Bulletin of Management Review

VOL- 2, ISSUE- 1, 2025

https://bulletinofmanagement.com/index.php/Journal

Name of Publisher: INNOVATIVE EDUCATION RESEARCH INSTITUTE
Area of Publication: Business, Management and Accounting (miscellaneous)
Review Type: Double Blind Peer Review

Bulletin of Management Review (BMR)

Online ISSN:3006-2268

Print ISSN: 3006-2276

Economic Policy Uncertainty Effect on Bank Lending Performance: Evidence from Pakistan

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Abstract

Economic policy uncertainty affects decisions of households, businesses, policy makers and financial intermediaries. We have thus examined in this paper the impact of economic policy uncertainty on aggregate bank credit growth in the context of Pakistan's economy. For the purpose of analysis 11 years monthly data from 2012-2023 has been taken. ARDL analysis and Quartile Regression have been used to examine the effect of EPU and other economic variables on Bank loan capacity. We have observed a significant positive association between loan spreads and EPU index. Together, our results suggest that economic policy uncertainty is an economically important risk factor for banks' loan pricing. EPU adversely impacts bank stability regardless of countries' development and income levels. Our empirical work has specific policy implications for banks, regulatory bodies and government agencies for decision-making.

Keywords: Economic Policy Uncertainty, ARDL Analysis, Quantile regression, Banks' loan pricing, Bank interest rate, Macro Economic Variables.

Paper Type: Research

Introduction

Economic policy uncertainty (EPU) has acquired substantial notice in recent literature due to its deep impact on financial institutions' lending decisions in a country like Pakistan (Ali *etal*., 2024; Fatemah and Ul Haq, 2024). Uncertainty in economic policies can significantly affect any financial intermediary's tactical choices, especially in markets characterized by high volatility and competition. Prior studies have emphasized the adverse effects of uncertainty on investment nature, suggesting that higher uncertainty levels can resort to reduced investment activities due to firms adopting a more cautious practice. Relying upon the essence of the nation's public policies and economic conditions, external borrowing responds to mold the growth proceedings accordingly. Private banks arguably are the second most reliable mode of borrowing, playing a pivotal role in financing the economy. It is imperative for a developing nation like Pakistan to break the chains of international borrowing from the likes of IMF, World bank China, Saudi Arabia and other Friends of Pakistan

Nations; to finance its function of public expenditure and development locally instead of relying upon expensive international alternatives (Qamruzzaman *etal*., 2022). Likewise, nations who are incapable to fulfill their debt obligations face severe macroeconomic imbalances, fiscal inconsistencies, worsening of foreign exchange reserves, lower investment and deterioration in credit ratings by international monitoring agencies. Policy-related uncertainty has numerous inferences for the safeguard and protection of the banking system. After the Financial crises 2008, policymakers have taken many steps, and bank regulators have tightened existing rules such as minimum capital requirements and introduced new rules such as liquidity rules, amongst others. The aim was to strengthen banks against future shocks.

A decade after the crisis, even though banks have become safer with important buffers, the recovery period has been quite sluggish for a developing economy like Pakistan unlike its counterparts in the region like India, Bangladesh Malaysia etc. In 2020 the world witnessed backlash of economies due to corona pandemic crises implying policy uncertainties (Ghani *etal*., 2024). The experience of the pandemic has taught the world that they should create provision and prepare in advance to safeguard their interests against consequences of economic policy uncertainties. This study aims to explore the specific impact of EPU on Bank Loans within the context of Pakistani economy, incorporating the role of macroeconomic variables as contributing factors.

In this paper, we use macro level aggregate bank data for the Pakistan banking industry and assess whether economic policy uncertainty has a role in explaining bank risk post-2007-2008 global financial crisis, Pakistan who has high reliance on foreign debt has an adamant need to be self-reliant on its own financial sector and local debt generation to meet its financial requirements. We specifically explore whether bank size, capital, and liquidity matter in mitigating the link between economic policy uncertainty and bank risk. To address this, we use the economic policy uncertainty (EPU) index developed by Baker et al. (2016), which accumulates policy uncertainty apparent in newspaper articles and other sources and addresses short-term and long-term uncertainty concerns.

Our Study provides two important contributions to the rapidly increasing

literature (Farooq *etal*., 2024; Karadima and Louri, 2021) that investigates the relationship between economic policy uncertainty and bank loan stability. First, by investigating the case of one single country i.e. Pakistan and using a large sample comprising of all commercial banks in Pakistan. Secondly, recent studies do not distinguish between demand-side effects and supply-side effects to capture actual changes in bank behavior caused by changes in economic policy uncertainty. Certainly, the impact of EPU on bank loan stability may result in a decline in customer loan demand (demand-side) as well as an adjustment in bank behavior in lieu of risk-taking (supply-side). In our paper we have strived to become the perspective of the supply side.

In our empirical analysis, we use aggregate data from a population of 33 Pakistani banks and 120 months expanding over a span of 11 years from 2012 Jan to 2023 Dec. Our findings indicate that higher economic policy uncertainty is significantly associated with a decrease in bank loans originating from borrowers' and customers' conditions but also from a change in bank behavior. Economic uncertainty results in decline and risk taking by financial institutions, i.e. Banks. The results are robust to alternative bank risk and economic policy uncertainty measures, controlling for standard macroeconomic variables. We document that the negative impact of economic policy uncertainty on stability of bank loans is significant.

The remainder of the paper is organized as follows. Section 2 presents relevant literature and Section 3 includes our data and methodology, and Section 4 presents our results and empirical findings. Section 5 provides the summary of the paper, policy implications and suggestions for future research.

