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The Money Market Stability: Exploring the Role of Uncertainty in Pakistan

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ABSTRACT

This study proposes an investigation into the relationship between money demand and economic uncertainty in Pakistan. This study extends the Keynes money demand function by including the optimal uncertainty index and analyzes the impact of uncertainty on the money demand. We employed annual data from 1990-2022 and ARDL for data analysis. We used money demand as the dependent variable, the world uncertainty index for Pakistan as a core explanatory variable, with other control variables. The empirical results indicate the existence of a long-run and direct relationship between uncertainty and money demand in Pakistan. The study also provides valuable implications for policymakers for a stable money market.

1 Introduction

The demand for money is influenced by a wide range of factors, such as commerce, GDP, inflation, technology, uncertainty, and currency rates. The main goal of this study is to examine how economic uncertainty affects the demand for money. Several conceptual and methodological frameworks, analytical tools, and models can be used to analyze the relationship that exists between economic uncertainty and demand for money.

A steady money supply would allow monetary aggregates to gradually affect the several economic variables that make up output, inflation, interest rates, and price levels, as demonstrated by Sriram (1999). In order to measure the efficiency of the Central Bank's monetary policy framework, the money demand function must continue to shift to remain stable.

Based on the findings of Khan and Qayyum (2007), trade openness in Pakistan does have long-run implications on the dynamics of inflation that have indirect effects on the money demand. Financial development is always in tandem with trade openness, as it must support global transactions with an effective financial structure. The enhanced loan and investment options improved by the intermediary efficiency can also influence money demands. Monetary development can be said to affect the money demand at a general level. Jalil, Feridum and Ma (2010) paper draws attention to how Pakistan's money demand is affected by monetary development. The empirical evidence indicates that financial development due to trade alters the patterns of money demand.

Advances in financial inclusion as well as technology have been of significance to the demand for money. Agha and Khan (2006) reveal that with easy access now through banks and other financial services, all these factors have somehow affected the normal relationship between money demand and the rise in the population. Income levels would likely be the difference. Arby et al. (2010) reported that the increase in population growth and per capita income positively correlates with the increase

in demand for money. Urbanization also affects the demand for money. Anwar and Asghar (2012) mentioned that usually, urbanization usually occurs along with population growth, which enhances economic activity and subsequently increases the need for money.

Money demand is of paramount importance for monetary policy decisions and for the economic stability of Pakistan, particularly in developing economic growth and inflationary control. The State Bank of Pakistan has recognized the demand for money as one of the most important measures of the state of the economy. The State Bank of Pakistan can control inflation and encourage economic growth by adjusting the money supply and interest rates to let individuals and businesses keep as much money as they want. It impacts decisions on the money supply and interest rates to curb the increase in inflationary forces. Once again, this allows policymakers to gauge the excess liquidity relative to the demand of the economy. For the money supply, management is essential to ensure either economic growth or expansion.

This means that when the supply of money is adequate enough, firms and individuals can use the money borrowed to supplement their consumption and productive activities, ensuring employment and overall economic activities. For financial stability reasons, the demand for money relationship needs to be understood. It allows the SBP to predict and track any financial crisis by keeping the liquidity of the banking sector adequate enough to meet the depositor's requests without disturbing the ongoing lending. With time, Pakistan's banking industry, financial markets, and economic structure have all evolved. The monetary policy frameworks and tools used by the SBP have changed with these changes in money demand patterns (State Bank of Pakistan, 2020).

Ahmed et al. (2012) argued that trade-related concerns may be relevant in determining the cash held while discussing the fluctuations in exchange rates on money demand in Pakistan. Krol (2014) claims that uncertainty in economic policy impacts the shifts in the exchange rate. Instead, high uncertainty is probably going to lead to more shifts in the exchange rate. From the uncertainty of the economy, businesses severely reduce order placements for foreign supplies since their goal is to obtain more stockpiles available for them. Consequently, a decrease in international trade would outweigh the decline in domestic activities. Then, trade and economic uncertainty will be inversely related. Economic uncertainty is especially high during recessions, elections, and monetary policy surprises. Hussain and Rashid (2016) have established that the economic growth of Pakistan benefits through several channels: as the economy grows, so does the need for money. Indeed, beyond the mere upset to future investment plans, another influential factor affecting nations' capability to operate well in economic terms is policy uncertainty pertaining to investment choices (Bloom, 2009; Villaverde et al., 2015; Mumtaz & Surico, 2018).

