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Asymmetric Analysis of Economic and Monetary Uncertainty on Money Demand in Asian Economies

Misbah Nosheen [a], **Alamgir Khan** [a], **Shahzad Ahmad**[b], **Sadia Naz** [c1]

Abstract

This study examines the complex relationship between money demand and economic and monetary uncertainties throughout Asia. It provides insight into how different factors affect money demand in the area by utilizing both linear and non-linear ARDL models. The study shows the importance of short-term uncertainties in the intricate economic environment of Asia by highlighting their significant impact on money demand. But the study also shows that these impacts can differ highlighting the significance of customized analysis for various situations. On a larger scale, it identifies important factors that influence money demand such as interest rates, exchange rates and economic uncertainties. Notably, these factors have varying effects on Asian nations indicating the need for sophisticated strategies. In the end, the study suggests that policymakers concentrate on developing deliberate monetary policies. In order to stabilize money demand in Asia's diverse and changing economic environment, these policies should not only address inflation but also the larger economic uncertainties. Because monetary policy has a direct impact on money demand in many Asian economies, these findings imply that policymakers should concentrate on stabilizing monetary policy in order to control inflation and lower uncertainty.

Key words: Monetary Uncertainty, Economic Uncertainty, Money Demand and Asymmetry
JEL classifications: E41, E44, E52, E58, G15

[1] [a] Department of Economics Hazara University Mansehra, Pakistan. Email: Misbah@hu.edu.pk.
[b] Department of Electrical & Computer Engineering COMSATS Abbottabad
[c] Department of Islamic and Religious Studies, Hazara University Mansehra, Pakistan

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1. Introduction

Since the middle of the 1970s, monetary economics has placed a great deal of emphasis on the stability of the "money demand" (MD) function. The motivation behind this focus is the aim to create a reliable and consistent connection between different measures of monetary aggregates and the factors that influence "money demand". In both the New Classical and New Keynesian models, the MD relation is essential. However, studies like Dixon (1997), Cuthbertson (1991) and Laidler (1985) have shown that empirical evidence regarding the stability of the MD function has been somewhat inconclusive. In order to reduce inflation rates, the Federal Reserve refocused its efforts from managing interest rates to controlling monetary aggregates. This action led monetarist model critics to doubt the reliability of the Quantity Theory of Money (QTM). However, Milton Friedman defended the QTM in 1984 claiming that the spike in inflation was caused by money instability. As a result of this instability, money velocity became unpredictable, and people began hoarding more cash as a hedge against volatile economic futures. Consequently, one important factor affecting the MD function was found to be uncertainty. The MD functions stability is still a major worry in monetary economics primarily because of past changes in monetary policy and the influence of uncertainty on people's choices about how much money to hold.

Since the middle of the 1970s, a major focus of monetary economics has been the investigation of the "money demand" (MD) functions stability. A key component of both the New Keynesian and New Classical models is the MD function. However, studies like Dixon (1997), Cuthbertson (1991) and Laidler (1985) show empirical validation of the MD functions stability has proven to be less than straightforward. World uncertainties for a few chosen countries are shown in Figure 1.2.

