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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 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.

Keywords: Demand for money, economic uncertainty, money market, interest rate, inflation

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1. Introduction

Many factors influence the demand for money, including trade, GDP, inflation, technology, uncertainty, and exchange rates. This study examines how economic uncertainty affects money demand in Pakistan. Several conceptual and methodological frameworks, analytical tools, and models can be used to analyze the relationship between economic uncertainty and money demand. Sriram (1999) reviews theoretical and empirical approaches to money demand, providing a foundation for examining its role in monetary analysis. A stable money demand function helps policymakers interpret changes in monetary aggregates in relation to output, inflation, interest rates, and prices. Therefore, the stability of this relationship matters for assessing the effectiveness of the central bank's monetary policy framework.

Based on Khan and Qayyum (2007), trade openness in Pakistan affects inflation dynamics, which may indirectly influence money demand. Financial development is closely linked to trade openness, as international transactions require an effective financial infrastructure. Improved borrowing and investment opportunities, enabled by more efficient financial intermediaries, may also influence the composition of money holdings. Similarly, financial development can affect the relationship between monetary aggregates and economic activity. Jalil, Feridun, and Ma (2010) examine the finance–growth relationship in China using principal components and ARDL bounds tests. Their study provides methodological context; however, its findings do not constitute direct evidence about money demand in Pakistan.

Advances in financial inclusion and technology may also influence money demand by changing access to banking and payment services. Agha and Khan (2006) discuss money demand and inflation in Pakistan, a relationship relevant to understanding the purchasing power of monetary balances. Income levels and the organization of economic activity may also shape the amount and composition of money held. Arby, Malik, and Hanif (2010) examine the informal economy in Pakistan, providing context for the distinction between recorded financial activity and informal transactions. Urbanization may similarly alter transaction patterns and access to financial services. Anwar and Asghar (2012) address the stability of money demand in relation to monetary and fiscal variables. These considerations provide background to the present analysis rather than separately estimated effects of population, urbanization, or technology.

Money demand is important for monetary policy decisions and for Pakistan's economic stability, particularly in relation to economic growth and inflation. For the State Bank of Pakistan (SBP), monetary aggregates can provide information about liquidity conditions when interpreted alongside income, prices, and interest rates. Changes in money supply and interest rates may influence borrowing, spending, and portfolio decisions; however, these relationships do not imply that the central bank can satisfy every desired money holding without consequences for prices or financial conditions. Understanding money demand therefore helps policymakers assess whether observed liquidity reflects transaction needs, precautionary holdings, or other influences. Managing monetary conditions requires attention to these distinctions when supporting economic activity and addressing inflationary pressures.

When financing conditions are supportive, firms and individuals can use borrowed funds to supplement consumption and productive activities, supporting employment and economic activity. For financial stability, the relationship between money demand and supply also needs to be understood. Monitoring this relationship may help the SBP assess liquidity pressures and deposit withdrawals without assuming that monetary aggregates alone can predict financial crises. Over time, Pakistan's banking industry, financial markets, and economic structure have evolved. The SBP's monetary policy frameworks and tools have changed alongside these developments and shifts in monetary conditions (State Bank of Pakistan, 2020). Therefore, historical relationships between money holdings and their determinants require empirical examination rather than an assumption of permanent stability.

Ahmed and Ali (2012) discuss exchange-rate volatility and money demand in Pakistan, suggesting that external-sector conditions may be relevant to money holdings. Krol (2014) links economic policy uncertainty with exchange-rate volatility. Higher uncertainty may therefore influence the relative attractiveness of domestic money and alternative assets. Businesses may also postpone imported inputs or adjust inventories when future demand and costs are difficult to predict. However, the direction and magnitude of changes in trade cannot be inferred from uncertainty alone. Economic uncertainty may intensify during recessions, elections, and unexpected monetary policy changes. Hussain and Rashid (2016) examine trade openness and economic growth in Pakistan, providing context for the relationship

between external integration and domestic activity. In addition, uncertainty surrounding investment decisions can influence economic adjustment and spending (Bloom, 2009; Fernández-Villaverde, Guerrón-Quintana, Kuester, & Rubio Ramírez, 2015; Mumtaz & Surico, 2018).