This may cause a change in the household as well as business behaviour and then lead to an effect on the gross domestic product of the entire nation since it might create changes in the demand for money. Qayyum (2006) indicates that interest rates for money demand play an extremely crucial role in Pakistan and the uncertainty of the economy holds importance at times of interest rate where consumers have their savings stored more in cash due to declined rate of interest rate. According to Khan and Ahmed (2017), economic agents prefer holding money to reduce risks associated with unforeseen economic situations. This may be part of the reason why precautionary money demand in Pakistan is increasing. People in Pakistan save more money as a hedge against potential economic shocks. Hence, economic confidence and expectations play a significant role in influencing money demand during uncertain periods (Ahmed & Ali, 2017). Although transitional demand for money might decline during economic downturns, total demand for money may remain consistent or even rise, spurred by precautionary motives in Pakistan (Farooq & Hussain, 2018).

From the perspective of economic development, the relation between money demand with economic uncertainty is mostly emphasized. The paper tries to put some empirical evidence forward on money

demand as a facilitating factor in dampening the effects of economic uncertainty on the growth of the economy in Pakistan.

2 Literature Review

Economists have been concerned about the relationship between money demand and economic uncertainty, especially in developing countries like Pakistan. This is triggered by several things, including changing economic policies, unstable political conditions, and even the state of the world economy. The following research was done by reading the existing literature on how economic uncertainty affects money demand studies in Pakistan. Interest rates, income levels, and general economic conditions all impact the demand for money (1936). For Keynes, there are three reasons why people want money: speculative, precautionary, and transactional. Preconditioned demand for money will increase with more uncertainty, as people and businesses will want to keep more liquid assets in case of impending financial turbulence. Using various estimation techniques, Khan (1982) estimated the money demand function of Pakistan and six developing Asian countries. The results for Sri Lanka, Korea, and Pakistan suggested that there was an actual significant association between money demand and inflationary expectations. In the case of Pakistan, the paper also showed that the opportunity cost of money required there is determined by the rate of interest.

Qayyum (2006) analyzed the dynamic relationship between interest rates and money demand in Pakistan. It is concluded that this cash preference over all other financial assets reduced the sensitivity of money demand to interest rates at times of economic uncertainty. Khan and Ahmed (2017) showed that consumers as well as corporations expanded their ownership of liquid assets during periods of increased uncertainty while using time series data from 1980 to 2015 for Pakistan. Therefore, economic uncertainty in Pakistan raises the demand for funding preventive measures

Farooq and Hussain (2018) measured the impact of economic uncertainty on speculative and transactive money demand in Pakistan. They found that transactional money demand declined with increased uncertainty, yet speculative demand rose sufficiently to uphold demand for money at a balanced level. Ahmed and Ali (2017) analyzed how money demand in Pakistan responded to expectations and economic confidence. In the process, when people and firms sought lower potential risks, their demand for money was found to surge significantly during low economic confidence.

Asghar et al. (2017) aimed to investigate the relationship between economic uncertainty and demand for money. Using time series data from 1991 to 2015, the study reflected that economic uncertainty greatly influenced the demand for cash in Pakistan; people and companies hoard fewer liquid reserves during uncertain times in the economy. Akbar (2021) tested the hypothesis of the demand for money. The study investigated the effects of inflation uncertainty and exchange rate volatility on demand for money. The data employed was 1976-2027 for Pakistan. The study identified inflation uncertainty as the most important determinant of money demand. Khan, Adil and Hussain (2023) conducted an empirical analysis to observe the impact of economic, monetary and stock market uncertainties on money demand and found a long-run relationship of money demand with all sorts of uncertainties in India.

The results of the study show that individuals and businesses are more likely to hold cash when economic uncertainty is higher. This implies that Pakistan's liquidity demand is highly influenced by the level of economic instability. These analyses underscore the need for policymakers to understand the extent to which Pakistani demand for cash is affected by financial instability when designing financial plans.

3 Methodology

Current research on the relationship between economic uncertainty and money demand relies upon the Keynesian theory of money demand. According to Keynesian theory (1936), people prefer cash because they keep it for three different motives, which are different from those held for bonds and other assets. These are transactional, cautious, and speculative goals. When Keynes combined the three reasons people hold money balances, he created what he called a liquidity preference function: a demand for real money balances. Transaction Motive: According to Keynes, people assume that carrying currency makes daily transactions easier and more convenient. Keynes also believed that people save money in case they have unanticipated bills. This is known as the precautionary motive. He asserted that people's income would also correlate with the degree of their demand to keep precautionary cash holdings. Speculative motive: According to Keynes, money was kept as a reserve of wealth due to speculative reasons. Yet another scientific basis is presented in the form of the quantity theory of money, first released by classical economist Irving Fisher (1911). As explained by Professor Fisher, other things remaining constant, when the quantity of money rises, prices rise proportionately and the value of money falls. He argues that the overall level of money in an economy is derived from the desire for money to buy goods and services. The effect of economic uncertainty on the demand for money can be studied using a quantitative research approach. To determine the degree of economic uncertainty during a certain period, one feasible way is to examine empirical data on important economic variables, including GDP, inflation, interest rates, the effective exchange rate, and trade. The following mathematical model can be used:

