Market Forces
College of Management Sciences

Volume 17, Issue 1, June 2022
https://doi.org/10.51153/mf.v7i1.518

Analyzing Various Channels of Monetary policy Transmission Mechanism: The Case of Pakistan

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Abstract

This paper measures the impact of the interest rate, credit, and risk channel on the monetary policy of Pakistan, based on a data set from 1995 to 2020. It also examines the long-run and the short-run relationship between foreign debt, bank capital, and monetary policy transmission mechanisms by using the Autoregressive Distributed Lag (ARDL) model. The results suggest that the risk channel does not follow the cointegration benchmark. We found an insignificant association between the independent and dependent variables, suggesting no long-term relationship between the model's variables. The interest rate coefficient is negative, but its relationship with the dependent variable is significant. Similarly, the credit channel's coefficient is negative, but its association with the dependent variable is statistically significant at the 90% confidence level. The research also suggests that the risk channel has a short-term association. At the same time, interest rates and credit channels have short-term and long-term relationships.

Introduction

An important and contentious question in macroeconomics is whether the monetary policy (MP) affects the real economy or not? It is difficult for policymakers

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to implement monetary policies as many variables are beyond their control. Therefore, the researchers investigate the factors that affect the monetary policy transmission mechanism. Researchers on how monetary policies affect economic activities in developing countries have diverse opinions. Many researchers believe that monetary policy significantly affects economic activities, while others believe it is unsuccessful to generate real economic activities as they assert that money and output have an insignificant association (Idris, 2019; Donkor et al., 2021). Given these conflicting and diverse perceptions, many researchers have given their opinions from different perspectives (Bernanke & Gertler, 1995; Zgambo & Chileshe, 2014).

Monetary policy helps to expand or contract the money supply. Researchers argue that the monetary transmission goal in the long term should stabilize currency supply and output without adversely affecting economic growth (Fabris, 2018). Auclert, Dobbie, and Goldsmith-Pinkham (2019) assert monetary policy helps in achieving a stable, balanced effect on GDP, investment, saving, export, production, and employment. A deficiency in aggregate demand for goods and services can promote unemployment. At the same time, a surplus demand stimulates inflation (Acharya et al., 2020). Literature suggests eight direct and four indirect channels affect the monetary policy transmission mechanism (MPTM). The direct channels are "the credit, exchange rate, asset price, and interest rate channels" (Adekunle et al., 2018; Igharo et al., 2020). We found a paucity of research on external debt despite the extensive research. Monetary policy is an important tool for price stability. People will not hedge their resources but use them more efficiently when prices do not fluctuate. The lower inflation risk premium will decrease the interest rate, allowing depositors to invest instead of saving (Alani, 2021). It can also help minimize unanticipated inflation, stabilizing the political and economic environment as monetary policy considers a single and exceptional tool for price stability(Viphindrartin, Saleh & Prestianawati, 2020). This paper investigates the long-run and short-run relation between the risk channel and monetary policy transmission mechanism (MPTM). It also explores the long-run and short-run relation between interest rate channels and monetary policy transmission mechanisms. Finally, it examines the long-run and short-run relation between credit channels and MPTM. After investigating the long-run and short-run relation between the risk channel credit channel and interest rate channel of MPTM, it will help the policymakers develop better policies for the economy and manage the money supply. This study can also benefit the banks to utilize their resources efficiently.

Literature Review

The economics literature has conflicting views on the monetary policy transmission mechanism (MPTM) (Zahid et al., 2021; Nkikabahizi, Hategekimana & Musabanganji,

2020). Consequently, several studies have analyzed foreign debt with various econometric techniques on panel, cross-sectional, and time-series data (Igharo et al., 2020). This research aims to recognize the relationship of MPTM with the other channel that remained unexplored and shed light on external debt on monetary policy transmission. The question is whether monetary policy shocks affect macroeconomic aggregates or not. Researchers have answered this question from different perspectives, but many researchers believe there is a need for more studies examining its effect on particular sectors or the whole economy.

In a study, Bader and Magableh (2009) examined the determinants of public debt in Jordon. The study used a data set from 1980 to 2004 and used the Johansen cointegration test for analysis. The study found that foreign aid, government budget deficit, and the saving gap affect the external debt, but the exchange rate has the most effect on external debts. Atique and Malik (2012) also studied the effects of liability on economic growth from 1980 to 2010 in Pakistan and used the ordinary least squares (OLS) approach. The result shows that external debt slows down economic growth.