Literature Review

Economic Policy Uncertainty And Economic Theories

Empirical studies can provide insights into how economic policy uncertainty impacts bank lending by analyzing data on loan volumes, interest rates, credit spreads, and loan terms, as well as how banks' lending behavior changes in response to fluctuations in policy uncertainty, often utilizing measures such as the Economic Policy Uncertainty (EPU) index to quantify these effects. Some of the important theories

impacting economic policy uncertainty and bank loans are as follows: the Bank Lending Channel Theory, Credit Rationing Theory, Asymmetric Information Theory, Real Options Theory, Agency Theory, Financial Accelerator Theory, Liquidity Preference Theory, and Behavioral Finance Theory. Babilla, (2024) comments that Bank Lending Channel Theory asserts changes in monetary policy affect the lending capacity of banks, which in turn affects the real economy. Economic policy uncertainty can lead to changes in interest rates and reserve requirements, thus influencing banks' willingness and ability to lend. Similarly, Jaffee & Stiglitz (1990) according to their credit rationing theory, banks may restrict the amount of credit they offer to borrowers if there is uncertainty about the future economic situation.Economic policy uncertainty can increase the perceived risk of lending, leading to more conservative lending practices. During times of economic policy uncertainty, the information asymmetry can be exacerbated, causing banks to tighten lending regulations to compensate risk (Akerlof *etal*., 2001).

In times of uncertain future economic conditions, firms may delay investment and borrowing until the uncertain situation is resolved. Here, Real options theory can be applied to understand how firms' investment decisions, including taking on new loans, are influenced by economic policy uncertainty (Jackson & Orr, 2019). Liquidity Preference Theory, developed by John Maynard Keynes, argues that during periods of uncertainty, both banks and borrowers prefer to withhold liquid assets rather than engage in lending or borrowing. Economic policy uncertainty can increase the demand for liquidity, thus reducing the supply of loans (Bibow, 2013).

Economic Uncertainty and Bank Lending

Bank lending rates are deeply impacted by economic policy uncertainty. During periods of high economic policy uncertainty, banks become more risk-averse. They perceive a higher risk of defaults due to the unpredictable economic environment, which leads them to tighten credit conditions. To compensate for the perceived increased risk, banks may raise their lending rates. This ensures that they are adequately compensated for the additional uncertainty and potential for higher default rates (Orden-Cruz *etal*., 2023; Ali *etal*., 2023).

Economic policy uncertainty also affects bank deposit rates. Research indicates that during periods of high uncertainty, banks often experience increased deposit inflows as depositors seek safe havens. However, the specific impact on deposit rates can vary based on the intensity and nature of the uncertainty, as well as the responses of central banks and regulatory bodies (Danisman *etal*., 2024; Cherrat & Prigent, 2023).

Ibrahim & Rizwi (2018) show that there is no significant difference in the lending behavior of Islamic and conventional banks during normal periods. However, this behavior diverges during crisis periods, indicating that the lending growth of conventional banks declines during crises, whereas Islamic banks remain unaffected. Bank lending rates are deeply impacted by economic policy uncertainty. During periods of high economic policy uncertainty, banks become more risk-averse. They perceive a higher risk of defaults due to the unpredictable economic environment, which leads them to tighten credit conditions. To compensate for the perceived increased risk, banks may raise their lending rates. This ensures that they are adequately compensated for the additional uncertainty and potential for higher default rates.

Ashraf & Shen (2019) in their study using bank-level data from 17 countries spanning the period from 1998 to 2012, concluded that government economic policy uncertainty is significantly and positively associated with interest rates on bank gross loans.

Economic Uncertainty and Investment

Economic uncertainty refers to the unpredictability of economic policies implemented by governments (Al-Thaqeb & Al Gharabali, 2019). This uncertainty is typically driven by frequent policy changes and/or the government's inability to enforce their policies effectively. Prior research underscores the significance of economic uncertainty, noting its substantial impact on various economic outcomes. Baker et al. (2016), have reported a negative impact of economic uncertainty on employment and investment. (Asgharian *etal*., 2023)associate economic uncertainty with higher volatilities in option markets and in stock markets, respectively. (Cui *etal*., 2021)

compliment these findings by showing that An increase in economic uncertainty depresses investment.

Economic Uncertainty and Consumer Price Index (CPI) Inflation

Economic policy uncertainty (EPU) can have a wide range of effects on inflation and the Consumer Price Index (CPI), influencing both directly and indirectly through various economic channels. High economic policy uncertainty can lead to reduced consumer confidence, causing households to delay or reduce spending. Lower consumer spending reduces aggregate demand, which can put downward pressure on prices and inflation. Central banks might respond to high economic policy uncertainty by adjusting interest rates. For instance, they may lower rates to stimulate the economy, which can increase inflation. Conversely, they may raise rates to prevent the economy from overheating, which can reduce inflation. High policy uncertainty can make it harder for central banks to anchor inflation expectations, potentially leading to more volatile inflation outcomes. Uncertainty can also affect capital flows, with investors seeking safer assets. Changes in capital flows can influence exchange rates and, consequently, import and export prices, impacting overall inflation. Moderate inflation can be predicted and managed by businesses and consumers. However, high or volatile inflation paves way for economic uncertainty (Tarkom & Ujah, 2023). Pakistan is also facing serious challenges such as high inflation, a large undocumented economy, income inequality, and a significant proportion of the population living below the poverty line. In April 2023, the national Consumer Price Index (CPI) was recorded at 36.40 percent (y-o-y), with Sensitive Price Index (SPI) reaching 46% in the same month. These two indices, along with other variables, substantially affect the everyday life of an ordinary citizen (Nasir, 2023). The country is struggling with a fiscal deficit, a reliance on external loans, and a need for structural reforms to promote sustainable growth. In such a devastating scenario, relying on domestic banks for loan lending is an excellent alternative to the less desirable option of external borrowing from institutions such as the International Monetary Fund (IMF) and foreign lenders (Khan *etal*., 2023).

