



## Exploring the Nexus between Economic Policy Uncertainty and Consumer Price Index in Emerging Economy: The Demonstration of ARDL and NARDL

Dr Abdul Rehman<sup>a</sup>, Tayyba Anwar<sup>b</sup>, Hafsa Iqbal<sup>c\*</sup>

<sup>a</sup>QEC Officer, The University of Faisalabad, Punjab, Pakistan. <sup>b</sup>Department of Computer Science, University of Agriculture, Faisalabad, Pakistan. <sup>c</sup>MPhil Scholar, Govt. College University Faisalabad (GCUF), Punjab, Pakistan

\*Email: [hafsaumiari845@gmail.com](mailto:hafsaumiari845@gmail.com)

**Abstract:** The global competitiveness and economic dynamics have caused volatility in many economic indicators especially in the uncertainty of government economic policies and regulations that effect the business and consumer decisions to greater extent. Investors and policymakers are constantly seeking to understand inflation dynamics and consider very important to know about the effects of such uncertainty on prices. This study aimed to spotlight the asymmetric impact of EPU on prices in Pakistan during period 2015 to 2022. We explored economic indicators, policy trends, and CPI sourced from the Pakistan Bureau Statistics. We applied ARDL and NARDL techniques to test the established hypothesis and achieve the study aims. Our findings confirmed that policy uncertainty has significant negative effect on Pakistani households. Further our findings also validated and confirmed the short and long-run asymmetric relationship between EPU and CPI in the context of Pakistan. Whilst spending, investment, and currency exchange rates are all factors that have connections to inflation thereby concluding that different government regulations and policies might affect these factors. Therefore, it is a serious issue that affects the country's economic dynamics and patterns directly, so the government needs a well-established workable framework to counter the element of uncertainty with a view to avoid price surge and economic imbalances. We also noticed that political instability and corruption have far reaching consequences for the economic growth of Pakistan. The study has implications for policymakers who are searching for way forward and new ways to reduce inflation and to remove the economic imbalances to ascertain smooth functioning of the economy. Further by understanding the relationships between policy uncertainty and the CPI, policymakers can build a growth-friendly environment with less negative effects on consumer prices.

**Keywords:** Economic Policy Uncertainty; Consumer Price Index; ARDL; NARDL; Wald test; Pakistan

### 1. Introduction

The emergence in globalization and trade facilitations has widened the scope of economic policies to be consistent to attain the desired economic milestones. Since last few decades, the significant changes in the global economic system, the structure of institutions, and the changes in policies have resulted in significant economic growth and also fostered challenges due to intense rivalry and competition. Therefore, the economic environment in which companies invest and allocate resources is becoming more uncertain and unpredictable. According to Handley & Limão (2015), policy uncertainty affects economic development significantly more than by either monetary policy or fiscal policy. The uncertainty of future consumption and investment plans have a significant impact on the growth rate in the economy in many countries, particularly in developing world (Choudhary et al., 2020; Pástor &

Veronesi, 2012). In developing countries, economic uncertainty is common phenomenon because not everyone has access to the same knowledge, production stands low, and the emergence of new technologies are fund rare. Due to these shortcomings and constraints these nations are more dependent on outsourcing and importing from developed nations due to their competitive edge. The government's erratic and inconsistent policies cause economic uncertainty, which is made worse mainly by officials' sloppy responses to changes in the economy, and their own goals. It is generally accepted that the financial markets respond to news regarding significant economic indicators such as changes in the money supply, consumer pricing index, wholesale price index, producer price index, unemployment rate, discount rate, and industrial production. The annual inflation rate is calculated using data from several different pricing indices that has an impact on the economic growth (Choudhary et al., 2020). A price index is a metric that is used to measure the change in overall prices from one year (the base year) to another and the CPI is an important measure of changes in retail prices which is calculated by the cost of a stable and representative basket of goods and services that are purchased by individual households in the economy. The CPI calculates annual changes in the cost of living in urban areas by making use of data provided by retailers in thirty five of Pakistan's largest cities (Subhani et al., 2010). Pakistan's poor growth in the economy can be linked in particular to a number of factors i.e. frequent political upheavals, it's politically unstable environment, and its economic policies. This sluggish expansion is one of the factors that has contributed to the current state of economic uncertainty and disruption in economic decision-making. Due to the country's inadequate banking and economic infrastructure, Pakistan's economy is currently in a situation that is highly unpredictable and challenging due to political and economic uncertainty. Due to these inefficiencies Pakistan's economy is in a state of great unpredictability and some calculated risks as well. The potentially cataclysmic results of economic policies that have not been resolved have been largely disregarded (Farooq & Yasmin, 2017). Because policy uncertainty shocks are asymmetric in nature, their onset is often unexpected and they are difficult to anticipate. If the increase in uncertainty has an equal and opposite effect on both sides, then the repercussions on economic growth may only have a temporary impact. Due to this reason the rate of economic advancement will remain stagnant eternally if there is an imbalance between the positive and negative impacts (Wen et al., 2022)