Many past studies have examined the impact of monetary policy transmission mechanisms (MPTM). For example, Adler et al. (2015) investigated whether monetary policy influences central bank capital. The study used central bank financial strength as a dependent variable. The data set in the study was from 2002 to 2010. The study found that policymakers can use central bank capital in interest rate policy decision-making based on a linear model. Atique and Malik (2012) studied the effect of liability on economic growth in Pakistan with a dataset from 1980 to 2010. The study found that external debt adversely affects economic growth. Abbas et al. (2019), in a study on emerging economies on a data set of six years from Pakistan, found that excess capital is good for an economy. This association is more relevant to low assets countries since high asset countries have other options to generate income.

Also, Era and Holger (2006) investigated the transmission mechanism of MP in America to determine the MP's ability to impact economic activity. The researchers found that monetary policy can be affected by three main channels: the interest rate channel, asset channel, and exchange rate channel. This paper concluded that the interest rate is strongly affected by the interest rate channel in developing and transition economies with a high degree. Furthermore, Agha et al. (2005) analyzed the channels of MPTM in Pakistan from July 1996-January 2004. The study employed a time series method to analyze the "credit channel, asset price channel, exchange rate channel, and interest rate channel". The study concluded that monetary contraction decreases the demand for goods and services. In essence, banks cater to investment demand. As a result, it

decreases the price pressure and reduces the economy's price level. However, banks play an influential role in the interest rate, asset price, and MPTM. Yet, the study found that the exchange rate channel is less effective compared to the other channels.

Moreover, Borio, Gambacorta, and Hofmann (2017) observe the consequence of bank capital in the Italian bank lending channel by capital to asset ratio of 1992-2001. Based on the panel regression analysis, the study found that bank lending channels affect bank capital channels. Aleem (2010), based on data from 1998 to 2007, examined the MPTM. The study used lending, asset pricing, and exchange rate channels as independent variables. The study found that bank loans had a significant influence on the MPTM. Ishioro (2013) investigated the relationship between macroeconomic aggregates and some channels from 2005 to 2012. Using the Granger causality test, the study found that only three channels (i.e., interest rate, exchange rate, and credit channels) contribute significantly to Nigeria's inflation.

At the same time, Arfin (2017) analyzed Bangladesh's MPTM, specifically through the lending and exchange rate channel from 2003 to 2013. The paper found that the monetary aggregate background affects the price level in Bangladesh. Also, the bank lending channel helps implement monetary policy in the economy. However, the exchange rate channel had the highest interference in the transmission process. This paper applied Structural Vector Autoregression to investigate the periodic data gathered on 8-variables. After reviewing all the above-discussed literature, we believe studies are abundant on the MP relationship with economic growth, the effectiveness of the MP, and the channels of the MP transmission mechanism in Pakistan. However, we found a limited number of studies on the debt channels.

Methodology and Data Collection

This research aims to examine the long-run and the short-run relationship between the risk channel, credit channel, and interest rate channel of MPTM. This paper also helps analyze the association between macroeconomic developments and monetary policy, which is the MP dependence on economic variables and vice versa (Agha et al., 2005). We used the data from 1995 to 2020 to examine the various channels of MPTM. Previously many past studies have explored the channels of MPTM (Rashid & Shah, 2019). However, many studies have explored the relationships between the risk channel, credit channel, and interest rate channel collectively (Uchendu, 1994; Chiminea & Nicolaidou, 2015). Numerous empirical researches found the exchange rate as a significant variable. Several studies have used gross domestic product (GDP) as a variable in the risk channel (Orzechowski 2016; Chiminya & Nicolaidou, 2015). Many researchers believe that the inflation rate significantly affects external debt channels (Onafowora & Owoye, 2019;

Omodero, 2019; Guei, 2019). The study has used the following variables presented in Table 1.