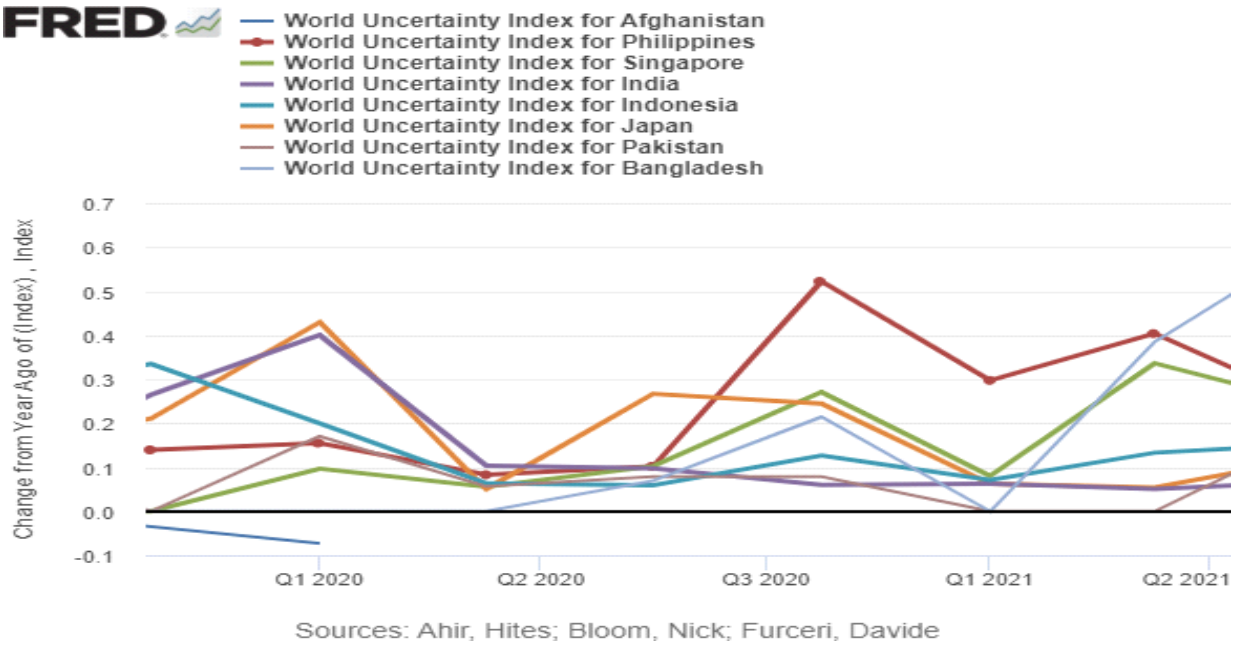

Figure 1.2: World uncertainties for selected countries

Based on "data from the International Monetary Fund (IMF)" for the years 1990–2021, Figure 1. 2 indicates the pattern of the World Uncertainty Index. Higher values on the index indicate higher levels of uncertainty in the world economy. The graph indicates a period of low uncertainty from the start of the dataset, but it also shows a significant rise in global economic uncertainty between 2010 and 2021. Global economic uncertainty significantly increased during this decade. A significant change came about in 1979 when the US in order to fight inflation the Federal Reserve shifted its emphasis from interest rates to monetary aggregates raising questions about the Quantity Theory of Money (QTM). However, Milton Friedman's 1984 defense of QTM contended that the monetary supply (MS) instability which led to unpredictable money velocity and heightened precautionary money holdings because of economic uncertainty which was the cause of the inflation spike. Concern over the stability of the "money demand" (MD) function has persisted throughout history as evidenced by this change in monetary policy and the impact of uncertainty on decisions. Choi & Oh (2003); Alsamara et al. (2017) and Brüggemann and Nautz (1997) conducted studies found that "money demand" is greatly impacted by monetary uncertainty which causes people to hold more cash when economic uncertainty is high Oskooe et.al (2013). Sahin (2018) examined the effects of various sources of uncertainty on

money velocity in fuel-producing economies while it was expanded to include monetary and economic policy uncertainties in emerging economies revealing short-term effects on MD. Baker et.al (2016) as well as Alting et al. (2017) both noted significant increases during economic turmoil (Brüggemann & Nautz 1997; Choi & Oh 2003 and Alsamara et al. 2020) which examined economic policy and general economic uncertainty [Sahin 2018; Alting et al. 2016; 1984 Friedman 2020)]. It is noteworthy though that these studies generally assumed that the effects of uncertainty on "money demand" were symmetric meaning that higher uncertainty results in higher "money demand". This may not always be the case though as people's reactions can be influenced by their expectations regarding how permanent changes in uncertainty will be. For instance, if they believe that the reduction in uncertainty is only temporary, they might not increase their cash holdings at the same pace. By performing an extensive analysis of "the impact of monetary and economic uncertainty on demand for money" in a sample of Asian economies including those in Bangladesh, China, Japa, India , Singapore, Indonesia, Malaysia and the Philippines, this study fills a significant scientific vacuum. By employing an asymmetric methodology that takes into account both immediate and long-term impacts, this study sheds light on the complex interplay between these factors. Extending the historical background presented by Oskooee and Kones (2014) who covered about the US, this study explores these dynamics within the context of South Asian economies including the Federal Reserve's 1979 policy shift and the subsequent criticism of the Quantity Theory of Money (QTM) as well as Milton Friedmans (1984) defense of the QTM by attributing higher inflation to monetary supply instability and increased perceived uncertainty.

This research, which covers a sizable dataset spanning three decades from 1990 to 2020, provides governments and policymakers with insightful information that helps them create effective policies that address the complex factors influencing "money demand". Using an asymmetric analytical approach the study aims to evaluate how monetary and economic uncertainty affects the demand for money in a few Asian countries.

2. Literature Review

Numerous studies have examined the connection between monetary and economic uncertainty and how it affects the demand for money in a variety of nations with differing results. A key

point of reference in later literature Bloom (2014) introduced the idea of Knightian uncertainty which describes circumstances in which economic agents face uncertain and assessable future events. Knightian uncertainty encapsulates situations in which people and organizations are unable to predict or assess future economic conditions, upsetting expectations and preventing well-informed decision-making. People who are faced with uncertainty about their future earnings, for example might decide to put off spending and save more money, a practice known as precautionary saving. This demonstrates how behavioral changes brought about by economic uncertainty affect "money demand". The relationship between "money demand" and economic policy uncertainty (EPU) has gained attention in recent studies due to its importance in creating efficient monetary policies. Advanced econometric tools are being used more and more in recent studies to investigate how EPU asymmetrically influences "money demand" across nations. The impact of changes in policy-related uncertainty on "money demand" in China was evaluated by Bahmani-Oskooee and Aftab (2022). Their analysis which made use of both linear and nonlinear ARDL methodologies showed that long-term cash holdings drastically increase as uncertainty rises. However, there was no discernible shift in the demand for money as uncertainty decreased. According to these findings monetary preferences exhibit nonlinear behavior with people and institutions responding more strongly to increasing uncertainty than to decreasing risks. Expanding the scope of the study to include developed economies Nusair et al. used a nonlinear ARDL model in 2024 to examine the effects of Economic Policy Uncertainty (EPU) on "money demand" "in Canada Japan the United Kingdom and the United States." The study discovered notable differences between the countries. In particular a rise in uncertainty caused "money demand to rise in the US and Japan but fall in Canada and the UK".

In contrast "money demand" increased in Canada and the UK but decreased in the US when uncertainty decreased Japan showed no discernible change. These results highlight how important it is to customize monetary policies for each nation taking into account the various ways that uncertainty can asymmetrically affect economic activity. Oskooee et.al (2012) investigated how "money demand" was affected by economic and financial uncertainty across several nations. According to their findings people modified their holdings between cash and other assets when uncertainty factors increased with noticeable short-term consequences. These

changes however did not last over time underscoring how temporary uncertainty's effects on "money demand" are. Oskooee (2011) investigated the demand for money in Australia in a follow-up study that used GARCH models to incorporate measures of financial and economic uncertainty. In contrast to previous research this study discovered that both forms of uncertainty had both immediate and long-term effects on Australia's M3 "money demand". Bahamani (2015) investigated how Thailand's "money demand" was impacted by both monetary and economic uncertainty. According to the study, peoples' portfolios of cash and other financial assets were rebalanced in response to monetary and economic uncertainty which were identified by changes in nominal monetary aggregates such as M2 and real GDP volatility respectively. Perceptions of risk had an impact on these changes some chose to increase their cash holdings as a hedge while others sought to protect themselves from price swings by holding less hazardous physical assets. This study found that uncertainty affected "money demand" in both the short and long term.