Economic Uncertainty and USD Exchange Currency Rate

Economic policy uncertainty can lead to increased volatility in exchange rates. A depreciating currency can increase the cost of imports, leading to higher CPI and inflation. Conversely, an appreciating currency can lower import costs and reduce inflation (Bin Khidmat *etal*., 2024). Korley & Giouvris, (2023) concluded that EPU has a positive effect on exchange rates and countries with weak economies have a weak institutional framework making them vulnerable to external fluctuations or more specifically in our case economic policy uncertainty. The exchange rate between the US Dollar (USD) and the Pakistani Rupee (PKR) can be significant, as high EPU can affect currency value and reserves of a volatile economy like Pakistan. Pakistan, like other developing nations, heavily depends on imports for goods like machinery, oil, chemicals, and raw materials. These imports are usually paid for in US dollars (USD). Therefore, the stability of the Pakistani Rupee (PKR) against the USD is vital for controlling import costs and sustaining a robust balance of payments (Abbass *etal*., 2022).

Ahmad *etal*., (2024) in their research on data from Pakistan observed that any unfavorable change in KIBOR (Karachi Interbank Offered Rate) does not positively impact bank performance in loan lending. The KIBOR is the benchmark interest rate at which banks in Pakistan lend to one another for their financial short-term needs. It is a critical reference rate used for pricing financial products like mortgages, loans and credit borrowing. KIBOR changes reflect the current financial conditions in the banking system and the overall economic situation (Rashid etal., 2024).

Economic Policy Uncertainty and Foreign Exchange Reserve

Economic policy uncertainty can have a spillover impact on a country's foreign exchange reserves, as seen in the case of Pakistan. When the government's economic policies are unclear or constantly changing, it can lead to fluctuations in currency values and a decrease in foreign exchange reserves (Bin Khidmat *etal*., 2024; Gohar *etal*., 2022). This uncertainty makes it challenging for investors to make decisions regarding their investments, leading to potential capital outflows. In the case of Pakistan, maintaining a stable and consistent economic policy is crucial to ensuring a healthy level of foreign exchange reserves, which are essential for supporting the

value of the country's currency and facilitating international trade. The decline in Pakistan's foreign exchange reserves has led to balance payment problems for the country, which heavily relies on imports (Sultani & Faisal, 2024; Al Abri *etal*., 2023). This situation poses significant challenges for Pakistan as it faces difficulties in meeting its external obligations. The country's high dependency on imports exacerbates the impact of the decline in foreign exchange reserves, making it harder to maintain a stable balance of payments. This imbalance highlights the importance of diversifying Pakistan's economy and reducing its reliance on imports to the effects of fluctuations in foreign exchange reserves. By addressing these issues, Pakistan can work towards achieving a more sustainable and resilient economy. The deficit balance of payment reflects that Pakistan should prioritize generating more funds locally through bank borrowing rather than relying heavily on external borrowing from institutions like the IMF and World Bank ((Khan etal., 2024; Shahid *etal*., 2023). By leaning local sources, the country can reduce the burden of hefty interests and additional costs associated with foreign borrowing. The shift can lead to a more secure and independent financial strategy that is beneficial for Pakistan's economy in the long run. This is the principal dilemma our study is addressing.

Economic Policy Uncertainty and Foreign Direct Investment (FDI)

When there is a high level of uncertainty economic policies, foreign investors may hesitate to invest in that particular country due to concerns about potential risks and instability. This hesitation can lead to a decrease in FDI, as investors may choose to hold back their capital until the economic environment becomes more predictable. On the other hand, a stable and transparent economic policy framework can attract foreign investors by providing them with the confidence and assurance they need to make long-term investments. Foreign companies bridge the saving-investment and technical gap by providing the recipient economy with essential capital and technological resources which assist in enhancement of overall productivity of the beneficiary country (Qamruzzaman., 2023). Thus, reducing economic policy uncertainty is crucial in attracting and retaining foreign direct investment, which can ultimately contribute to economic growth and development (Bin Khidmat *etal*., 2024).

Data and Methodology

This study employs the economic policy uncertainty index developed by Baker et al. (2016). This index measures economic policy uncertainty by quantifying the content of major daily newspapers in an economy. It is a country-specific index based on newspaper frequency, coverage and disagreement among economic predictors. For the construction of this index monthly counts of articles that contain terms pertaining to uncertainty (or uncertain, unclear, unstable unpredictable,), and economics or more of the following policy-relevant terms: regulation, monetary policy, fiscal policy, central bank (or SBP), FBR (or tax authorities), policymakers, parliament, deficit, government, reserves, taxes, tariffs, legislation. After acquiring these raw counts, they scale by the number of articles published in the same newspaper and month. They standardize each newspaper's scaled frequency counts to have a unit standardized deviation from August 2010 onwards. All variables were collected monthly with the sample data ranging from January 2012 to Dec 2023.

For values of variables Bank Loan advances, Foreign Direct investment, Foreign Exchange Reserve natural Logaithm (Ln) has been taken in order to moderate variables with large quantities.This has several advantages which are described as follows. One rationale for transforming data is to make it more symmetrical or "normal" by giving the data a singulairity of measurement for the purpose of analysis. When engaged in statistical analyses assuming normality, a log conversion can aid in meeting this assumption. Another purpose is to satisfy the condition of uniform variance within linear modeling contexts. It is common for certain data types to exhibit exponential growth tendencies. By applying the natural logarithm to a series that displays exponential growth, we essentially achieve a linear data format. This transformation facilitates the visualization of growth rates. Logarithms play a crucial role in probability and statistics by converting skewed data or transforming multiplicative relationships into additive forms, rendering them suitable for specific statistical methods. Through logarithmic transformations, researchers can tackle numerous challenges including diminishing the impact of outliers, approximating skewed data towards normality, linearizing variable

relationships, and stabilizing variances in heterogeneous data. This approach simplifies tracking the net changes in variables in comparison to other variables with minor quantities (Ghani *etal*., 2022;Wang & Muasavi, 2023; McCall & Villafranca, 2024). For other varaiables comprising of percentages, rupees currency exchange we have taken data without log since they are smaller values (Jena & Sethi, 2020)etc.