These developments may change household and business behavior and, in turn, the level of economic activity and demand for money. Qayyum (2006) discusses money demand in Pakistan, highlighting the relevance of conventional monetary determinants. Interest rates represent an opportunity cost of holding money, although the response may depend on the composition of the monetary aggregate. According to Khan and Ahmed (2017), economic agents may prefer liquid holdings to reduce exposure to unforeseen economic conditions. This provides a possible explanation for precautionary money demand during uncertain periods. Economic confidence and expectations may similarly influence money holdings in Pakistan (Ahmed & Ali, 2017). Although transaction demand may decline during an economic downturn, precautionary motives may partly offset that decline, allowing total money demand to remain stable or increase (Farooq & Hussain, 2018).

From an economic development perspective, the relationship between money demand and economic uncertainty has implications for interpreting monetary conditions. This paper examines the short- and long-run relationship between economic uncertainty and money demand in Pakistan over 1990–2022, while accounting for income, inflation, the exchange rate, trade openness, and the interest rate. The central research question is whether uncertainty has different relationships with money demand over the short and long run. The analysis adds country-specific evidence to monetary policy discussions; however, it does not directly estimate whether money demand moderates uncertainty's effect on economic growth.

2. Literature Review

Economists have been concerned about the relationship between money demand and economic uncertainty, especially in developing countries such as Pakistan. This concern reflects changing economic policies, political conditions, and developments in the world economy. The literature reviewed here considers how these influences interact with income, interest rates, and other determinants of monetary holdings. Keynes (1936) distinguishes three motives for holding money: transaction, precautionary, and speculative motives. Precautionary demand may increase with uncertainty as households and businesses seek liquid resources against unexpected financial needs. However, lower spending and investment may simultaneously reduce transaction demand. Using various estimation techniques, Khan (1982) examines permanent income, inflation expectations, and money demand in developing countries. This work places income and the opportunity cost of holding money at the center of the money demand function. Therefore, uncertainty needs to be considered alongside conventional determinants rather than as an isolated influence on monetary behavior.

Qayyum (2006) examines money demand in Pakistan, providing a basis for discussing the dynamic relationship between monetary holdings and their conventional determinants. A preference for liquid assets may affect sensitivity to interest rates during uncertain periods; however, such a mechanism needs to be distinguished from a directly estimated uncertainty effect. Khan and Ahmed (2017) report that households and corporations increased liquid holdings during periods of heightened uncertainty, using time-series data for Pakistan from 1980 to 2015. This account emphasizes precautionary balances as a means of meeting unexpected expenditure. Therefore, uncertainty may raise the desire to retain accessible funds, even when weaker economic activity reduces transaction-related requirements.

Farooq and Hussain (2018) discuss the relationship between economic uncertainty and speculative and transaction demand for money in Pakistan. Their account suggests that declining transaction demand can coexist with increased holdings motivated by uncertainty. Similarly, Ahmed and Ali (2017) examine money demand in relation to expectations and economic confidence. These perspectives connect changes in monetary holdings with households' and firms' responses to perceived financial risks. However, the balance between transaction and precautionary motives may vary over time. Consequently, the net relationship between uncertainty and aggregate money demand is an empirical question rather than an automatically positive response in every period.

Asghar, Fahad, and Ahmed (2017) investigate the relationship between economic uncertainty and money demand using time-series data for Pakistan from 1991 to 2015. Their reported findings indicate that uncertainty can be associated with lower liquid reserves, a finding that differs from a simple precautionary-demand explanation. Akbar (2023) examines the effects of inflation uncertainty and

exchange-rate volatility on money demand in Pakistan using annual data for 1976–2017 and Bayesian econometric analysis. This approach considers uncertainty alongside conventional determinants and addresses parameter instability through Bayesian inference. In addition, Khan, Adil, and Husain (2023) examine economic, monetary, and stock-market uncertainty in India. They report a long-run relationship between money demand and these uncertainty measures. Together, these studies show why the definition of uncertainty, the monetary aggregate, and the estimation framework matter when comparing findings across countries and periods.