Oskooee et al. (2017) investigated how economic and financial uncertainty impacted "money demand" in Korea. Utilizing GARCH models, they included two measures of uncertainty in their analysis. The study uncovered short-term significance for both measures, but only the adverse effects of output uncertainty persisted over time, resulting in a stable "money demand" function. The complicated "relationship between money demand and exchange rates" was clarified by Khan and Shafiq's (2022) "analysis of the effects of Pakistan's real effective exchange rates on currency demand from 1974 to 2019." Although a lot of research has focused on the positive "relationship between exchange rates and money demand" this study took into account possible negative effects which further complicated the dynamics of "money demand". Economic and monetary uncertainty and "money demand" have a complex and nuanced relationship as this thorough literature review highlights. To obtain a comprehensive understanding of how these uncertainties impact "money demand" dynamics across different nations it is important to take into account a variety of economic indicators and models.

3. Methodological Approach

This section of the study focuses on the methods and strategies used to look into how monetary and economic uncertainty affects "money demand" (MD).

Asymmetric Analysis of Economic and Monetary Uncertainty on Money Demand in Asian Economies

3.1 Theoretical Framework

Keynes (1936) proposed that people hold money as a store of value and as a way to facilitate transactions which helps us understand why people choose to save money. Keynes believed that a key component of the "money demand" (MD) relationship was income. An additional "opportunity cost of holding real money balances" was the interest rate. Higher interest rates according to Tobin (1956) and Baumol (1952) had a deterrent effect on the motivation to hold onto cash which was consistent with Keynes (1936). Consequently, the following is an expression for the traditional "money demand" function.

MD=f(Y,i)

Where:

MD represents "money demand".

Y denotes income, reflecting the transactionary aspect.

i signifies the interest rate, representing the opportunity cost of holding money.

This framework forms the basis for understanding how economic and monetary uncertainties can influence the demand for money. The study investigates whether these uncertainties introduce additional factors that modify the conventional MD function.

M

$P = m = \beta i(y, r)$ —

In the context of the theoretical framework, we can express the "money demand" (MD) function as follows:

M=P·m(Y,r)

M represents the nominal money balance.

P is the price level.

m(Y,r) denotes the demand for real money balance, which is a function of income (Y) and the interest rate (r).

It's worth noting that ∂>0∂Y∂m>0 signifies that as income increases, the demand for real money balance also rises, indicating a positive relationship with income.

Additionally, ∂<0∂r∂m<0 suggests that as the interest rate increases, the demand for real money decreases, reflecting a negative association with the interest rate.

Sakib (2021) emphasized the significant role of inflation and interest rates in various economic theories. Lower interest rates encourage more individuals and businesses to borrow funds, resulting in increased spending and economic growth. Conversely, higher interest rates prompt individuals to save more, leading to reduced spending, economic slowdown, and lower inflation. This dynamic relationship between fluctuating interest rates and inflation influences current fiscal policies, impacting the overall economic trajectory. In essence, there exists a linear relationship between interest rates and inflation, where falling interest rates stimulate borrowing and spending, ultimately fueling economic growth and inflation. Conversely, rising interest rates encourage savings, curbing spending, and potentially leading to economic stagnation.

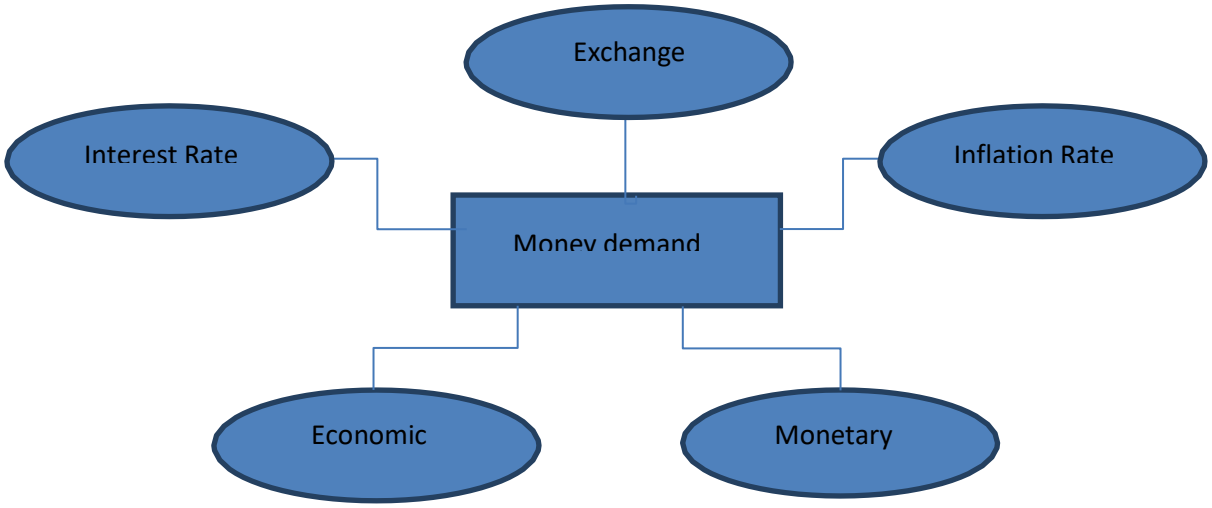

Figure 3.1: Conceptual Framework

In this analysis, “money demand” (MD) serves as the dependent variable, while explanatory variables encompass interest rates, exchange rates, inflation rates, economic uncertainty, and monetary uncertainty. Notably, economic and monetary uncertainties exhibit negative short-term effects on “money demand”, but their significance grows in the long run due to hedging behaviors.

The connection between inflation and interest rates holds a prominent place in various macroeconomic theories. When interest rates decrease, individuals and businesses gain increased access to borrowing from banks and other lenders. Consequently, consumers have more financial resources to allocate toward their businesses, leading to economic expansion and, ultimately,

higher inflation rates. Conversely, the inverse relationship is equally valid: high interest rates compel individuals to prioritize saving, as savings offer substantial returns (Ireland, 2008).