The growth rate of Pakistan was 5.4% in 2016, but due to policy uncertainty, it has decreased to 2.9% in the recent year, which affects the overall welfare of Pakistan adversely (Economic Survey of Pakistan, 2018). Numerous researchers claimed that policy uncertainty has an impact on a wide variety of macroeconomic indicators due to the ubiquitous nature of policy uncertainty across many economies (Chu, Lan Khanh, et al.2023). On the other hand, there hasn't been a lot of research done exploring that how policy uncertainty effect on CPI in the context of Pakistan. The CPI is an important way to measure inflation because it shows how the prices of goods and services bought by customers change on average each year in percentage. Therefore, capturing the dynamics of inflation and its influence on welfare and economic stability as well as understanding the connection between policy uncertainty and CPI is crucial for policymakers, firms, and consumers. Knowing about these relationships can shed light on these dynamics (Munir & Riaz, 2020). There are two primary issues at hand: First, the paradox of the relationship between these variables is missing or rare in the body of knowledge in the context of Pakistan, and policy uncertainty has a substantial impact on the CPI, but little efforts in this regard is witnessed in Pakistani context due to the country's distinct socioeconomic characteristics, institutional structure and policy environment. This is why one of the reasons why more research need to be conducted in this area (Khan, S. A., & Qureshi, 2020). As a second point of discussion, the idea of policy uncertainty is a complicated and multi-faceted notion that takes into account a variety of elements, including political unpredictability, changes in regulatory policies, shifts in fiscal policy, and external shocks. In order to unravel the tangled relationship between policy unpredictability and the CPI, researchers need to do an in-depth analysis that takes into account the dynamic relationship between these variables as well as how they are expressing within the context of Pakistan. An examination of this nature has the potential to shed light on the mechanisms by which policy uncertainty influences consumer pricing. These mechanisms include the ways in which changes in expectations, different investment strategies, and volatile markets play role in the process (Ateeb Akhter Shah et al., 2021).

By analyzing the effect of policy uncertainty on the CPI in Pakistan, the purpose of this research is to fill the knowledge gaps and add to the existing body of knowledge. Examining the short-term and long-term consequences of policy uncertainty on inflation dynamics will apply rigorous econometric methodologies and pertinent macroeconomic data to accomplish the purpose. In addition, it endeavors to determine which aspects of policy uncertainty have the biggest influence on consumer prices in the hopes of assisting policymakers in their efforts to rein in inflationary pressures (Jafri et al., 2018). The study in hand will be respond the following research questions.

(1) What is the nature and scope of policy uncertainty in Pakistan, and how it has been changed over time? (2) What is the relationship between Pakistan's policy uncertainty and the Consumer Price Index? (3) How does policy uncertainty contribute to the fluctuations in Pakistan's consumer prices? The research on the effect of policy uncertainty on the CPI in Pakistan addresses a crucial knowledge gap which is beneficial for policymakers, businesses, and consumers alike. By concentrating primarily on Pakistan, this study narrows its focus to the context of a developing nation, which has its own unique socioeconomic characteristics, institutional framework, and policy environment. The findings will provide Pakistani policymakers with critical understandings that will enable them to adopt economic policies that are targeted and appropriate for the situation. It is crucial for the strategic planning, risk management, and decision-making processes of businesses to have a solid understanding of how various industries react to policy uncertainty and how this influences pricing behavior. The insights into individual industries that were uncovered by this research can help businesses enhance their pricing strategies and respond more effectively to uncertainty. In addition, consumers will benefit from having a better understanding of how policy uncertainty influences consumer prices. This will enable them to make more accurate decisions regarding their spending patterns as well as their long-term financial planning. A considerable amount of research has been conducted in recent years on the impacts of EPU on different economic indicators around the world. The CPI in Pakistan is the most widely used indicator for determining inflation, but there is still a noticeable research gap regarding its specific impact. Therefore, the study aims to explore that how EPU impacts the dynamics of CPI dynamics in Pakistan.