The literature suggests that individuals and businesses may increase liquid holdings when uncertainty strengthens precautionary motives. However, lower transaction activity or a shift toward alternative assets may produce an opposing response. Pakistan's liquidity demand therefore needs to be examined in relation to both economic conditions and the type of monetary asset measured. These distinctions are relevant to policymakers seeking to interpret changes in monetary aggregates during financial instability. The present study focuses on aggregate real M2; accordingly, its findings concern broad money holdings rather than a direct observation of separate household motives or currency hoarding.

A useful distinction in this literature is between the source of uncertainty and the adjustment horizon. Akbar (2023) considers inflation uncertainty and exchange-rate volatility, whereas Khan et al. (2023) distinguish economic, monetary, and stock-market uncertainty. These measures capture related but different conditions and need not yield identical money demand responses. The present analysis examines the uncertainty indicator alongside conventional macroeconomic determinants within a single-country framework. Its contribution is therefore assessed through the estimated short- and long-run relationships, with attention to the limitations of aggregate monetary data. This comparison also avoids treating findings from India as direct evidence for Pakistan or assuming that every uncertainty measure represents the same underlying mechanism.

3. Methodology

The analysis of economic uncertainty and money demand draws on the Keynesian theory of liquidity preference. According to Keynes (1936), people hold money for transaction, precautionary, and speculative purposes, reflecting considerations that differ from those associated with bonds and other assets. The transaction motive concerns the use of money for routine purchases and payments. The precautionary motive concerns liquid balances retained for unexpected expenditure, with income influencing the capacity and need to maintain such reserves. The speculative motive concerns the choice between money and alternative stores of wealth in response to expected returns and asset prices. Together, these motives explain why uncertainty may alter desired money holdings without producing the same response in every period. A further theoretical perspective is the quantity theory of money associated with Fisher (1911). Under its simplifying assumptions, changes in the quantity of money are related to the price level through the volume of transactions and the velocity of circulation. However, this relationship does not by itself establish a proportional short-run response when output or velocity changes. The present study uses a quantitative time-series approach to examine uncertainty alongside GDP, inflation, the interest rate, the exchange rate, and trade openness. The empirical framework therefore combines conventional determinants with an uncertainty indicator to examine the relationship in Pakistan. The functional specification is expressed as follows:

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

Here, MD denotes real money demand, represented by M2; GDP denotes real gross domestic product; INF denotes consumer price inflation; and ER denotes the real effective exchange rate. WUI denotes the uncertainty index, while TO represents trade openness, measured as the sum of exports and imports of goods and services as a share of GDP. IR denotes the interest rate. This notation distinguishes the uncertainty measure from the exchange rate and other explanatory variables. A logarithmic transformation can provide a convenient representation of proportional relationships for strictly positive variables. However, the interpretation of each coefficient depends on the transformation actually applied to that variable; an equation expressed in levels does not automatically yield elasticities. The corresponding linear specification is presented below.

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

In this specification, $\alpha 1$ is the intercept, $\alpha 2$ through $\alpha 7$ are the slope coefficients, and εt is the disturbance term. The subscript t denotes time, and the study covers Pakistan over 1990–2022. Coefficients represent elasticities only when both the dependent variable and the relevant explanatory variable are expressed in natural logarithms. In a mixed specification, coefficients instead require elasticity, semi-elasticity, or level-based interpretations as appropriate. The disturbance term captures influences not explicitly

included in the equation; its statistical properties are assumptions that require diagnostic assessment rather than consequences of the notation.

The theoretical framework of money market stability considers the interaction between money demand and money supply. With a fixed short-run money supply, a change in desired money balances may create adjustment pressures through interest rates, prices, or portfolio allocation. However, an increase in money demand does not, by itself, establish instability in the estimated money demand function. Stability concerns whether the relationship between money holdings and their determinants remains sufficiently consistent over time. Therefore, the analysis distinguishes changes in desired money holdings from changes in the parameters governing that relationship, while retaining the focus on uncertainty and monetary conditions in Pakistan.

The monetary aggregate requires particular care in interpretation. Broad money includes deposit holdings as well as currency, so an increase in real M2 cannot automatically be described as an increase in cash held outside banks. In addition, a relationship estimated with aggregate time-series data does not reveal whether households and firms adjust in the same way. These distinctions follow from the study's measurement framework and delimit the interpretation of precautionary and transaction motives. Keynes (1936) provides a theoretical explanation of liquidity preference, but the aggregate specification does not directly identify separate behavioral channels.