MD=f (WUI, GDP, INF, ER, TO, IR)

Where MD is the real money demand (M2), GDP is Pakistan's actual gross domestic product, INF denotes inflation which is represented as inflation at consumer prices, ER denotes exchange rate which is the real effective exchange rate, EU denotes economic uncertainty which is measured by economic uncertainty index, TO denotes trade openness Trade is the sum of imports and exports of goods and services measured as the share of gross domestic product, IR denotes interest rate. By taking the natural log of the primary function, we get a linear form corresponding to the expected exponential form of the process.

$$MD= \alpha_1+ \alpha_2 WUI_t+ \alpha_3 GDP_t + \alpha_4 INF_t + \alpha_5 ER_t + \alpha_6 TO_t+ \alpha_7 IR_t + \varepsilon_t$$

Where $\boldsymbol{\alpha_1}$ is the intercept, α_2, α_3, α_4, α_5, α_6, and α_7 elasticity, and $\boldsymbol{\varepsilon_t}$ is the independent and identically distributed disturbance term. The **"t"** is substituted for the economy of Pakistan, studies using time series data spanning 1990-2022

The theoretical framework of money market stability is that there are two main forces of any market that will stabilize or unstable the market, which are demand and supply. In the short run supply of money is fixed, so the stability or instability of the market depends on money demand. If the demand for money is high and shifts the curve upward, it will result the instability.

3.1 Unit Root

Generally, unit root testing is applied to time series data. One can determine that if a variable has unit roots through the methods of unit root testing, then if that is so, a time series variable is not stationary. This prevents regression from being misleading in time series analysis. This will encompass most protocols and techniques that are widely used in unit root testing, including the Augmented Dickey-Fuller (ADF) test, Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The authors of the augmented Dickey-Fuller test are Wayne A. Fuller and David A. Dickey. The Dickey-Fuller test was first proposed in their seminal 1979 paper. In a 1981 study, they extended it to include higher-order autoregressive processes in the ADF test. The ADF test is widely used at the beginning of econometrics and time series analysis to ensure the stability of the variables before any specific statistical models are estimated and tested.

3.2 Co-integration Test (Long-Run Impact)

Granger (1981) introduced the concept of co-integration. Johansen (1988, 1991, 1995a); Phillips and Ouliaris (1990); Stock and Watson (1988); Phillips (1986, 1987) and Engle and Granger (1987) made more contributions to this topic. All these efforts dealt with the case where only one co-integration vector exists in a bivariate system. Engle and Granger (1987) define co-integration technically for two variables and Engle Engle-Granger method involves the following steps:

Step 1: Estimate the long-run relationship using OLS; regress one variable on the other.

$Y_t = \alpha + \beta_1 x_{1t} + \beta_2 x_{2t} + \ldots\ldots + \beta_n x_{nt} + \varepsilon_t$

Where Y_t is the dependent variable, x_{1t} is the independent, α is the intercept, βs are the coefficients, and ε_t is the error term.

Step 2: Perform a unit root test on the OLS regression.

If residuals are stationary, the variables are co-integrated, indicating the long-run equilibrium relationship.

To improve the limitations of the Engle-Granger procedure, Johansen and Juselius produced more refined co-integration test models in 1988 and 1990. The one used by Johansen (1988) has become so widely used that it is available on many econometric software programs. The concept of the testing method begins with the association between the rank and the unique roots of the matrix. Unlike other co-integration tests, such as the Autoregressive Distributed Lag Techniques, the Engle and Granger, and others, Johansen co-integration is often used and is usually considered better. In order to discover long-term relationships among the relevant variables, the co-integration techniques, as proposed by Autoregressive Lag (ARDL), have been used in this study.

3.3 Autoregressive Distributed Lag Model (ARDL)

In the short and long runs, the autoregressive distributed lag model would be employed with an extension in the order of integration. An OLS-based procedure for level relationships testing time series, which are autoregressive distributed lag and non-stationary with a mixed order of integration, would fully benefit from using an ARDL model.