Table 1: Variables

Variable	Frequency	Source
Risk Channels		
External Debt Channel	Yearly	State Bank of Pakistan
Exchange Rate	Yearly	State Bank of Pakistan
Gross Domestic Product	Yearly	State Bank of Pakistan
Inflation	Yearly	State Bank of Pakistan
Interest Rate	Yearly	State Bank of Pakistan
Interest Rate Channels		
Treasury Bills Six Month	Yearly	State Bank of Pakistan
Consumer Price Index	Yearly	State Bank of Pakistan
Karachi Stock Exchange-100 Index	Yearly	State Bank of Pakistan
Loan	Yearly	State Bank of Pakistan
Real Effective Exchange Rate	Yearly	State Bank of Pakistan
Whole Sale Price	Yearly	State Bank of Pakistan
Credit Channels		
Loan	Yearly	State Bank of Pakistan
Treasury Bills Six Months	Yearly	State Bank of Pakistan
Consumer Price Index	Yearly	State Bank of Pakistan
Whole Sale Price Index	Yearly	State Bank of Pakistan

Variables

The Risk Channel

The factors that motivate a country to borrow money may promote a sustainable external debt solution. This study has focused on several models (Adelman & Chenery, 1966; Taylor, 1996). From these models, we have derived (i) sources of debt accumulation which is the external exchange gap, (ii) the saving-investment gap, and the (iii) the fiscal-constraint gap, which is very important for a country like Pakistan. Empirically we also identified other variables related to the channel of external debt. The study has used the following framework for analyzing the risk channel in Pakistan:

$$ED = f(GDP, INF, EX, INT)$$

Where ED = External Debt, GDP = Gross domestic product, INF = Inflation rate, EX= Exchange Rate, INT= Interest rate

$$ED \downarrow => GDP \uparrow => INF \downarrow EX \downarrow INT \downarrow => Y \uparrow$$

ED shows external debt. If it decreases, it can increase the gross domestic product, leading to a decrease in inflation, positively affecting investment spending. It will also reduce the exchange and inflation rates. Therefore, the risk channel equally applies to consumer spending as consumers' investment decisions include durable expenditure and housing. The risk channel contains the following variables. For the variables, we have applied the Logarithm form. The empirical estimating model of the study follows;

$$lED_t = \alpha + \beta lGDP_t + \beta lInf_t + \beta lEx_t + \beta lInt_t + \mu_t$$

lED = Log of External Debt, lGDP= Log of Gross domestic product, lInt = Log of interest rate, lEx = Log of Exchange Rate, lInf = Log of Inflation rate and μ_t= error term.

The Credit Channel

Several factors associated with the credit channels affect the interest rates. Thus, banks play a significant role in stimulating broad monetary aggregates. Mishkin (1995) asserts when a monetary policy focuses on reducing the money supply, the banks' reserves also decrease, due to which consumers' borrowing is also reduced. Mathematically, this is presented in the following equation:

$$M \downarrow => bank\ deposits \downarrow => bank\ loans \downarrow => I \downarrow => Y \downarrow$$

Consequently, the quantum of bank loans decreases, and investment also declines, negatively affecting the output, promoting reduced investment, reduced spending, and low aggregate demand. The credit channel contains the following variables:

Loan: "Private sector credit, WPI: wholesale price Index, CPI: Consumer Price Index, TB6: 6-month Treasury Bill Rates, REER: real effective exchange rate data, KSE100: Karachi stock exchange 100 indexes." Therefore, the following equation was estimated:

$$lLOAN_t = \alpha + \beta_1 lCPI_t + \beta_2 lWPI_t + \beta_3 lTB6_t + \mu_t$$

The Interest Rate Channel

Interest rate is a key channel for the MPTM as its affects the economy. We have aligned the interest rate channel with the Keynesian standard. Keynes 1936 studied the IS-LM framework (Hicks, 1980), which several authors extended in their studies, including Taylor (1995) and Mishkin (1995). This schematic diagram represents the monetary policy tightening effect on the economy.

$$M \downarrow => i \uparrow => I \downarrow => Y \uparrow$$

The interest rate channel contains the following variables. M in the equation shows that the contraction in monetary policy can increase the interest rates, leading to rising capital costs and negatively affecting investment spending. These higher interest rate decisions result in a fall in business stock and residential accommodation. It will also lead to a fall in aggregate demand and a decline in yield. Therefore, the interest rate channel equally applies to consumer spending and investment decisions related to durable goods and housing.