3.1. Unit Root

Unit root testing is used to examine the time-series properties of the variables before estimating their relationships. A variable containing a unit root is non-stationary in levels, whereas a stationary variable fluctuates around a stable mean or a specified deterministic trend. This distinction matters because regressions involving unrelated non-stationary series can produce misleading statistical relationships. Common procedures include the augmented Dickey–Fuller (ADF), Phillips–Perron (PP), and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests, although the results reported in this study concern the ADF procedure. Dickey and Fuller (1979, 1981) developed the testing framework used to assess a unit-root null hypothesis while allowing for dynamic adjustment through lagged differences. In applying the ADF test, the inclusion of an intercept, a deterministic trend, and lagged terms affects the test specification and its interpretation. Therefore, decisions about stationarity depend on the selected specification and the relevant significance threshold rather than on the sign of the test statistic alone.

3.2. Co-integration Test (Long-Run Impact)

Granger (1981) introduced the concept of cointegration, which concerns a stationary relationship among non-stationary variables. Subsequent contributions include Johansen (1988, 1991, 1995a), Phillips and Ouliaris (1990), Stock and Watson (1988), Phillips (1986, 1987), and Engle and Granger (1987). These approaches differ in their assumptions and in whether they examine a single equation or a system of equations. In particular, Johansen's framework can accommodate multiple cointegrating relationships, whereas the Engle–Granger procedure estimates a single long-run relationship. Engle and Granger (1987) provide a residual-based approach that can be summarized in the following steps:

Step 1: Estimate the *proposed* long-run relationship using *ordinary least squares (OLS), with the dependent* variable *regressed* on the *explanatory variables.*

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

Here, Y_t is the dependent variable, x_{1t} through xnt are the explanatory variables, α is the intercept, the β coefficients describe their estimated relationships with Yt, and εt is the error term.

Step 2: Test the estimated residuals from the long-run regression for a unit root *using* the *appropriate residual-based critical values.*

If the residuals are stationary, the evidence supports cointegration among the variables, indicating a long-run equilibrium relationship despite non-stationarity in the individual series.

Johansen (1988) and the subsequent Johansen and Juselius (1990) framework address cointegration in a multivariate system and allow the cointegrating rank to be investigated. The procedure relates the rank of the long-run coefficient matrix to its characteristic roots and can identify more than one equilibrium relationship. It is therefore conceptually different from a single-equation residual-based procedure. However, no cointegration method is universally preferable; suitability depends on the

integration properties, model specification, and available observations. The present study adopts an autoregressive distributed lag (ARDL) approach to investigate the short- and long-run relationships. The discussion of alternative procedures provides methodological context rather than evidence that all of these tests were implemented in the empirical analysis.

3.3. Autoregressive Distributed Lag Model (ARDL)

The autoregressive distributed lag model is used to examine short- and long-run relationships between money demand and its explanatory variables. The framework includes lagged values of the dependent variable and current or lagged explanatory variables, allowing monetary adjustment to occur over time. An ARDL bounds-testing approach can accommodate regressors that are I(0), I(1), or a mixture of the two, provided that the conditions of the selected procedure are satisfied and no variable is I(2). The distinction between integration order and cointegration is important: integration describes an individual series, whereas cointegration concerns a long-run relationship among series. Lag selection also requires attention to the available sample because additional parameters reduce the effective observations and degrees of freedom.

3.4. Error Correction Model (Short Run Dynamics)

When the variables share a cointegrating relationship, an error correction model (ECM) can describe short-run adjustment toward that equilibrium. The following bivariate relationship illustrates the underlying long-run specification:

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

Engle and Granger (1987) establish the connection between cointegration and error correction. According to Gujarati (2004), an ECM incorporates short-run dynamics together with an error-correction term representing the preceding period's deviation from long-run equilibrium. This distinction allows the immediate relationship between changes in variables to differ from their long-run association. The coefficient on the equilibrium error describes the direction and speed of adjustment under the stated normalization. Consequently, evidence of convergence requires attention to both the sign of this coefficient and the definition of the error-correction term.