## 2. Literature Review, and Hypothesis Development

A time series analysis was conducted in order to uncover potential effects of policy uncertainty on inflation dynamics in Pakistan by examining the relationship between EPU and CPI through time series analysis. Pigou & Keynes, (1921) and Knight, (1921) were the first who differentiated between the risk of uncertainty and the risk that may be insured against. According to Fernández-Villaverde et al. (2015), the negative effects of uncertainty include the tendency of households to reduce their expenditure out of anxiety. In addition, when deciding what monetary, fiscal, and regulatory policies should be implemented, economists (Hassett & Metcalf, 1994) take into account the detrimental consequences that economic uncertainty has on the economy.

### 2.1 Economic Policy Uncertainty in Pakistan

We build an EPU for Pakistan in light of the expanding body of evidence, highlighting the significance of uncertainty for both the business cycle and the political economy. To our knowledge first time it is done. The ramifications of uncertainty for Pakistan, a country with a reasonably big economy that is growing rapidly and which has received 22 bailouts from the IMF, and has one of the lowest credit to GDP ratios in South Asia, cannot be overstated. In point of fact, (Bloom et al., 2012) have shown that the EPU is particularly important for emerging economies like Pakistan's, which often feature non-diversified industries, fluctuating goods prices, and political instability. Pakistan is one of these countries.

Table 1: Economic policy uncertainty event in Pakistan

Year	Event	Description
2010	Flooding	EPU index shows Pakistani economy struggles first. The July 2010 floods destroyed 78 districts over 100,000 square km, 20 million people, and 1,980 deaths. Floods devastated 1.6 million homes, 2,085,400 hectares of crops, 23,831 kilometers of roads, and livelihoods. The floods raised the EPU index during 2010 (Pdma Capacity Building, 2014).

---

<b>2011-2012</b>	Terrorism	The EPU index was high in 2011 and 2012 because Pakistan was fighting terrorism again from late 2010 to early 2012. Pakistani militants killed 20,000 people in 2010–12. The war on terrorism and energy limitations may explain the "event sense" of the EPU index's high level from 2010 to 2012 (Vision 2025, 2017)
<b>2013</b>	Elections	Our index found no significant policy uncertainty-increasing events in 2013. In Pakistan's 67-years history, a democratically elected government completed its term and left office this election year. Pakistan's 2013 IMF deal determined its economic policies.
<b>2014</b>	Election protests	2013's peace and economic stability were short-lived, but 2014's first half was normal. The 2013 election protests dashed economic and political optimism. The Azadi March, Dharna, or Freedom March began in August 2014 and finished in December 2014. The EPU index peaked in March 2010–2020. This disaster crippled the nation's economy and political system.
<b>2015</b>	Inflation	In 2015, inflation, the fiscal balance, and the current account balance were improving and the EPU was low. FX reserves reached 18.7 billion US dollars as the exchange rate stabilized. Apart from these rise the decreased oil price may cause a year-long EPU decline (Vision 2025, 2017)(Pakistan Bureau of Statistics, n.d.; PBS, 1998, 2021).
<b>2016</b>	Inflation	Inflation, interest rates, and EPU were all low in 2016. This year, both the current account gap and inflation went up. In 2016, these things got worse in July, October, and November. All three times, the Index was below 100.
<b>2017</b>	Panama Verdict	In 2017, the EPU accelerated and rose alarmingly high twice, with one observation—October 2017—being among the highest in the sample. Political uncertainty, stock market volatility <sup>12</sup> , and local currency pressures may have generated this exceptional spike in fear. The Supreme Court of Pakistan's July 28, 2017, "Panama Verdict," which removed the current Prime Minister following a thorough probe into the "Panama-Papers" breach of financial information, also increased the EPU(Vision 2025, 2017)(Pakistan Bureau of Statistics, n.d.; PBS, 1998, 2021).