These macro economic Independent variables include consumer price Index (CPI) for inflation analysis, Karachi Inter bank Offered rate (KIBOR), Deposit Rate (%) lending Rate(%) and US Dollar exchange currency rate (USD). Eviews 10 software has been utilized for analysis of the statistical data.We began our analysis with chcking for stationarity for all variables as it is a prerequisite of time series modelling. This was followed by Auto distributed Lag Model (ARDL) which was used to investigate the long run cointegration effect in the context of Pakistan‘s economy. Correlation matrix was also used to identify and check for multicollinearity issues. F- bound test was run to check for cointegration. Lastly for enhanced analysis Quantile regression was used as an important tool to asess performance at every 5^{th} Quantile ranging from 0 to 100.

The ARDL model offers several advantages over its predecessors. First, it provides reliable results even with small sample sizes. Second, it is effective regardless of whether the variables are integrated of order 1 or 0. (Uzar & Eyoboglu, 2024). This is a unique feature because traditional models like VAR and VECM can only be used when the variables are integrated to the same order. (Hashmi & Chang, 2023; Elneel & al Muhim, 2022; Shuaibu *etal*., 2021)). Thirdly, the model further facilitates the derivation of ECM (Error Correction Model) (Kong *etal*., 2021)). Fourthly, ARDL models are free from residual correlation, which helps address endogeneity issues also. (Sowah & Kirikkaleeli, 2022).

To identify the impact of Economic Policy Uncertainty (EPU) on bank lending, we estimate the following model:

$$Ln\ Bank\ Loan\ Advances\ (y_t) = \alpha + \beta_1 EPU_t + \beta_2 CPI_t + \beta_3 Kibor_t + \beta_4 Deposit\ Rate_t + \beta_5 Lending\ rate_t + \beta_6 Ln\ Foreign\ Exchange\ Reserve_t + \beta_7 USD\ Exchange\ Rate_t + \beta_8 Ln\ FDI_t + \varepsilon$$

Our Dependent Variable Bank Loan Advances is the monthly aggregate bank Advances from all the banks in the Pakistan Economy. The monthly index of economic policy uncertainty (EPU) compiled by (Baker *etal*., 2016) has been employed as our primary variable of interest. Other variables in the equation include CPI, which is consumer price index monthly percentage rate, Kibor (Karachi Interbank Offered rate) interest rate for banks, LN Foreign Exchange Reserve is the exchange currency reserve withheld by the banks for making import bill payment and opening LC (letter of credit), Lending rate is the % percentage change for interest charged as per directions of Pakistan's Central bank I.e. State Bank Of Pakistan.

Reflecting the movements in policy-related uncertainty, EPU is available for 30 major economies of both developed countries and emerging markets. Baker et al. (2016) shows a strong relationship between EPU index and other conventional measures of economic uncertainty and policy uncertainty. This index has been widely applied in academic research and industry practices.

Table 1 presents the description, symbol and details for variables used in this study.

Table 1 Description of Variables for Varaiables used in this Study

Variable	Symbol	Category	Measurement Unit (Monthly)	Source
Ln Bank Loan Advances	Ln Bank Loan	Dependent Variable	Rupees (Millions)	State Bank of Pakistan (https://www.sbp.org.pk)
Economic Policy Uncertainty index	EPU	Independent Variable	Index value	https://www.policyuncertainty.com/
Consumer price Index	CPI	Independent Variable	Index value	State Bank of Pakistan (https://www.sbp.org.pk)
Deposit Rate	Deposit	Independent Variable	%	State Bank of Pakistan (https://www.sbp.org.pk)

Lending Rate	Lending	Independent Variable	%	State Bank of Pakistan (https://www.sbp.org.pk)
Foreign Direct Investment	Ln FDI	Independent Variable	Rupees (Millions)	State Bank of Pakistan (https://www.sbp.org.pk)
Karachi Interbank Offered Rate	KIBOR	Independent Variable	%	State Bank of Pakistan (https://www.sbp.org.pk)
Ln Foreign Exchange Reserve	Ln Fex	Independent Variable	Rupees (Millions)	State Bank of Pakistan (https://www.sbp.org.pk)
United States Dollar Currency rate	Usd	Independent Variable	Pak Rupee	State Bank of Pakistan (https://www.sbp.org.pk)

Table 2 provides list of all the banks which comprise the aggregate banking sector used in this study with details of their scale of operations by exposure of their accumulated branch network geographically dispersed all over the country, Pakistan

Table 2: List of Banks and Branches in Pakistan

No.	Bank	Total Branches	Ownership Structure
1	Allied Bank	1417	Local Private Bank
2	Askari Bank	548	Local Private Bank
3	Bank Al-Habib Ltd.	754	Local Private Bank
4	Bank Alfalah	693	Local Private Bank
5	Habib Bank Ltd	1750	Local Private Bank