Economic uncertainty (represented as VGDP) in the sampled Asian countries is measured using a five-variable index. This index incorporates government expenditure, imports, exports, remittances, and foreign direct investment. Fluctuations in each of these 5 observations are computed using a rolling technique, considering the standard deviation. The index values are subsequently derived using the formula:

$VGDP=\sum i\gamma i(VI-V1)$

Where:

VGDP represents "the economic uncertainty index".

VI represents the volatility of the ith variable.

1V1 signifies the average volatility.

γi denotes the weight attributed to each individual factor.

To measure monetary variations, we utilize M2, which represents nominal money supply on a monthly basis. These monthly fluctuations are converted into average fluctuations, calculated as a 12-month average. The table below provides details on data sources and variable descriptions.

Table 1: Description of Variables

Variable	Symbol	Measure	Source	T
Inflation	INF	Inflation, CPI (annual %)	WDI	1990 -2020
Money demand	M2	Broad money (GDP%)	WDI	
Exchange Rate	EX	Exchange Rates, (Domestic Currency per USD)	IFS	
GDP	GDP	GDP (current US$)	WDI	
Interest rate	IR	Financial, Interest Rates, Monetary Policy-Related Interest Rate,	IFS	
VGDP	VGDP	Volatility of GDP		
NVGDP	PVGDP	Negative Volatility of GDP		
PVGDP	PVGDP	Positive Volatility of GDP		
VM2	VM2	The volatility of the Money supply		
NVM2	NVM2	The negative Volatility Money supply		
PVM2	PVM2	Positive Volatility of Money supply		

Source: World Development Indicator (WDI), International Financial Statistics (IFS)

4. Econometrics Techniques

The study utilized both "linear Autoregressive Distributive Lag (ARDL) and Nonlinear Autoregressive Distributive Lag (NARDL) models" to evaluate the impact of "monetary and economic uncertainty on MD in selected Asian countries."

The linear ARDL model, as proposed by Peasaran et al. (2001), introduces a unique equation capable of accommodating independent variables with various orders of integration, including one or zero, signifying potential cointegration. Importantly, this ARDL model remains applicable even when dealing with limited sample sizes, rendering it a preferred choice for analysis. The pivotal test for establishing long-term relationships among fundamental variables is the F-statistic, often referred to as the Wald test. A surpassing F-statistic, beyond the critical value threshold, implies "the existence of a long-run relationship". One notable advantage of this

method is its capacity to detect interconnected vectors when multiple coherent vectors are present. However, it may face challenges when confronted with an integrated stochastic trend of I (2).

In a study conducted in 2014 by Shinn and Nimo, a nonlinear model was employed. This approach broke down the partial sum in both positive and negative directions, allowing for asymmetric impacts "in both the short- and long-term". Cointegration analysis was a fundamental part of the study. Due to the unique attributes of the partial sum and its non-linear nature, Shin and Nimmo (2014) "adopted the non-linear Autoregressive Distributive Lag (ARDL) model". Regardless of the order of integration or whether Ordinary Least Squares (OLS) or Bound Testing was employed to develop the model, it was found to provide reliable long-term predictions.

The need for money in any nation is primarily influenced by real or nominal GDP, price levels, interest rates, and exchange rates. Building upon the work of Friedman (1984) and Oskooee et al. (2020), the study formulated models specific to the chosen Asian nations.

4.1. Linear model

The linear model can be presented as follows.

$$LM2_t = \beta_0 + (\beta_1 VGDP_t + \beta_2 IR_t + \beta_3 EX_t + \beta_4 INF_t + \beta_5 VM_t) + u_t \qquad (1)$$

In this equation, denoted as Equation (1), L indicates lag operator in the model. Several factors are used to model the demand for real money: "the nominal effective exchange rate" (EX) the "price level" (INF) the "interest rate" (IR) the "volatility of the money supply" (VM) and the "volatility of real GDP" (VGDP). Notably VGDP and VM2 stand for monetary and economic uncertainty respectively in this context. The dependent variable is the "money demand", specifically M2.

Both monetarists and Keynesians theories posit certain expectations regarding the coefficients in this equation. Specifically, the anticipated coefficient for 1 is "expected to be positive", implying that monetary demand should increase with rising income, at the expense of foregone interest earnings. Conversely, the coefficient for 2 is expected to be negative, indicating that monetary

demand should decrease as the interest rate considered favorable for holding money rises. The signs of the coefficient for 3, however, are not explicitly mentioned in the information provided.

$$\Delta LM2t = \alpha + \Sigma(\gamma i \Delta LM2(t\text{-}i)) + \Sigma(\eta i \Delta GDP(t\text{-}i)) + \Sigma(\lambda i \Delta IR(t\text{-}i)) + \Sigma(\phi i \Delta EX(t\text{-}i)) + \Sigma(\omega i \Delta INF(t\text{-}i)) + \Sigma(\psi i \Delta LVM2(t\text{-}i)) + \Sigma(\phi i \Delta LVGDP(t\text{-}i)) + r0LM2(t\text{-}1) + r1\ GDP(t\text{-}1) + r2\ IR(t\text{-}1) + r3\ EX(t\text{-}1) + r4\ INF(t\text{-}1) + ct$$

Using "the Akaike information criterion (AIC)" the ideal lag lengths are represented by the letters a to f. Δ represents the first difference operator and α stands for the drift term. The estimates $r1$ through $r5$ capture the long-term effects while the short-term parameters are represented by $\gamma\ \eta\ \lambda\ \varphi\ \omega+$ and $\omega-$. The use of $r0$ normalizes the long-term estimates. ϵt represents the white noise error term.