Prices: "Consumer Price Index (CPI) the inflation rate, TB6: 6-month Treasury Bill Rates, Loans: Private Sector Credit, REER: Real Effective Exchange Rate, KSE100: Karachi Stock Exchange (KSE-100) Index, WPI: wholesale price Index." Therefore, the following equation was estimated:

$$lTB6_t = \alpha + \beta_1 lCPI_t + \beta_2 lWPI_t + \beta_3 lLOAN_t + \beta_4 lREER_t + \beta_5 lKSE100_t + \mu_t$$

Data Analysis

We have used the time-series data from FY1995 to FY2020 to forecast Pakistan's monetary policy transmission mechanism by considering its components. Additionally, we tested the short-term and long-term relationships using the ARDL model. A precondition for this model is that the variables should be stationary at the level and 1st difference. We employed the Dickey and Fuller (1979) test to investigate unit roots in the data series to test this precondition.

Augmented Dickey-Fuller test

To identify the stationarity of the data series, we have used various types of unit root tests. It is necessary for sophisticated and higher econometric modeling. For this purpose, we have used the most popular and widely used unit root test, i.e. the Augmented Dickey-Fuller test. The generated equation for it is as follows:

$$\Delta yt = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^{n} \alpha \Delta y_t + e_t \quad \text{Eq (1)}$$

As mentioned in equation 1, 'y' represents the time series, t is the period, α0 is a constant, n is the optimum number of lags, and 'e' is an error term.

ARDL

Before applying the ARDL model, we have tested the integration level of all the variables. Therefore, if any variable needs to be 2nd differenced, then ARDL won't be applicable. We applied the ARDL model, avoiding all the other limitations (Pesaran, Shin & Smith, 1996). Pesaran, Shin and Smith (1996) introduced this approach which

gained worldwide acceptance. This approach is best when the variables are at level, 1st difference, or even fractionally integrated. The small sample size provides a super consistent estimate of long-run coefficients and robust cointegration results.

$$\Delta In(MF_t) = \beta_0 \sum_{i=1}^{q} \beta_u \Delta In(MF_{t-i}) + \sum_{i=0}^{q} \beta_{2i} \Delta In(TFP_{t-i}) + \sum_{i=0}^{q} \beta_{3i} \Delta In(PI_{t-i}) + \sum_{i=0}^{q} \beta_{4i} \Delta In(TO_{t-i}) + \beta_5 In(MF_{t-1}) + \beta_6 In(TFP_{t-1}) + \beta_7 In(PI_{t-1}) + \beta_8 In(TO_{t-1}) + U_t$$

To identify the long run and the short relationship between variables, we used the ARDL model, which includes the Bound test of the equation using the F-statistic with lower bound and upper bound. For the null hypothesis, we assumed "no cointegration between variables."

Empirical Analysis

The ARDL model prerequisite is that the time series is stationary. Therefore, we identified the order of integrating variables involved in the model at level or 1st difference. We used this method to get the long-run or short-run relationship in the ARDL model. The ARDL model is preferable for a small sample size.

Stationarity and Unit Root Test Result

In this exercise, the first step is to identify the integration of the data. For this, we transformed the data set into a simple graph to see data integration. Subsequently, we developed a unique graph called correlogram, followed by the ADF unit root test.

ADF Unit Root Tests

Table 3 depicts the summary of the ADF test.

Table 3: ADF Test Results

Variables	At Level		At First Difference	
	ADF Stats	P-value	ADF Stats	P-value
Risk Channel				
LED	-4.9097	0.0006		
LEX	-2.7282	0.0853	-11.2750	0.0000
LGDP	-2.5910	0.1085	-5.3495	0.0003
INF	-2.0731	0.2563	-4.8829	0.0008

LINT	-3.7823	0.0090		
Interest Rate Channel				
LTB6	-4.7248	0.0011		
LCPI	-2.0731	0.2563	-4.8829	0.0008
LKSE100	-3.8051	0.0106		
LLOAN	-2.6482	0.0983	-4.6032	0.0014
FREE	-2.7282	0.0853	-11.2754	0.0000
LWPI	-3.9215	0.0075		
Credit Channel				
LLOAN	-2.6482	0.0983	-4.6032	0.0014
LTB6	-4.7248	0.0011		
LCPI	-2.0731	0.2563	-4.8829	0.0008
LWPI	-3.9215	0.0075		