6	Habib metro	401	Local Private Bank
7	JS Bank	365	Local Private Bank
8	MCB	1418	Local Private Bank
9	Samba	40	Local Private Bank
10	Silk Bank	124	Local Private Bank
11	Soneri Bank Ltd.	310	Local Private Bank
12	Standard Chartered	61	Local Private Bank
13	Summit Bank	193	Local Private Bank
14	United Bank	1415	Local Private Bank
15	Dubai Islamic	252	Islamic Bank
16	Bank Islami	340	Islamic Bank
17	MCB Islamic	185	Islamic Bank
18	Meezan	760	Islamic Bank
19	Faysal Bank	556	Islamic Bank
20	Al-Baraka Bank	194	Islamic Bank
21	First Woman Bank Ltd	42	Public Sector Commercial Bank
22	Sindh Bank	335	Public Sector Commercial Bank
23	Bank Of Khyber	176	Public Sector Commercial Bank
24	Bank Of Punjab	790	Public Sector Commercial Bank
25	National Bank of Pakistan	1589	Public Sector Commercial Bank
26	Deutsche	2	Foreign Bank
27	Bank of China	1	Foreign Bank
28	Industrial & Commercial Bank of China	3	Foreign Bank
29	Citi Bank	3	Foreign Bank
30	SME Bank	13	Specialized Bank
31	Punjab Provincial Cooperative Bank	151	Specialized Bank
32	Industrial Development Bank	2	Specialized Bank
33	*Zarai Taraqiyati Bank (ZTB)*	502	Specialized Bank

Total	**15385**

Source : State Bank of pakistan website https://www.sbp.org.pk

Empirical Framework

Results and Analysis

Descriptive Statistics

Table 3 summarizes the descriptive statistics of the independent and dependent variables of the Bank loans and EPU studied, which were calculated from the monthly reporting's of the statistical bulletin from the state bank of Pakistan (SBP), showing the mean, the median, the maximum, the minimum and the Standard deviation for each variable. Mean represents the average value for each variable, whereas Std. Dev. represents the dispersion of these variables from their respective means.

Table 3 Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	SD
Ln Bank Loan	15.607	15.813	16.268	14.95	0.4164
EPU	98.172	83.298	319.899	27.493	53.740
CPI	10.026	8.20	38	1.3	8.076
KIBOR	10.102	9.220	22.52	5.96	4.279
Deposit Rate	5.143	4.895	12.76	2.84	2.217
Lending Rate	10.604	10.26	21.46	6.03	3.698
Ln Foreign Exchange Reserve	9.698	9.791	10.206	9.0	0.277
USD Exch Rate	141.434	110.360	304.846	90.257	55.035
Ln FDI	5.4003	5.4282	6.566	1.808	0.506

Unit Root Test

Unit root tests are crucial for determining the stationarity of a data distribution, which is essential before selecting appropriate econometric models for analysis. The behavior of stationary and non-stationary series differs significantly, necessitating different treatments for each type (Liao *etal*., 2022; Doganlar *etal*., 2021)). To ensure robustness and facilitate comparison, we employed both the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test at the level and first difference. The results for all variables are summarized in Table 4. The ADF unit root test results indicate that all variables are stationary at level except EPU and Ln FDI, which reveal stationarity at 1st differnce. Philips-Perron test designate similar findings for intercept test equation. When some varaibles are stationay at level and others at 1st difference ARDL (Auto Regressive Distributed Lag) method is the appropriate technique for analysis. The detailed table for the unit root test can be found in Table 4.

Table 4 Unit Root Test

Variables	Intercept				Intercept and Trend			
	ADF		PPP		ADF		PP Test	
	Level	1st Difference	Level	1st Difference	Level	1st Difference	Level	1st Difference

Loan	-0.557	-8.42***	-0.591	-11.879***	-2.64	-8.39***	-2.68	-11.83***
	(0.875)	(0.00)	(0.867)	(0.00)	(0.259)	(0.00)	(0.243)	(0.00)
EPU	-2.94**	-10.75***	-3.809***	-36,83***	-4.607***	-10.72***	-5.86***	-42.15***
	(0.042)	(0.000)	(0.003)	(0.000)	(0.001)	(0.00)	(0.00)	(0.00)
CPI	0.030	-6.123***	-0.100	-11.289***	-1.259	-6.123***	-1.259	-11.668***
	(0.977)	(0.00)	(0.964)	(0.00)	(0.893)	(0.00)	(0.893)	(0.00)
Kibor	-0.759	-3.944***	0.042	-8.169***	-1.564	-4.37***	-0.868	-8.857***
	(0.827)	(0.00)	0.960	(0.00)	(0.802)	(0.00)	(0.955)	(0.00)
Deposit	-0.727	-3.859	-0.519	-19.003	-1.34	-4.127	-1.245	-20.018
	(0.835)	(0.00)	(0.882)	(0.00)	(0.873)	(0.00)	(0.896)	(0.00)
Lending	-0.796	-3.595***	-0.0907	-9.389***	-1.383	-4.22***	-0.725	-9.697***
	(0.816)	(0.00)	(0.947)	(0.00)	(0.861)	(0.005)	(0.968)	(0.00)
Ln exch	-2.25	-4.183***	-1.945	-10.699***	-2.22	-4.181***	-1.934	-10.665***
	(0.189)	(0.00)	(0.311)	(0.00)	(0.473)	(0.00)	(0.631)	(0.00)
USD	1.567	-5.423***	1.861	-14.686***	-0.409	-6.193***	-0.534	-15.619***
	(0.999)	(0.00)	(0.999)	(0.00)	(0.986)	(0.00)	(0.981)	(0.00)
LN FDI	-3.771***	-8.899***	-8.994***	-62.702***	-4.031***	-8.869***	-9.332***	-75.058***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

***, ** and * denotes significance at 1%, 5% and 10% respectively

Table 5 sheds light on the empirical results of ARDL bound testing approach. The criterion to analyze bound tests is as follows: If Value of F test is between upper and lower bound: Results are non-conclusive. If value of F is above Upper bound: Cointegration exists. If value of f is below lower, bound: no cointegration. The results

indicate that the calculated F testing approach 1.32 for Ln Loan is less than I (0) at 10% 5% 2.5 % and 1% with values 1.85, 2.11, 2.33 and 2.62 respectively. Thus, the

ARDL Bounds Test – Bank Loan		
Test Statistic	**Value**	**k**
F-statistic	1.326504	8
Critical Value Bounds		
Significance	**I (0) Bound**	**I (1) Bound**
10%	1.85	2.85
5%	2.11	3.15
2.50%	2.33	3.42
1%	2.62	3.77

null hypothesis is accepted. Test is insignificant and we conclude there is no cointegration amongst the selected variables.