This study employs the ARDL and NARDL models, which are well-suited for analyzing the relationship between economic variables, especially when they are integrated at different levels. These models are particularly effective for Asian economies, where relationships between variables, such as "money demand" and economic uncertainty", may be nonlinear and asymmetric. The NARDL model, in particular, captures these asymmetric effects, distinguishing between positive and negative shocks.

The study also uses two key economic uncertainty indices: VGDP (Volatility of GDP) and VM2 (Volatility of Money Supply). These indices measure fluctuations in GDP and money supply growth, reflecting economic instability. VGDP is calculated as the standard deviation of GDP growth, and VM2 measures the volatility of money supply growth. These indices are more appropriate for capturing the unique uncertainties in Asian economies, where sudden shocks are common and directly impact "money demand".

5. Analysis and Results

This study discusses the unequal impact of "economic and monetary uncertainty on MD in selected South Asian nations", utilizing data spanning from 1990 to 2020. The research methodology comprises several key steps. Initially, the stationarity of the data series is assessed.

Subsequently, both linear and non-linear Autoregressive Distributive Lag (ARDL) models are estimated.

"Using the Augmented Dickey-Fuller (ADF) test" the series stationarity is assessed. While the alternative hypothesis suggests that the series is stationary the null hypothesis (H0) is based on the assumption that a unit root exists, suggesting non-stationarity."The Akaike Information Criterion is used to calculate the maximum lag length (AIC)." Table 4. 1 presents the unit root test results.

Table 4.1: ADF Unit Root Test

S. No.	Country	Status	M2	INF	EX	IR	VGDP	VM2
1	Bangladesh	I(0)	-0.30	4.80***	3.94***	-0.22	23.58***	-1.97
2	India	I(1)	3.90***	4.25***	-0.62	5.66***	-5.13***	4.42***
			-1.19			-2.22		8.30***
3	Indonesia	I(1)	3.91***	-3.14**	7.44***	-6.97***	6.51***	-2.52
			-3.24**		-0.65	-2.71***		
4	Japan	I(1)	-1.37	3.13***	5.70***	-3.53***	-9.24***	1.52***
						-2.43		-2.06
5	Philippines	I(0)	5.25***			5.69***	4.26***	
			-1.40	-1.90	-1.49	-2.35	-5.03***	8.73***
6	Singapore	I(0)	5.26***	9.26***	6.01***	-5.96***	-9.21***	-1.27
			-1.98	-3.48**	-2.03	-5.54***		
			6.16***		5.29***			5.91***

Note: *** shows significance at 1%, ** at 5%, and * at 10%.

The study findings reveal that the various series under examination exhibit a combination of I(1) and I(0) stationarity. For instance, the inflation rate is stationary at I(0) in all countries except the Philippines, where it is I(1). Conversely, M2 displays I(1) stationarity in all countries. Additionally, all countries except Bangladesh, Indonesia, and Singapore exhibit I(1) stationarity in the currency rate. Interest rates, except in Singapore and Indonesia, display I(1) stationarity in all countries. VGDP remains stable and level across all nations, except for India and the Philippines, where VMS exhibits first-difference stationarity. Due to this mixed stationarity, the adoption of the ARDL model is considered the most appropriate econometric approach in this context.

The short-term projections from the linear ARDL model are presented in Table 4.2. Both monetary uncertainty (VMD) and economic uncertainty (VGDP) exert significant influences on MD in the short term. Notably, the coefficient of VGDP is positively significant for Indonesia, indicating a direct relationship between VGDP and "money demand". Specifically, a 1% change in VGDP leads to a 0.57% increase in "money demand" for Indonesia. Similarly, for Bangladesh, the coefficient sign of VGDP is large and positive, suggesting a 2.51% rise in "money demand" for every 1% change in VGDP. However, in Japan, the VGDP coefficient sign is negative and not statistically significant. In India, there exists a positive and statistically significant association between VGDP and "money demand". In contrast, Singapore and the Philippines exhibit a negative and significant relationship between VGDP and "money demand". Regarding the impact of interest rates on "money demand", negative associations are observed for Indonesia, Bangladesh, Japan, Singapore, and the Philippines, except for India. This implies that changes in interest rates result in a decrease in "money demand" by varying degrees, such as -0.067%, -0.57%, and -0.98% for Indonesia, Bangladesh, and Japan, respectively. However, in India, an increase in the interest rate leads to a 0.130% increase in "money demand", indicating an unconventional trend. The lag value of the interest rate also exhibits a negative and significant relationship, aligning with findings in the U.S. for "money demand" (Choi & Oh 2003).

With the exception of India, the coefficient estimate of VM2, representing monetary uncertainty, is consistently negative and statistically significant, suggesting an inverse relationship between "money demand" and monetary uncertainty. In the selected countries, an increase in monetary uncertainty discourages people from holding more money. For instance, a 1% increase in monetary uncertainty leads to a 0.67%, 1.17%, and 1.87% decrease in "money demand" in Indonesia, the Philippines, and Singapore, respectively. The short-term inflation forecast also significantly impacts "money demand". In Indonesia, "money demand" is inversely correlated with inflation, whereas there is a negative correlation between "money demand" and inflation in India, Singapore, Bangladesh, and the Philippines. This means that a 1% increase in inflation results in an immediate decrease in "money demand", such as a 0.02%, 0.0003%, and 0.068% decrease in Indonesia, Singapore, and the Philippines, respectively. With a lag, the relationship becomes unfavorable for Indonesia and Japan while remaining favorable for India. This aligns

with findings by Bahmani-Oskooee et al. (2012) for China. Furthermore, the negative correlation of the exchange rate with domestic "money demand" indicates that fluctuations in the exchange rate led to a decrease in "money demand".

Overall, the study provides detailed insights into the relationships between economic and monetary uncertainty and "money demand" in the selected South Asian countries, highlighting both short-term and country-specific nuances.