3.4 Error Correction Model (Short Run Dynamics)

If the variables are I (I) and there exists a co-integration relationship, it is possible to formulate an Error Correction Model (ECM). Take into account the following bivariate relationship

$Y_t = \alpha + \beta_1 x_{1t} + \epsilon_t$

In 1987, Engle and Granger introduced a theorem that shows the relationship between co-integration and the Error Correction Model (ECM). According to Gujarati (2004), the ECM is a variant of the regression model, and it incorporates short-run dynamics by further including an error correction term that allows for how quickly the dependent variable returns to equilibrium after a shock in the independent variable.

The general form of an ECM is:

$\Delta y_t = \alpha + \gamma \Delta x_t + \lambda (y_{t-1} - \beta x_{t-1}) + \epsilon_t$

Where Δy_t represents the change in the dependent variable, Δx_t represents the change in the independent variable, $(y_{t-1} - \beta x_{t-1})$ is the error correction term, representing the deviation from long-run equilibrium, λ is the coefficient that measures the speed of adjustment back to the equilibrium, γ represents the short-run impact of changes in the independent variable on the dependent variable, ϵ_t is the error term.

4 Results and Discussion

A moderating feature of time series data, dominated by stochastic trends and examined by the Augmented Dickey-Fuller (ADF) test, determines the stationarity of variables. The orders of integration for the respective series are reported in Table 4.1.

Table 4.1

ADF Unit Root Test (At Level)

Variables	With Trend	Probability	Without Trend	Probability
MD	-2.1013	0.5256	0.0454	0.6900
WUI	-4.8316	0.0025***	0.4640	0.8089
GDP	-1.4167	0.8371	8.8286	1.0000
INF	-5.5805	0.0004***	-3.1460	0.0026***
ER	-2.3677	0.3880	-1.2379	0.1936
IR	-3.4945	0.0618*	-3.2594	0.0020***

From Table 4.1, it can be observed that trade, GDP, and money demand in Pakistan are non-stationary at level I (0). Consequently, the p-value of commerce, GDP, and money demand is more significant than the level of significance. In Pakistan, the three independent variables inflation, interest rates, and uncertainty attain level I (0), where they are stationary and significant. The table shows that the p-value at level I (0) is lower than the given significance level of 0.05. Thus, the order of stationarity for MD, TO, and GDP is zero. The p-values of ADF statistics for WUI, INF, and IR are greater than the given level of significance of 0.05. Hence, WUI, INF, and IR are stationary at level I (0).

Table 4.2

ADF Unit Root Test (At First Difference)

Variable	I(0)	Prob.	I(1)	Prob
MD	-4.4935	0.0061***	-4.6459	0.0000***
WUI	-6.5378	0.0000***	-6.6124	0.0000***
GDP	-3.2974	0.0866*	-0.2828	0.5756
INF	-6.4936	0.0000***	-6.6989	0.0000***
ER	-4.2224	0.0116**	-4.2566	0.0001***
MD	-4.4935	0.0061***	-4.6459	0.0000***

The results reported in Table 4.2 indicate that Pakistan's trade, GDP, and money demand are all at level I (1). The other exogenous variables, WUI, INF, and IR, also become stationary at level I (1), but the p-value is less than the significance level. Table 4.2 indicates that at level I (I), the p-value is less than the significance level of 0.05. Because the variables have mixed-order co-integration, the ARDL method is suitable for estimating the models. The variables are co-integrated according to the ARDL bounds, which is a precondition for using ARDL modelling.

The Bound-testing approach confirms that there is a long-run relationship between the selected variables with the help of the technique of co-integration. With the help of SBC, the lag order has been chosen as one. Table 4.3 presents the findings of the Bound test for the existence of co-integration:

Table 4.3

Bound Test

Test statistics	Value	Significance	I (0)	I (I)
F- Statistics	7.134914	10%	1.99	2.94
		5%	2.27	3.28

The bound test for co-integration is now applied to the suggested model. WUI, INF, ER, IR, TO, and GDP are the six independent variables, and money demand is one of them. The F-statistic value of the model is greater than the upper bound value at the 5% level of significance, according to the data in Table 4.4. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which says

that there is long-run co-integration among the variables. It also shows how any given model can be used to predict estimates for the near and long term. The preceding section explained the applicability of the ARDL method for modelling. In this section, we use ARDL modelling to present both short- and long-term estimates. Since we can analyze both short- and long-term estimates, we begin by estimating long-term estimates for the research model.