Table 5: ARDL Bound Test for Long Run and Cointegration

Table 6 Long Run Analysis for Bank Loan

Long Run Coefficients for Bank Loan				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
EPU	-0.00	0.00	-0.09	0.92
CPI	0.02	0.03	0.65	0.51
KIBOR	0.06	0.12	0.50	0.61
Deposit rate	-0.01	0.16	-0.07	0.93
Lending Rate	-0.14	0.17	-0.85	0.39
Ln Exch Reserve	0.53	0.43	1.24	0.21
USD rate	0.005	0.004	1.22	0.22
Ln FDI	0.12	0.15	0.803	0.423
C	9.72	4.22	2.29	0.02

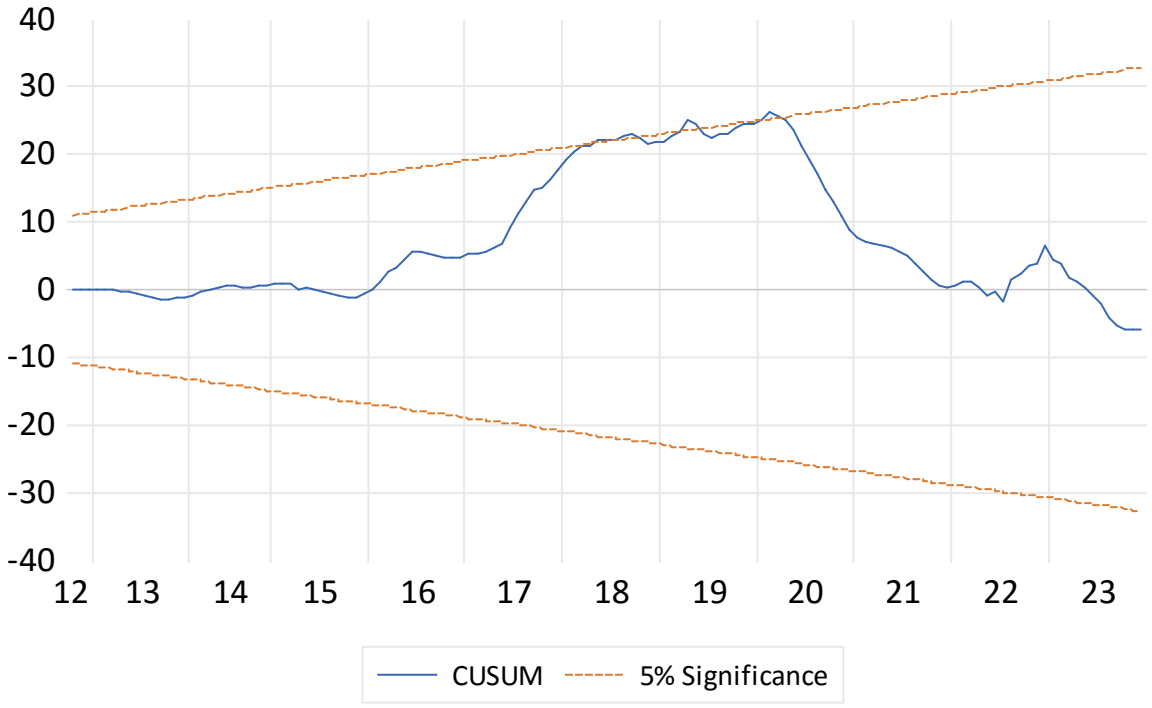
***, ** and * denotes significance at 1%, 5% and 10% respectively

Our ARDL regression equation has failed the long run co-integration and bound test

thus depicting a nonexistence of short-term equation. Therefore, we have avoided reporting short- term results for our analysis.

Figure 1 displays the Cumulative residual square (cusum) test. The Cusum test helps determine whether the regression coefficients are changing systematically.

Figure 1 Diagram for Bank Loan Cusum



Quantile Regression

Quantile regression is a statistical technique that extends traditional regression analysis beyond estimating the mean of the dependent variable. Instead of focusing solely on the conditional mean, quantile regression estimates the conditional median or other quantiles (percentiles) of the dependent variable distribution. This approach provides a more comprehensive view of the relationship between variables, especially when the data exhibits heteroscedasticity or non-normality.

Model Specification

The functional form of the model for Economic Policy Uncertainty and macroeconomic factors'

effects on the performance of the Ln Bank Loans is specified as follows:

Ln Bank Loans = f (EPU, Lending, Deposit, LN FDI, Ln Fex, Usd, kibor, CPI) ….(2)

Quantile Regression is described by the following equations.

$Y_t = X_t \beta_q$ …… (3)

Where β_q is the vector of unknown parameters associated with the q^{th} quantile.

The OLS minimizes $\sum_t I e_t I$

The quantile regression minimizes $\sum t\ qIe\ t\ I + \sum t\ (1 - q)\ Ie_t\ I$ which is a sum that produces the asymmetric penalties $qIe_i\ I$ representing under-prediction and $(1 - q)Ie_t\ I$ for over-prediction.