Table 4.2: Linear ARDL Model

Variables	**Indonesia**	**Bangladesh**	**Japan**	**India**
Panel A: Short run				
D(VGDP)	0.57**(1.99)	2.51***(2.01)	-0.51(-1.13)	1.38***(2.360)
D(VM2)	-0.67***(-3.48)	-1.17**(-2.5)		0.130***(2.36)
D(IR)	-0.67***(-3.48)	-0.58**(2.02)	-0.98(-1.60)	0.00019(0.27)
D(IR-1)	0.73***(3.94)			
D(IR-2)	-0.31***(2.51)		-0.017**(-2.51)	
D(INF)	0.006***(3.64)	-0.02(0.13)	0.057(0.83)	-0.0003(-0.62)
D(INF-1)	-0.003***(-4.3)		-0.002*(-1.92)	
D(EX)	-0.10***(-3.30)	-1.33*(-2.01)	-0.09**(2.40)	0.002(-1.52)
D(EX-1)				
CointEq(-1)		-0.16*(-2.29)		0.05(0.60)
Variables	**Philphanese**		**Indonesia**	
D(VGDP)	-0.090***(-		-3.05***(-2.06)	

	2.81)			
D(VGDP-1)				
D(VM2)	-1.87**(-2.58)		5.13***(4.02)	
D(VM2-1)				
D(IR)	-0.62**(2.58)		0.07(1.62)	
D(IR-1)				
D(INF)	-0.068*(-1.74)		-0,20**(-2.07)	
D(INF-1)				
D(EX)	-0.097***(-3.77)		-0.42**(-2,55)	
D(EX-1)				
CointEq(-1)	-0.14**(2.42)		-1.26**(2.51)	

Note: "*** shows the 1 %, **shows the 5 %, and * shows the 10 % level of significance"

In Table 4.3, Panel B, the examination of long-term relationships within the six countries is presented. The results reveal distinct associations between economic uncertainty (VGDP) and "money demand" across these nations. For Bangladesh, Indonesia, and Japan, economic uncertainty displays a positive and statistically significant link with "money demand" in the long run. This suggests that as economic uncertainty increases, there is a corresponding increase in the demand for money over the long term, as individuals seek to hedge against economic uncertainties. VGDP proves statistically significant at both the 1 and 10 percent significance levels. In contrast, for India, the Philippines, and Singapore, economic uncertainty exhibits a negative and statistically insignificant relationship with "money demand" over the long term.

Moving on to the representation of monetary uncertainty by VM2, the results demonstrate a predominantly positive relationship between VM2 and "money demand", except for Bangladesh. In the long run, monetary uncertainty significantly influences "money demand", with positive coefficient estimates observed in Indonesia, Japan, the Philippines, and Singapore. For instance, a one-unit change in monetary uncertainty leads to increases in "money demand" by 6.63, 10.7, 8.7, and 10.9 units in Indonesia, Japan, the Philippines, and Singapore, respectively. However, in India, the long-term estimate of VM2 is found to be statistically insignificant. Notably, for Bangladesh, VM2 exhibits a negative but statistically significant coefficient estimate. These findings align with previous research conducted by Kiptui (2014) and Inoue & Hamori (2008).

In summary, Table 4.3, Panel B, provides insights into the long-term relationships between economic and monetary uncertainty and "money demand" in the six listed countries, highlighting the diverse patterns observed across these nations.

Table 4.3: Long-run Estimate of Linear ARDL

	Bangladesh	**Indonesia**	**India**	**Philippines**	**Japan**	**Singapore**
VGDP	15.2*** (3.63)	10.83*** (2.92)	-0.003 (-0.03)	-0.062 (-0.09)	5.59* (1.97)	-8.52 (-0.97)
VM2	-1.25** (-2.27)	6.63*** (5.73)	0.007 (0.14)	8.73** (2.56)	10.77*** (3.36)	10.79* (1.96)
IR	0.79*** (18.60)	-0.043** (-2.06)	0.05 (0.93)	0.011 (0.98)	0.001 (0.25)	-0.021 (-1.16)
INF	0.02 (0.13)	-0.097** (-2.04)	-2.599 (-0.49)	0.047 (1.49)	-0.06 (-0.82)	-0.087 (-0.92)
EX	-0.09 (-0.22)	-0.021*** (-4.33)	-1.53 (0.74)	0.069*** (3.67)	-0.027 (4.98)	0.76 (5.09)

Note: "*** shows the 1 %, **shows the 5 %, and * shows the 10 % level of significance.

The variable IR represents the interest rate, and the results reveal interesting insights into its relationship with "money demand" across the selected countries. In Indonesia and Singapore, there is a negative correlation between interest rates and "money demand". However, it's important to note that the significance of the interest rate's impact on "money demand" is found

to be insignificant in these two countries. This negative relationship can be explained by the fact that as interest rates rise, the yields on saving deposits and other interest-bearing assets increase as well, subsequently raising the opportunity cost of holding money. Consequently, individuals tend to opt for alternative forms of investment, which leads to a decrease in the demand for money. This finding aligns with prior research conducted by Mangla (1971) and Ibrahim (2001).

In contrast, interest rates display a positive association with "money demand" in Bangladesh, Japan, India, and the Philippines, although these associations are statistically insignificant except in the case of Bangladesh. This suggests that in these countries, there is a tendency for people to hold more money when interest rates are higher. However, it's important to note that the statistical significance of these relationships is not strong, indicating that other factors may also be influencing "money demand" in these nations.

Moving on to the variable INF, which represents inflation, the results suggest that the inflation rate represents an opportunity cost of holding money in the long run. However, it's noteworthy that only in Indonesia is the inflation rate found to be statistically significant. In Indonesia, as the inflation rate increases, it positively affects "money demand". This implies that people in Indonesia prefer to hold more money in response to higher inflation.

Conversely, for Japan, India, Singapore, and Bangladesh, as well as Indonesia, the inflation rate exhibits a negative and statistically insignificant relationship with "money demand". In these countries, higher inflation does not seem to significantly impact the demand for money.