Results

The risk, channel & LINT are stationary if the probability is lower than 0.05. Hence, we rejected the null hypothesis, suggesting the "LEX, LGDP, and LINF are stationary at 1st difference." Moreover, in the interest rate channel, "LTB6, LKSE100, and LWPI are stationary at level ($p<.05$). Therefore, we rejected the null hypothesis, suggesting LCPI and LLOAN are stationary at the 1st difference. Also, in the credit channel LTB6 and LWPI are stationary ($p<.05$). Therefore, we rejected the null hypothesis, suggesting LLOAN and LCPI are stationary at the 1st difference. In all three channels, all variables are stationary at the 1st difference and none at the 2nd difference.

Risk Channel

Bounds Test

Table 3a represents the F-statistics containing lag of second-order and having the value of the lower bound and upper bound, which is 2.86 and 4.01 respectively, at the 5% level. The F-test value is 3.15, which is between the lower bound and upper bound of F-statistics, which results in inconclusive results. Consequently, we found that there is no long-run relationship between the variables.

Table 3a: Bounds Test

Order of Lag	F-statistic
2	3.15

ARDL Co-integration Test

The optimum model selection method was the Akaike info criterion (AIC), and the maximum lag selection criteria were 2. Table 4a suggests it is not following the

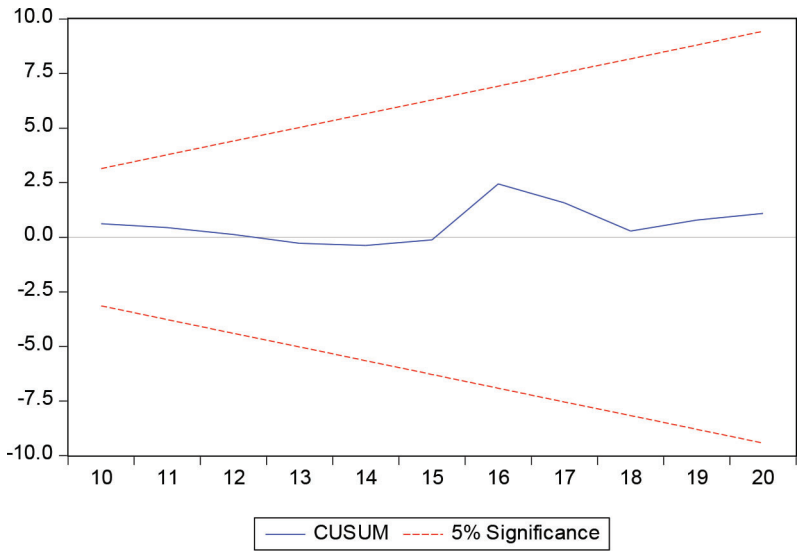
cointegration benchmark as the "coefficient is negative, but the probability is more significant than 0.05," which is statistically insignificant. Therefore, the model has "no long-run relationship between the variables."

Table 4a: ARDL Cointegration Model

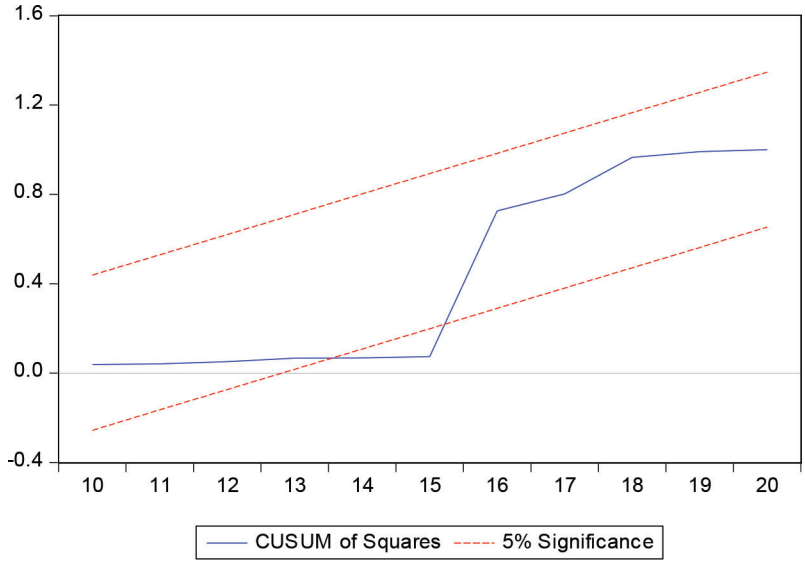
Dependent Variable: LED				
Variables	**Coefficient**	**Std. Error**	**t*Statistic**	**Probability**
D(LED(-1))	-0.3633	0.2593	-1.4012	0.1887
D(LINF)	0.7532	1.2325	0.6111	0.5536
D(LINF(-1))	-1.8979	1.2235	-1.5512	0.1491
D(LINT)	-0.2078	0.2677	-0.7762	0.4540
D(LEX)	0.0401	0.6741	0.0594	0.9537
D(LEX(-1))	-0.7709	0.7134	-1.0805	0.3030
D(LGDP)	-2.4677	2.1045	-1.1726	0.2657
D(LGDP(-1))	-3.9142	1.9949	-1.9621	0.0755
CointEq(-1)	-0.4086	0.2810	-1.4542	0.1738