Essentially, the estimator of the q^{th} βq minimizes over βq the objective function expressed as;

min $_{b£R}{}^{K}$ [$\sum_{t£(t:yt\geq x^t\ t}$ β) qIy_t - $x^{\ t}{}_t$ βqI+ $\sum_{t£(t:yt< x^t\ t\ \beta)}$ (1 – q)Iy_t - $x^{\ t}{}_t$ βqI ……(4)

Where; 0< 1 denotes the conditional quantile function for the θ—th quantile. Indicating with xí the í—th regressor (í=1,..,κ), the conditional quantile Q_θ (y/xi) = χ'_t βqis the inverse of the conditional distributional function of the response variable, F^{-1} y/x_i).

Ordinary Least Square (OLS) Residuals

Linear ordinary least squares (OLS) regression can be performed to determine the linearity of the variables under study. However, if the assumptions of multivariate normality, no serial correlation, and homoscedasticity are violated, the quantile regression model is applied instead. The results of Ordinary Least Square (OLS) residual or pre-estimation tests are presented in Table 1 below. Our tests failed to reject normality of the data distribution, but residual tests conclude that the OLS assumptions of no serial correlation and homoscedasticity are being violated. In this regard we further explore quantile regression for our study of Ln Bank Loan under Economic policy uncertainty conditions.

Table 5: Residual Test Results for OLS (Ordinary Least Square) Regression

Tests	F-Statistics	P-value	Conclusion
JarqueBera	2.978	0.225	Data is normally distributed
Breusch Godfrey	68.27	0.00***	Serially correlated
BreuschPagan Godfrey	2.055	0.052*	Heteroscedastic

Table 6 presents the QR estimates of the variable EPU in the model for ln Bank Loans. We analyzed the performance of the EPU coefficient at every 5% interval, resulting in a total of 20 quantiles. The results demonstrate that economic policy uncertainty is closely linked to slower real loan growth, both at the aggregate level and across individual banks in Pakistan. This finding remains robust even when significant economic variables are included, using the newspaper-based historical index on finance-centric economic policy uncertainty from Baker et al. (2016). This indicates that economic policy uncertainty impacts the economy through the bank lending channel, supporting the interpretation that higher levels of economic policy uncertainty, typically observed during recessions and recoveries, constrain bank loan growth and economic activity.

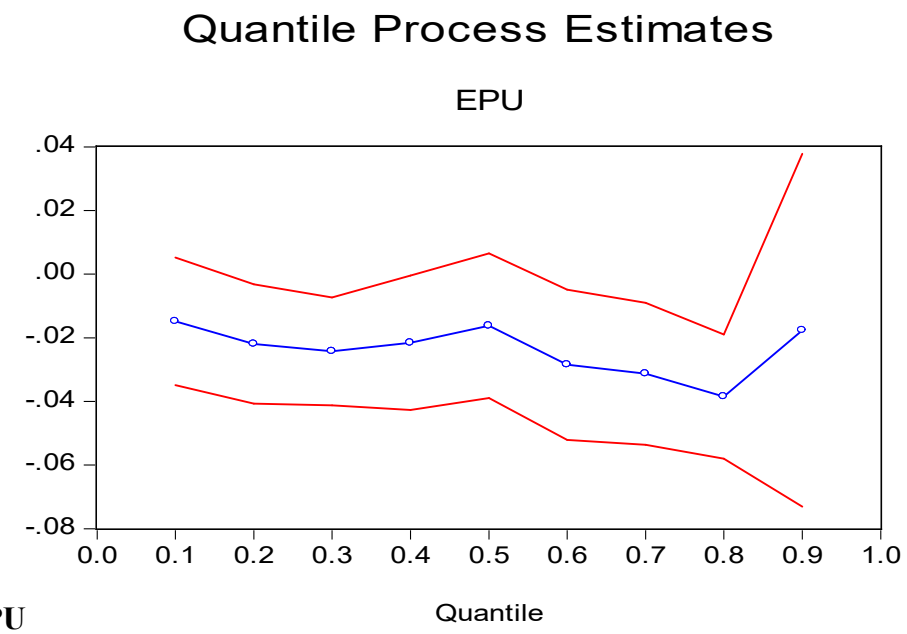
Table 6 Quantile Regression Estimates of Coefficient EPU for Model Estimating Ln Bank Loans

Quantile (Tau)	**EPU**	
	Coefficient	**Prob**
0.05	0.001018**	(0.0186)
0.1	0.001123**	(0.0278)
0.15	0.001121***	(0.0065)
0.2	0.001121***	(0.0065)
0.25	0.001176***	(0.0029)
0.3	0.001062**	(0.0104)
0.35	0.001026***	(0.0089)
0.4	0.001201**	(0.0113)
0.45	0.001574**	(0.0141)
0.5	0.001416**	(0.0279)
0.55	0.001428**	(0.0141)
0.6	0.001518***	(0.0034)
0.65	0.001465**	(0.0035)
0.7	0.001593***	(0.0042)
0.75	0.001002*	(0.0937)

0.8	0.001555*	(0.0815)
0.85	0.001020*	(0.0952)
0.90	0.000304	
0.95	0.000007	

***, ** and * denotes significance at 1%, 5% and 10% respectively

Figure 2 Quantile Process Estimate for Variable



EPU

Table 7 displays output for Wald and equality of slopes tests across quantile levels. The Wald test summary of Chi-Sq. statistic value of 178.874 is statistically significant at the 5% level. Therefore, there is a rejection of the null hypothesis of slope equality across quantiles. This finding confirms that the relationship between the explanatory variables (EPU, CPI, LN FDI, Ln exch Reserve, exchange rate, Kibor, deposit rate, lending rate) and the explained variable (Ln Loans) varies across quantile values. These findings confirm the heterogeneity of the macroeconomic factors' and EPU effects Bank loans. However, the individual coefficient restriction test values show evidence of symmetry across all quantiles except percentiles 70%,75%; and 85%, 90%. With 10% level of significance. It means there is evidence of asymmetry at 10% significance for these quantiles.