Additionally, the exchange rate displays a predominantly negative association with "money demand" in most countries, except for Singapore. An increase in the exchange rate signifies a decrease in the value of the domestic currency (M2), which can influence the demand for money. As people anticipate a further depreciation of the domestic currency, they may seek to convert their holdings (M2) into foreign assets, which could reduce the demand for domestic currency.

Because changes in the exchange rate have a major impact on "money demand" in Indonesia and the Philippines it is important to note that these two countries are the only ones where the exchange rate is statistically significant. Overall long-run coefficient results show that monetary and economic uncertainty can have a significant impact on long-term "money demand". This conclusion is corroborated by earlier studies (Gul and Sajid 2020). These results highlight the

significance of taking a range of economic factors into account when examining the factors that influence "money demand" in various nations. For most of the countries examined there is a negative correlation between interest rates and "money demand" (see Table 4.2). This supports conventional economic theory which holds that higher interest rates decrease "money demand" by raising the opportunity cost of holding money. In contrast the relationship seems to be different in India where the negative link is less noticeable. This disparity might result from particular elements in the Indian setting. Significant regional differences in banking accessibility a heavy reliance on cash transactions and the quickly growing digital payment industry are the hallmarks of Indias financial infrastructure. Furthermore, recent policy measures like demonetization and initiatives to support a cashless economy might have changed the conventional demand for money and produced a distinct dynamic not seen in the other nations under study. The observed discrepancy in the relationship between interest rates and "money demand" may be explained by these unique aspects of the Indian economy. Table 4.3 examines the long-term effects of economic uncertainty on "money demand" showing notable variations among nations. Economic uncertainty typically has a less noticeable effect on "money demand" in developed economies. This is explained by the robust banking industries' well-established financial systems and efficient monetary policies that are in place to lessen the effects of uncertainty.

In contrast, in emerging and developing economies, where financial markets are less mature and trust in formal financial institutions may be weaker, individuals often prefer to hold greater amounts of money as a precautionary measure during uncertain times. In these economies, factors such as political instability, inflationary pressures, and reliance on informal financial practices can amplify the demand for money. These varying responses suggest that while economic uncertainty universally affects "money demand", the magnitude and nature of this effect are heavily influenced by a country's specific economic environment and institutional framework.

Table 4.4: Diagnostic test

	Bangladesh	Indonesia	India	Philphanese	Japan	Singapore
F TEST	598**	8,73***	3.75*	4.14**	6.18***	8.21***
R^2	0,87	0.95	0.45	0.81	0.76	0.76
Adj R^2	0.85	0.92	0.31	0.76	0.73	0.69
QS (QS 2)	S,s	S,S	S,S	S,S	S,S	S,S
LM TEST (P chi ^{2})	0.16	0.20	0.12	0.35	0.78	0.21
Breusch-Pagan Godfey (chi ^{2})	0.34	0.67	0.31	0.51	0.17	0.15
JB test (P value)	0.41	0.99	0.23	0.79	0.44	0.51

Note: "*** shows the 1 %, **shows the 5 %, and * shows the 10 % level of significance"

The outcomes of the ARDL diagnostic tests, particularly when the F-test value surpasses the upper-bound critical value, are presented in Table 4.4. This indicates that the cointegration hypothesis is accepted for all the variables under examination. It's worth noting that the R-squared (R2) values for all the models indicate a good fit, with each value exceeding 0.05. The R2 statistic measures the proportion of variance in an independent variable that can be attributed to the dependent variables, highlighting the models' appropriateness.

Furthermore, to assess autocorrelation between the error terms, the researcher conducted the Lagrange multiplier test. The results of this test indicate the absence of serial correlation among the variables, enhancing the robustness of the models.

In addition to these diagnostic tests, stability tests, namely QS and QS2, were conducted to evaluate the stability of the estimates within the selected sample of countries. The results of these tests affirm that all estimates remain stable over the chosen sample period. These findings collectively reinforce the reliability and soundness of the models used in the analysis.

6. Estimation Results of Nonlinear ARDL

Table 4.5 presents the results of the Nonlinear ARDL model, encompassing both long-run and short-run estimations. A significant observation is the persistence of short-term effects on the demand for money into the long term within this non-linear model. Notably, among the variables affecting "money demand", the coefficient of MD's growth stands out as noteworthy in terms of its impact over time. This suggests the presence of an enduring unbalanced relationship.

To explore the long-term asymmetrical impact, the study employs the Wald test. This test is instrumental in exploring how certain variables exert varying influences on "money demand", and whether these effects change over time. The results from this test offer valuable insights into the dynamic and evolving nature of the relationship between the variables in the model.

Table 5: ARDL (Nonlinear)

NLARDL	Bangladesh	Indonesia	India	Philphanese	Japan	Singapore
SN & variables	(1)	(II)	(III)	(IV)	(V)	(VI)
D(IR)	-2.001** (-2.36)	-.011* (1.99)		-0.0003 (-0.35)	-0.054** (-2.51)	0.021** (2.65)
D(IR-1)	0.09** (2.22)		-0.031*** (-3.21)	-0.001 (1.61)		
D(INF)	-0.037*** (-3.08)	- 0.0008** (2.17)	-0.001 (-0.12)	-0.0009 (-1.41)	0.013 (1.25)	-2.64 (-3.94)
D(EX)	-0.25*** (-2.81)	0.007 (0.93)	0.005 (0.84)	0.002 (0.54)		
D(EX-1)	4.07*** (4.20)		-1.10 (-0.77)		-6.2* (-1.97)	-6.28 (-5.58)
D(PVGDP)	-0.55** (-2.04)	2.21 (3.41)	-2.08** (-2.59)	2.12 (1.50)	2.38** (2.24)	4.12** (2.91)