---

---

2018	Senate Elections	In February 2018, Senate Elections (pressure, ambiguous agreements, and rivalries) increased uncertainty. It was elevated until July 2018. Due to presidential elections, concern peaked again in September. The year ended with uncertainty. The only danger was currency rate depreciation, and the November 2018 attack on the Chinese Consulate in Karachi may have worsened it (Vision 2025, 2017).
2019-2020	Pakistan's National Accountability Bureau (NAB) examinations	2018's EPU increase continued into 2019. Pakistan's National Accountability Bureau (NAB) examinations of politicians for banking system and deceptive account theft sparked unusual political turbulence in December 2018 and January 2019. In January, officials demolished hundreds of unauthorized stores. Uncertainty fell in March 2019 before rising again. From April through July 2019, economic leadership changed, including the finance minister and governor state bank (Vision 2025, 2017). After major changes in top leadership, the government launched serious talks with the IMF about a rescue package to fix BOP imbalances. On July 3, 2019, the IMF granted Pakistan a \$6 billion Extended Fund Facility (EFF) after many rounds of talks in May and June 2019.
2020	Outbreak of Pandemic (COVID-19)	After August 2019, economic stabilization in tight coordination with the IMF and external inflows (exports, remittances, and capital flows) increased foreign exchange reserves and lowered uncertainty until February 2020. However, after outbreak of the COVID-19 pandemic, that started from China in December 2019, reached practically every country, including Pakistan, by March 2020, raised EPU to unprecedented levels, as demonstrated in our aggregate EPU index (Choudhary et al., 2020).
2021-2022	Economic crisis	Pakistan has faced a number of economic challenges in 2021-2022, including excessive inflation, budget deficits, and a balance of payments problem. Political upheaval, security concerns, and external factors such as rising global commodity prices and geopolitical conflicts and uncertainties affected the Pakistani economy. In 2021 and 2022, the Pakistani government took a variety of steps to address these economic concerns and enhance stability. These steps include probing for financial help from international organizations, like the IMF and make changes to the country's structure to improve the business climate, attract investors, and speed up economic growth. However, a variety of factors, including as changes in governmental policies, political developments, and external shocks like as the COVID-19 pandemic, may all contribute to the longevity of EPU. To obtain the most recent and accurate information on Pakistan's ambiguous economic policies during the specified years, it is critical to study current and reliable sources such as economic reports, news items, and government statements.

---

EPU determines when an economic body can't predict exactly how the government will change its current economic policy (Wen et al., 2022). Researchers have written a lot about economic instability, pointing out that everyone agrees that political instability is bad for the economy as a whole (Kirikkaleli, 2020). In general, there are two ways that an unstable political environment can hurt an economy: directly and indirectly. In the direct route, uncertainty alters the nature of investments, influences the demand for resources, and modifies spending behaviors. These changes directly impact economic growth (Tabassam et al., 2016). The indirect route emphasizes that the worsening political climate is likely to hurt economic growth by causing less money to be spent on investments. Uncertainty is also seen as a bad thing by investors because it hurts the economy. This is because it is hard for business owners to predict the long-term growth of a country's economy in a political climate that is hard to predict (Qamruzzaman, 2022).

## 2.2 Consumer Price Index

CPI is an essential factor to consider when formulating economic policy, particularly during periods of economic uncertainty (International Monetary Fund, 2022). Classical economists were the first to acknowledge the importance of savings and to recognize the myriad of factors that influence the practice. According to Smith (1776), "modesty is increased by capital, while prodigality and misconduct reduce it." Before 1936, the standard economic theory on saving postulated that interest rates and savings had an inversely proportional relationship with one another. Because of this, the amount of money that people have saved in banks will decrease if there is an increase in inflation (as measured by the CPI). This is the exact behavior that has been predicted by this theory. Pigou & Keynes (1921) defined savings as the share of income that is left over after all of the expenses associated with consumption have been deducted.

$$S = I - C$$

Where I refers to Financial Gain

S refers to spending, and C refers to consumption

The wholesale pricing index (WPI) is widely believed to be the principal factor influencing the CPI. The transmission mechanism is driven by the demand side, which is characterized by consumer behavior, and the supply side, which is characterized by producing activities. According to this view, when domestic production has been made, the retail sector uses it as an input and adds value to it. Therefore, producer prices for domestically produced items, prices of imported commodities, nominal exchange rates, rates of indirect taxes, marginal costs of retail manufacturing, and interest rates are all components that affect demand side dynamics. As a result, the theoretical foundation for the chain of events leading from wholesale to retail prices in a small open economy is provided by this mechanism (Shahbaz et al., 2010). As more small open economies (SOEs) move away from exchange rate pegs and toward policies that target inflation, the question of which price index small open economies (SOEs) should aim for is becoming more important. The theory of optimal monetary policy in a multi-sector economy, as shown in Aoki, (2001) and Woodford, (2010) can be used to answer this question. But until now, these kinds of studies have only been done in closed economies, leaving questions about open economies unanswered. Some of the questions about an open economy are about the effect of global commodity prices and how trade trends work. In an open economy, the main thing that keeps the argument going about whether to use the CPI or the producer price index (PPI) to compare prices is that the perfect price index theory doesn't work. The average CPI versus the core CPI is another example of this debate (Matsumura, 2022).