Stability Tests

We carried out the stability test of ARDL based on an error correction model using CUSUM and CUSUM squared tests. Graphs 1a and 1b depict both the bounds at the 5% confidence levels. Both the models are stable, but Graph1b is unstable only for the period 2014 and 2015



Graph 1a: CUSUM Test



Graph 1b: CUSUM Squared Test

Interest Rate Channel

Bounds Test

Consequently, Table 3b represents the F-statistics of the second lag order and has the value of the lower bound and upper bound, which are 2.96 and 4.18 respectively, at the 5% level. The F-test value is 2.96, between the lower and upper bounds of F-statistics, suggesting no long-run relationship among variables.

Table 3b: Bounds Test

Order of Lag	F-statistic
2	2.96

A negative and significant value in the error correction term suggests cointegration exists in the long run. The correction factor suggests that a yearly 46% adjustment in the dependent variable will help achieve an equilibrium state.

ARDL Cointegration

We used the optimum model selection method and the Akaike info criterion (AIC) by using the maximum lag selection criteria of 2. Table 4b suggests a negative but significant effect in the benchmark of cointegration. Therefore, we have inferred a long-run relationship between variables for the model. The variables LCPI (-1), LKSE100(-1),

LWPI, and LWPI(-1) are statistically significant at level 0.0385, 0.0214, 0.0000 & 0.0597, respectively.

Table 4b: ARDL Cointegration Model

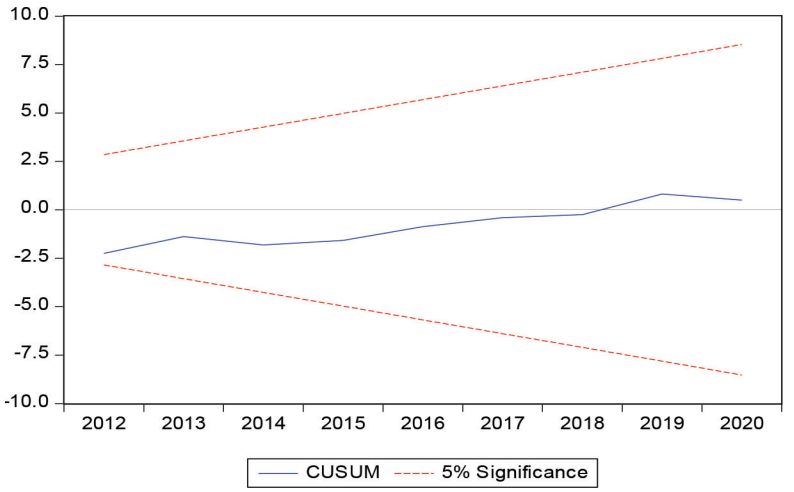
Dependent Variable: LTB6

Variables	Coefficient	Std. Error	t*Statistic	Probability
D(LCPI)	19.2775	13.2192	1.4583	0.1788
D(LCPI(-1))	19.9388	11.8363	1.6845	0.1264
D(LWPI)	-6.6314	6.9531	-0.9537	0.3651
D(LWPI(-1))	-11.8688	6.9683	-1.7033	0.1227
D(LLOAN)	2.3905	1.4676	1.6288	0.1378
D(LREER)	2.1507	2.9628	0.7259	0.4864
D(LREER(-1))	-6.4021	2.5417	-2.5189	0.0328
D(LKSE100)	-0.8440	0.6593	-1.2802	0.2325
D(LKSE100(-1))	1.7591	0.7487	2.3496	0.0433
CointEq(-1)	-0.7672	0.2582	-2.9713	0.0157