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D(NVGDP)	0.75 (0.50)	-0.77 (-0.45)	-0.094*** (-3.61)	1.96*** (2.68)	4.85 (1.48)	-0.37*** (-3.21)
D(PVM2)	-0.12** (-2.5)	1.96** (2.76)	2.26** (2.76)	3.46** (2.30)	3.81 (1.39)	0.52** (2.21)
D(NVM2)		-5.6*** (3.01)	-1.05*** (-2.6)	2.03 (1.83)	-1.02* (-1,81)	-0.56 (-2.65)
CointEq(-1)		0.32** (2.81)		-0.19** (2.38)		
PANEL B LONGRUN						
IR	0.006668 (0.40)	-.011* (1.99)	0.036** (2.36)	0.002 (0.413)	0.052 (0.20)	-0.010** (-2.46)
INF	-0.07**(-2.07)	0.03 (0.84)	-0.002 (-0.12)	-0.0049 (1.56)	-0.05 (-0.69)	-0.02*** (-3.01)
EX	-0.030*** (-3.38)	0.28** (2.60)	0.074 (10.76)	-0.02* (1.97)	- 0.022*** (5.46)	0.90*** (8.64)
PVGDP	-2.81* (-1.98)	8.12** (2.60)	- 0.37*** (2.81)	-10.76*** (-4.6)	-0.11** (-2.07)	-4.16*** (-2.83)
NVGDP	19.24*** (5.08)	-0.77 (-0.45)	0.11* (1.93)	14.63* (1.85)	2.004*** (3.41)	3.30*** (2.68)
PVM2	22.05** (2.03)	-9.61*** (-3.01)	2.89 (4.27)	3.85*** (2.41)	-4.75 (-5.83)	-8.15*** (-7.72)
NVM2	5.31 (0.51)	1.96 (1.21)	-5.99 (17.84)	-6.85* (-1.93)	7.99 (4.02)	8.41 (7.62)
Panel C: Diagnostic test						
R^2	0.89	0.94	0.85	0.89	0.81	0.94

Adj R^2	0.85	0.91	0.78	0.86	0.78	S,S
F TEST	4.67**	4.31***	8.17***	7.62***	5.41***	0.97
LM TEST ($P\ chi^2$)	0.12	0.32	0.60	0.51	0.61	0.29
QS (QS 2)	S,S	S,S	S,S	S,S	S,S	0.76

Note: "*** shows the 1 %, **shows the 5 %, and * shows the 10 % level of significance"

The analysis of "money demand" reveals varied results across different countries and time horizons, highlighting some intriguing patterns. Panel C shows that there isn't enough evidence to reject the null hypothesis of symmetric, long-run effects for "money demand". This suggests that, if the long-run estimates are accurate, there is likely a cointegration among these series. Despite this, the F-statistic calculated is below the 10% critical value, which limits our ability to make strong statistical inferences from the test. However, the negative and significant coefficient of ECMt-1 supports the notion of a long-term relationship between the variables.

Turning to the short-run outcomes in Panel A, we see that in Indonesia, most factors, except GDP, have minimal short-term effects on "money demand". In contrast, Bangladesh and Japan experience significant impacts from various factors, although "money demand" and GDP have a relatively minor influence. India and the Philippines, however, show substantial short-term effects from all factors. Singapore is unique in that most factors have negligible short-term impacts, with "money demand" being the only notable exception.

Panel B provides insights into the long-term effects. Here, all factors significantly influence "money demand" across the countries studied, with Bangladesh and the Philippines exhibiting the most pronounced effects.

Additional diagnostic information in Panel C confirms that there is no autocorrelation, as indicated by the Lagrange Multiplier (LM) statistic being below the critical value of 9.48 at the 5% significance level. The stability of both short- and long-run coefficients is supported by QS and QS2 tests. The corrected R-squared values further demonstrate the model's effectiveness, with high explanatory power across countries: 85% for Indonesia, 94% for Bangladesh and Singapore, 78% for Japan and the Philippines, and 89% for India.

The findings from the model indicate that short-term impacts continue into the long run. This continuation may reflect underlying structural constraints, delayed adjustment processes, or a

form of path dependence within the economic system. It suggests that initial disturbances, whether favorable or adverse, are not quickly corrected but rather leave a lasting imprint. This emphasizes policymakers the need for timely and well-thought-out policy actions. Interventions should take into consideration the possible long-term effects of short-term shocks in addition to managing immediate fluctuations. In order to create policies that are both forward-looking and able to lessen the long-term effects of economic asymmetries it is essential to acknowledge this persistence

7. Conclusions

Both linear and non-linear ARDL models are used in this study to examine how monetary and economic uncertainty affects the demand for money in particular Asian countries. The results demonstrate an inverse relationship between "money demand" and monetary uncertainty in most of the countries studied with the exception of India. Short-term effects on inflation indicate that other countries experience a negative impact whereas Indonesia experiences a positive correlation. "money demand" is generally higher during uncertain times due to economic volatility indicating a greater need for stability. Depending on the nation interest rates affect "money demand" in different ways. According to long-term findings monetary uncertainty tends to have a positive impact in many countries while economic uncertainty generally increases "money demand" in some. The dynamics of "money demand" are also influenced by variables like inflation and exchange rates. The study suggests that Asian nations concentrate on stabilizing their monetary policies in order to address these findings. By enhancing inflation control and preserving a stable money supply this strategy would eventually support regional economic stability. Examining the impact of additional types of uncertainty such as institutional or political instability could improve our understanding of "money demand" in future studies. Furthermore, broadening the study to encompass regions such as Africa or Latin America may provide insightful comparisons and advance a more thorough comprehension of the ways in which various forms of volatility affect "money demand" in various economic contexts. Future research could enhance the understanding of "money demand" by examining the influence of other forms of uncertainty, such as political or institutional instability. Additionally, expanding

the study to include regions like Africa or Latin America could offer valuable comparative insights and contribute to a more comprehensive understanding of how different types of volatility impact "money demand" across diverse economic contexts.

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