The general form of an ECM is:

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

Here, Δy_t represents the change in the dependent variable, and Δx_t represents the change in the explanatory variable. The expression $(yt-1 - \beta xt-1)$ denotes the preceding period's equilibrium error under the simplified representation, with an intercept incorporated where appropriate in the long-run relation. The coefficient λ describes adjustment toward or away from equilibrium, γ represents the short-run relationship, and εt is the disturbance term. With the equilibrium error defined as the dependent variable minus its long-run fitted value, a negative adjustment coefficient is consistent with movement back toward equilibrium. This bivariate equation illustrates the mechanism; the empirical application involves the explanatory variables specified in the money demand function.

4. Results and Discussion

The augmented Dickey–Fuller (ADF) test examines the stationarity of the time-series variables before interpreting the estimated relationships. Table 4.1 reports the level-test statistics and associated probabilities under the stated deterministic specifications.

Table 1: ADF Unit Root Test (At Level)

Variables	With Trend	Probability	No 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***

Source: Calculated by the authors.

Table 4 indicates that the unit-root null is not rejected for MD, GDP, or ER at the 5% significance level in either specification. Inflation rejects the unit-root null in both specifications. For WUI, the trend specification rejects the null, whereas the reported specification without a trend does not. Similarly, the

inference for IR differs across specifications at the 5% threshold, although the trend specification provides evidence at the 10% level. Therefore, the table does not support a uniform classification of all variables irrespective of deterministic terms. An I(0) classification denotes stationarity in levels; failure to reject a level unit root is not itself evidence that a variable is I(0).

Table 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***

Source: Calculated by the authors.

The first-difference results in Table 2 provide evidence of stationarity for MD, WUI, INF, and ER at the 5% level in both reported columns. However, the reported GDP probabilities of .0866 and .5756 do not establish first-difference stationarity at that threshold; the first provides evidence only at the 10% level. The integration classification therefore remains sensitive to the test specification and significance level. A mixture of I(0) and I(1) regressors can motivate an ARDL framework, but it does not establish cointegration by itself. The bounds test addresses the separate question of whether a long-run levels relationship exists, subject to the integration and specification conditions of the procedure.

The bounds-testing approach is used to investigate whether the selected variables share a long-run levels relationship. The reported lag-selection criterion is the Schwarz Bayesian criterion (SBC), and the stated lag order is one. Table 3 presents the bounds-test statistic and the critical values used in the analysis. Interpretation depends on the complete lag specification and the assumptions underlying these critical values.

Table 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

Source: Calculated by the authors.

The bounds test is applied to the proposed money demand model, with WUI, INF, ER, IR, TO, and GDP as the six explanatory variables and MD as the dependent variable. Table 4.3 reports an F-statistic of 7.134914, exceeding the stated upper-bound critical value of 3.28 at the 5% level. Against those reported critical values, we reject the null hypothesis of no long-run levels relationship. However, this inference depends on the appropriateness of the critical values for the deterministic specification, number of regressors, and effective sample size. Cointegration concerns a long-run relationship; it does not establish causal effects or demonstrate forecasting accuracy. The following tables present the estimated long-run coefficients and short-run dynamics, which are interpreted separately because their signs and adjustment patterns may differ.

Table 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

Source: Calculated by the authors.

Long-run estimates are presented in Table 4, whereas Table 4.5 reports the short-run dynamics. The distinction is substantive: long-run coefficients describe the estimated equilibrium relationship, while differenced terms describe changes over the relevant observation period. Statistical significance is assessed using the reported probabilities, and economic interpretation concerns the coefficients rather than their t-statistics.

Table 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

Source: Calculated by the authors.

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

The model examines the relationship between uncertainty, GDP, other explanatory variables, and Pakistan's demand for money. Table 4 reports a positive long-run uncertainty coefficient of 0.0005, with a probability of .0257. This association is consistent with a precautionary-liquidity interpretation; however, aggregate M2 does not directly identify the motives of individual households or firms. The reported GDP coefficient is negative (−1.4025), rather than positive, and therefore differs from the conventional expectation of an income-related increase in money holdings. Inflation has a negative coefficient of −0.6322, while the exchange-rate coefficient is positive at 0.2695. Their reported probabilities are .0118 and .0056, respectively. The interest-rate coefficient is negative but statistically insignificant at the 5% level (p = .4092). The t-statistics describe statistical evidence and should not be interpreted as the magnitude of an economic effect. In the short run, Table 4.5 reports a negative contemporaneous uncertainty coefficient and a positive lagged coefficient. These estimates suggest that adjustment timing matters when comparing immediate changes with longer-run money holdings.