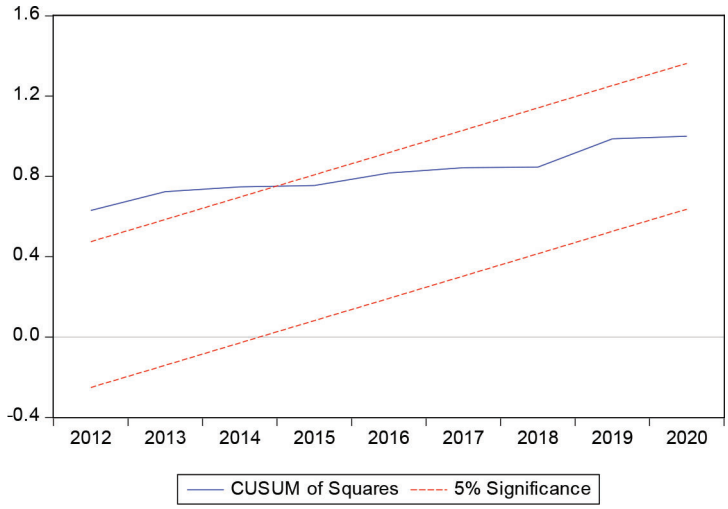
Cointeq = LTB6 - (-1.4219*LCPI + 0.5283*LWPI + 3.1158*LLOAN + 7.1774, *LREER -1.8660*LKSE100 -58.1416).

Stability Test

Results related to the stability tests based on the error correction model using the CUSUM and CUSUM squared tests are presented in Graphs 2a and 2b. The model in Graph 2a is stable. The overall model of Graph 2b is stable for all years except from 2012 to 2014.



Graph 2a: CUSUM Test



Graph 2b: CUSUM Squared Test

Credit Channel

The results related to the credit channel test are depicted in Table 4c.

Table 4c: Bounds Test

Order of Lag	F-statistic
2	3.55

The F-test value is 3.55, between the lower and upper bounds of F-statistics, suggesting no long-run relationship between the variables. Table 4d suggests the effect is negatively significant at a 90% confidence level. Therefore, there is a long-run relationship amongst variables for the model. However, the variables LLOAN (-1), LWPI (-1) and LCPI (-1) are statistically significant at level 0.0024, 0.0074 & 0.0481, respectively.

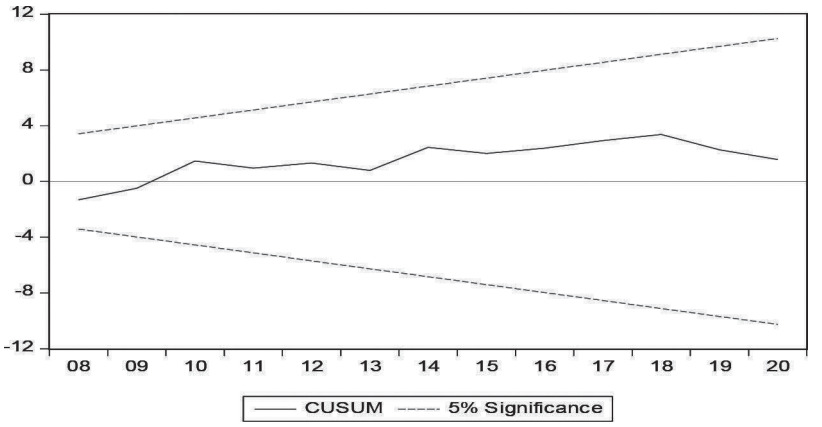
Table 4d: ARDL Cointegration Model

Dependent Variable: LLOAN				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability**
D(LLOAN(-1))	0.6375	0.1700	3.7495	0.0024
D(LWPI)	0.4779	0.4960	0.9635	0.3529
D(LWPI(-1))	-1.4193	0.4483	-3.1659	0.0074
D(LCPI)	0.7805	0.8536	0.9143	0.3772
D(LCPI(-1))	1.4695	0.6735	2.1820	0.0481
D(LTB6)	-0.0132	0.0176	-0.7465	0.4686
CointEq(-1)	-0.1377	0.0712	-1.9342	0.0752