Table 7: Heterogeneity Test for Equality of Slopes

Test Summary	**Chi Sq**	**d.f.**	**Prob.**
Wald Test	178.874***	126	0.0014

EPU (Economic Policy Uncertainty)

Percentile	Test Stat	P value
05,10	-0.000105	0.78
10,15	0.0000002	0.99

15,20	0.000115	0.60
20,25	0.0000059	0.75
,15%25,30	0.000114	0.56
30,35	0.0000362	0.84
35,40	-0.000175	0.40
40,45	-0.000373	0.21
45,50	0.000158	0.57
50,55	-0.000116	0.96
55,60	-0.0000906	0.71
60,65	0.0000536	0.81
65,70	-0.000129	0.61
70,75	0.0000591*	0.07
75,80	-0.000553	0.27
80,85	0.000535	0.30
85,90	0.000716*	0.08
90,95	0.000223	0.55

***, ** and * denotes significance at 1%, 5% and 10% respectively

Moreover, the results have significant implications for financial reform and stability. While most previous studies have shown a negative association between economic policy uncertainty and loan growth (Nguyen et al., 2024; Ozili, 2022; Nguyen et al., 2020), our findings reveal a smaller positive impact of economic policy uncertainty on loan growth at banks. Some studies have documented positive relationships between EPU and bank credit (Moudud-Ul-Huq & Akter, 2024; Bhatia, 2024). The primary reasons include well-capitalized reserves and liquidity holdings in such banks, with less robust evidence suggesting that uncertainty effects are less negative due to banks holding more cash. This evidence of loan supply-side effects at the individual bank level suggests that transitioning to a more highly capitalized banking system could make economies more resilient to economic policy uncertainty, especially if countercyclical capital and liquidity buffer provisions prevent regulatory issues. Another reason for positive association with banks credit and EPU is that when there is evidence of future economic uncertainty people liquidate their stock investment and

put their funds in Gold and fixed term deposit to yield guaranteed fixed minimum returns rather than bearing huge losses due to stock indices declining and prevalent economic uncertainty. This creates interest and a positive relationship with bank loans. Our results show that bank credit is slightly rising due to the increase in economic policy uncertainty (EPU). Therefore, research shows EPU and Gold prices move in the same direction (Shaikh & Vallabh, 2024; Yu *etal*., 2024;).

Our results also imply that bank lending growth in Pakistan may have been supported since early 2014 by reducing economic policy uncertainty following the transition to higher bank capital ratios, induced by the prerequisites of external loan agreements from the IMF and World Bank (Limi, 2004). Moreover, the State Bank of Pakistan (SBP) has imposed stricter capital adequacy requirements and other regulatory measures. Smaller banks, which could not meet these requirements, faced consolidation, merger with larger banks or closure (Ahmed, 2018; Khalid & Nadeem, 2017). Considering that other studies have highlighted the substantial macroeconomic impacts of bank lending growth on the broader economy, our findings align with the perspective that high economic policy uncertainty may have hindered Pakistan's economic recovery from the ongoing recession by limiting overall credit growth through the bank lending channel.

Larger banks tend to hoard extraordinary cash reserves during periods of economic uncertainty. Spillover effects show that banks with higher member bank liquid assets are more likely to reserve cash in uncertain times compared to those with lower partner resources. The impact of economic policy uncertainty (EPU) is particularly detrimental for larger banks, those with smaller capital bases, higher credit risk, and public sector banks. Increased liquidity hoarding in these institutions is driven by the balance sheet and bank lending channels as outlined in credit channel theory. This study emphasizes the importance of developing financial markets and institutions that can adapt to changing economic conditions to mitigate the adverse effects of economic policy uncertainty.

Summary and Conclusion

The present study was conducted to examine the dynamic interactions between

macro-economic variables economic policy uncertainty index and Bank Loan aggregate data for the country. This study pioneers in documenting adverse effects of EPU upon banking sector of Pakistan, which is valid for both symmetry and asymmetry estimation. Time series monthly data for the period Jan 2012 till Dec 2023 has been utilized in this study.

Our purpose of investigation in this article was to determine the effect of Economic Policy Uncertainty (EPU) on Bank credit and Loans. We conducted unit root test followed by ARDL test to investigate the short- and long-term relationship of our variables of study. Our data did not stablish cointegration and short-term relationship. Thus, we then applied Quantile regression technique to study our variable of interest. We executed Quantile regression, equality of slopes and Wald test. Quantile regression process estimates for EPU proved significant for all the quantiles from 5% till 90%.

The unique finding of our paper was we discovered a positive relationship between Bank Loans and EPU which is coherent with a few researchers also (Bhatia, 2024; Moudud-Ul-Huq & Akter, 2024). This is owing to the preence of cash liquidity holdings by banks (supply side) and a demand push effect of investors to move their investments from stocks to Gold and bank loans return.

Economic policy uncertainty significantly impacts bank lending rates through increased risk perception, higher costs of capital, changes in loan demand, and regulatory responses. Understanding this relationship is crucial for policymakers and financial institutions as they navigate periods of economic instability and work to ensure a stable lending environment.

For future recommendation the horizon of this study can be extended to micro level with investigating of various sectors like financial / capital / automobiles/ agriculture / textiles and their industry practice and response to economic policy uncertainty.

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