirmed that the data is clear from all kind of reported issues and the results are reliable and authentic.

Conclusion and policy implications

The role of money supply and the volume of domestic credit to the private sector has been under discussion since long ago. Its role in economic development and people's well-being cannot be overlooked. Money supply assumes to perform a dual role in an economy by not only promoting domestic consumption but it also contributes to raise the price level which affect the purchasing power of the common consumer. Domestic credit, on the other hand, contributes to enhancing private sector productivity thereby improving economic growth. The purpose of this study is to determine the impact of money supply and domestic credit on the economic well-being of the people of Pakistan over a period of 39 years from 1981 to 2018. In order to determine the long run associations and dynamic interaction among the dependent and independent variables, Autoregressive Distributed Lag (ARDL) Bound Testing approach has been applied.

The findings of the result indicate that money supply and domestic credit, both have a statistically significant and positive impact on GDP per capita; a measure of economic well-being. The findings also show a significant negative impact of inflation and real effective exchange rate on GDP per capita in Pakistan economy. The probability value of ECM (-0.632390) confirms that in the long run, the convergence of the model would take place in approximately 2.719 years.

In the light of the findings of the study, it is suggested that the monetary authorities of Pakistan (State Bank of Pakistan) should devise such an expansionary monetary policy which would increase the domestic consumption and enhance the economic well-being of the people of Pakistan. It should also take measures to promote domestic credit to private sectors by the banking sectors and other financial intermediaries so that it can contribute more towards the economic development of Pakistan.

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