Table 5 separates short-run coefficients from the error-correction term. The contemporaneous coefficients for D(INF) and D(WUI) are negative, whereas the reported lagged coefficients are positive, indicating that immediate and delayed responses need not coincide. The t-statistics and probabilities describe statistical evidence conditional on the model assumptions; they do not independently establish coefficient reliability. The magnitude 0.5895 would imply adjustment of approximately 59% of a preceding disequilibrium within one observation period if the error-correction coefficient were negative under the conventional normalization. A positive coefficient under that normalization would instead indicate movement away from equilibrium. Therefore, the coefficient's magnitude alone cannot support a convergence inference. The reported R-squared and adjusted R-squared values of approximately .9705 and .9551 indicate a close in-sample fit, but do not demonstrate parameter stability, causal identification, or predictive performance. Similarly, the Durbin–Watson statistic of approximately 2.5671 is descriptive here and does not by itself establish the absence of serial correlation in a dynamic model containing lagged dependent variables.

The contrast between the negative contemporaneous uncertainty coefficient and the positive long-run coefficient offers a possible explanation for differing findings across observation horizons. An immediate reduction in transactions may coincide with later rebuilding of liquid balances, although the present model does not separately test those mechanisms. The long-run association can be discussed alongside the precautionary interpretation reported for India by Khan et al. (2023), while Akbar (2023) illustrates the importance of distinguishing uncertainty measures. However, differences in periods, monetary definitions, and specifications limit direct coefficient comparisons. The evidence is most appropriately interpreted as a conditional aggregate relationship rather than proof of a specific household response.

5. Conclusion and Policy Implications

This research examines the relationship between economic uncertainty and money demand in Pakistan from 1990 to 2022. The analysis draws on Keynesian liquidity preference and uses unit-root testing together with an ARDL framework to distinguish short-run changes from long-run associations. The reported estimates suggest a positive long-run relationship with uncertainty and a negative contemporaneous short-run relationship. However, these patterns need to be interpreted in light of the integration evidence, coefficient reporting, and model specification. The study focuses on how money holdings respond to uncertainty alongside conventional determinants; it does not directly estimate the effect of money demand on economic growth. Monetary stability is therefore treated as a policy context rather than a separately estimated outcome.

The policy relevance of the analysis concerns interpreting liquidity conditions during uncertainty. The SBP may benefit from considering uncertainty indicators alongside inflation, income, interest rates, and exchange-rate developments when assessing changes in monetary aggregates. Monetary tightening may be appropriate under some inflationary conditions; however, the present model does not estimate the consequences of a particular tightening decision. Similarly, a tax or penalty on large cash withdrawals raises questions about cash use and formal banking participation, but this paper does not evaluate its effectiveness or distributional consequences. Foreign-exchange reserve accumulation and intervention may be considered within a wider policy framework for external stability; the reported exchange-rate association does not establish their optimal scale or timing. Therefore, these measures are policy considerations that require separate evaluation. The study's direct implication is to distinguish uncertainty-related shifts in desired money balances from changes associated with transaction activity and the opportunity cost of holding money.

Several limitations qualify the interpretation of these findings. The 1990–2022 period provides a limited time span, and lagged terms reduce the observations available for estimation. Model complexity therefore matters for the precision and stability of the coefficients. Real M2 combines monetary assets with different liquidity characteristics, and a single uncertainty indicator cannot capture every source of risk faced by economic agents. In addition, a long-run association does not rule out possible feedback among uncertainty, monetary conditions, and economic activity. These considerations limit how far the estimates can be generalized to other countries or translated into specific policy interventions.

Future research could compare alternative monetary aggregates and uncertainty measures, examine whether the relationship changes across economic episodes, and assess whether uncertainty improves the performance of a conventional money demand specification. Such comparisons would distinguish changes in the composition of money holdings from changes in total desired liquidity. Similarly, comparing models with and without uncertainty could clarify the additional information supplied by the uncertainty indicator. These extensions would develop the present research question while preserving its focus on money demand in Pakistan.

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