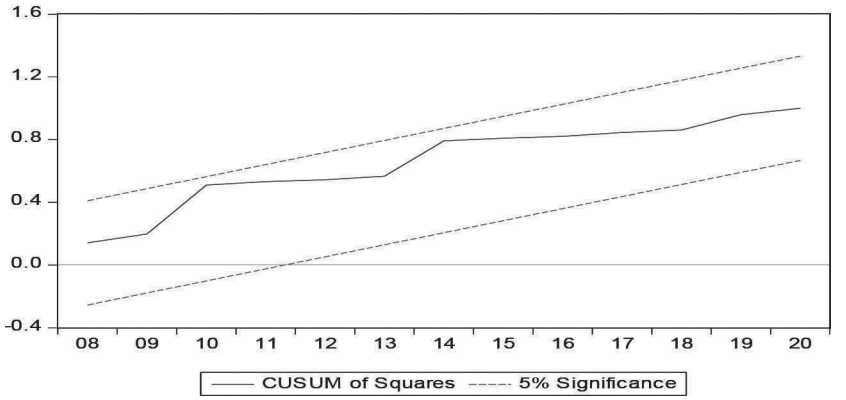
*Cointeq = LLOAN - (2.0093*LWPI -0.7240*LCPI -0.7125*LTB6 + 9.6375)*

Stability Tests

We carried out the stability tests using the CUSUM and CUSUM squared tests. Graphs 3a and 3b depict stable results at the 95% level.



Graph 3a: CUSUM Test



Graph 3b: CUSUM Squared Test

Conclusion

This paper aims to analyze the MPTM in Pakistan by considering these channels: The interest rate channel, credit channel, and the risk channel, as an innovative channel to measure its impact on the MPTM by covering the data from 1995 to 2020 in Pakistan. To fulfill the paper's aim, we examined the long-run & short-run relationship between foreign debt, interest rate, bank capital, and monetary policy transmission mechanism.

We have used the ARDL model, which has several advantages. The stated result

shows that the risk channel is stationary (p<.05). LEX, LGDP, and LINF are stationary at the 1st difference. In the interest rate channel LTB6, LKSE100 and LWPI are stationary. We found LCPI, and LLOAN are stationary at 1st difference. Also, in the credit channel LTB6 and LWPI are stationary. All the variables are stationary at 1st difference level and none at 2nd difference in all three channels. Subsequently, we used ARDL (Autoregressive Distributed Lag model) model. Table 4a of the risk channel shows the data does not follow the cointegration benchmark. The coefficient is negative (p>.05), suggesting no long-run relationship between the model variables.

Table 4b of the interest rate channel shows a negative coefficient, suggesting a long-run relationship between variables for the model. However, the variables LCPI(-1), LKSE100(-1), LWPI, and LWPI(-1) are statistically significant. Table 4c of the credit channel represents the cointegration benchmark. The coefficient is negative and statistically significant at 90%, suggesting a long-run relationship between the model variables. However, the variables LLOAN(-1), LWPI(-1), and LCPI(-1) are statistically significant. The results also show no long-run relationship in risk channel variables. Still, there is a long-run and short-run relationship between the interest rate and credit rate channels' variables.

Policy Recommendations

The paper has investigated the long-run and short-run relationship between the risk channel, interest rate channel, and credit channel of MPTM. Interest rate helps in stabilizing inflation. Besides interest rates, we recommend that the monetary authorities consider other options for controlling inflation. The credit channel of MPTM has a significant effect on monetary policy and the real economy. Apart from the credit, output significantly affects price shocks. The authorities can look to these aspects when forming the policy. Private sector investment is important for generating economic activities in an economy. Thus, the authorities may encourage private investors to invest in the productive sector. The country's monetary policy, apart from domestic variables, significantly depends on foreign variables. The international price of oil and dollar-rupee parity significantly affects macroeconomic variables such as "interest rate, exchange rate, inflation, and output," thus, the monetary policy must aim to reduce the deficits in the balance of payments. The policy must reduce the imports by finding alternative substitutes and decreasing the export of raw materials. Further, the export of value-added products by providing technical and financial assistance is encouraged.

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