Table 4.4

Long Term Estimates

Variables	Coefficients	Std. Error	T- statistics	Probability
WUI	0.0005	0.0002	2.545	0.0257
GDP	-1.4025	-1.6752	6.2389	0.0000
INF	-0.6322	0.2132	-2.9651	0.0118
ER	0.2695	0.0799	3.3699	0.0056
IR	-0.0443	0.0518	-.08551	0.4092
T	0.3220	0.2197	1.4625	0.1686
C	3.7809	9.5169	0.3972	0.6981

Long-term estimates are presented in Table 4.4, whereas Table 4.5 reports the short-run dynamics.

Table 4.5

Short-Run Estimates

Variables	Coefficients	Std. Error	t-statistics	Probability
D(MD(-1))	0.045509	0.067938	0.669867	0.5156
D(MD(-2))	-0.229921	0.070944	-3.240887	0.0071
D(WUI)	-0.000124	3.63E-05	-3.409559	0.0052
D(WUI(-1))	0.000223	3.78E-05	-5.88572	0.0001
D(GDP)	-1.01E-10	3.44E-11	-2.928039	0.0126
D(GDP(-1))	-1.60E-10	4.11E-11	-3.888469	0.0022
D(INF)	-0.235962	0.019624	-12.02387	0.0000
D(INF(-1))	0.158471	0.025780	6.147056	0.0000
D(TO)	0.149846	0.090290	1.659619	0.1229
D(TO(-1))	0.608660	0.092411	6.586433	0.0000
CointEq(-1)*	0.589562	0.062016	-9.506607	0.0000

R-squared = 0.9705, Adjusted R-squared = 0.9551, S.E. = 0.8720, SSR = 14.4495, DW statistics = 2.5671

This model takes into consideration the influence exerted by GDP, uncertainty and other exogenous factors on Pakistan's demand for money. The main variable of Pakistan's uncertainty index has a positive contribution to its demand for money. Money demand and GDP have a positive and statistically significant relationship (6.238). The need for money is negatively affected by inflation, which also significantly affects -2.965. The need for money is positively affected by the exchange rate with an effect of 3.369. Utilizing the ARDL method, the short-run estimation assesses how independently influencing factors impact Pakistan's money demand in the short-run period. We consider Pakistan's uncertainty, real interest rate, GDP, exchange rate, trade, and inflation using the ARDL short-run error correction model (ECM). We explain how the risk of models in their short-run period can be changed through an ARDL error correction model. Table 4.4. Based on the ARDL model, several factors affecting the short-term dynamics of the Pakistani economy have been depicted. The short-term ARDL (ECM) for Pakistan's demand for money is as follows in Table 4.5. Uncertainty is one of the many supporting elements that have a short-term influence on Pakistan's demand for money, as depicted in the above table.

Many aspects are reflected in the rows of the table. It is observable how much each variable affects demand for money in the second column. The model shows that the negative coefficients for D (INF)

and D (WUI) negatively impact the demand for money. The t-statistics and p-values are significant for making statistical conclusions, and the reliability of the coefficients increases as the confidence interval is reduced. The Error Correction Term Coint. Eq. (-1) is the most significant coefficient in this model with a value of -0.5895, showing how fast the economy returns to long-run equilibrium after any short-run shock. It is therefore the most important part of the model because it enables a comprehensive understanding of the economic process by integrating short-run dynamics with long-run equilibrium. The high R-squared and Adjusted R-squared values at 0.97058 and 0.955101, respectively, show that the model has goodness of fit, thereby explaining a large proportion of the variability in the dependent variable. Other evidence for the model adequacy is provided by the Durbin-Watson statistics at 2.567197, which reveal that the residuals are not autocorrelated and thus the regression coefficients are reliable.

5 Conclusion and Policy Implications

The uncertainty has increased dramatically worldwide over the last few years. This research explores the elements that impact economic uncertainty and the rise in demand for money in Pakistan. The study conclusions show that a stable money market is essential for a growing economy because it promotes demand for money. The initial step involved assessing the stationarity of the time series using the Augmented-Dickey-Fuller (ADF) test. In Pakistan, we utilize the Keynesian theory of demand due to the presence of money market instability caused by uncertainty in the economy.

In times of uncertainty, the SBP could adopt a more tightening monetary policy to curb inflation and reduce speculative demand for money. Introduce a tax or penalty on large cash withdrawals. This would discourage individuals and businesses from keeping large sums of cash outside the formal banking system, thus reducing the overall demand for money. By increasing foreign exchange reserves, the SBP can create a safety net to protect the economy from outside shocks, which helps reduce the impact of currency fluctuations on the demand for money. A stable money market allows for less costly government borrowing of money, and this lowers the debt burden while creating efficient fiscal management. The SBP should step in and act in the foreign exchange market when needed to help stabilize the rupee, prevent large swings in its value, and keep investors confident.

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