A haphazard relationship between macroeconomic variables and policy uncertainty has attracted numerous researchers. Because of the potentially negative consequences that EPU could have on economic outputs, there has been a rise in interest in this topic, particularly after the recent global financial crisis. Both the IMF and the Federal Open Market Committee (2009), came to the conclusion that the 2008–2009 economic downturn and subsequent sluggish recoveries experienced by the economies of the United States and Europe were significantly influenced by policies that were designed to reduce uncertainty (such as fiscal, regulatory, monetary, and INF policies). The importance of the EPU in accurately anticipating the flow of economic activity has been shown by a number of empirical investigations. (Kang & Ratti, 2013), for example, found that unexpected escalation in the level of policy uncertainty in the United States had a detrimental influence on real stock returns.

Bekiros et al., (2015) revealed that knowledge about EPU plays a substantial impact in predicting changes in the oil prices. This was determined through the utilization of VAR with time-varying parameters. In a study that was quite similar to this one, (Chang et al., 2015) revealed how the EPU in the United States affects the fluctuation of oil prices around the world. However, a study carried out by (Balciyar et al., 2015), that EPU have the ability to

forecast both exchange rate returns and return variation across the complete conditional distribution for different exchange rates. Reboredo & Uddin et al. (2016) hypothesized that EPU has a major impact on the markets for energy resources. In addition, there has been some empirical studies conducted to investigate the role that EPU can play in forecasting shift in home prices Kirikkaleli et al. (2021) and (Hirata et al., 2012). Likewise, Christou et al., (2017) examined the role that EPU plays in forecasting housing returns of the Organization for Economic Cooperation and Development (OECD) member countries, and they established that EPU is capable of performing this job Adams et al. (2020) and (Athari et al., 2022).

### **2.3 Economic Policy Uncertainty and Economic Growth in Pakistan**

In today's highly interdependent world, unpredictability is more important than it has ever been when it comes to making decisions about economic policy. Over the past few decades, the global economic landscape, its institutions, and the policies that govern it have undergone substantial changes. Resultantly, the economic climate in which investing and resource allocation presently take place is fraught with uncertainty. As per the (Handley & Limão, 2015), the effect of EPU on economic growth is substantially more significant than that of either monetary policy or fiscal policy. In addition to future decisions regarding investments, uncertainty surrounding future consumption and investment plans has a significant impact on the rate of economic growth in developing nations (Pástor & Veronesi, 2012). Asymmetric knowledge, low output levels, and a lack of technological innovation all contribute to the ubiquitous economic unpredictability that exists in poor nations. As a consequence of this, they are far more dependent on the programs and policies that are produced by industrialized nations and international financial institutions. Uncertainty in the economy is caused by a variety of government policies that are conflicting with one another. This uncertainty is made worse by the policymakers' inattentive responses to the evolving conditions of the economy as well as their own shifting ambitions. The economic impact of these policies has moved significantly since the 1970s, particularly in developing countries; as a result, the argument over EPU has gained more significance in recent years. As a result, the influence that uncertainty has on both developed and underdeveloped economies has been the subject of a significant amount of research Pástor & Veronesi, (2012) and (Handley & Limão, 2015) (Choudhary et al., 2020).

Recent research by Baker et al., (2016) devised that the creation of a brand new index for quantifying EPU that is based on the number of times an event was covered in the media. Existing research has empirically examined how EPU affects productivity and job growth (Bloom, 2009), economic growth (Bhagat et al., 2013; Fatima & Waheed, 2014; Ateeb Akhter Shah et al., 2021) and (Bhagat et al. 2013; Karnizova & Li, 2014; Fatima and Waheed 2014) and (Ren et al., 2020), unemployment (Baker et al., 2015; Oliver Baker, 2022; Wen et al., 2022), investment (Q. Wang & Sun, 2017), trade (Tam, 2018), innovation (Saleem et al., 2017) and tourism (Ghosh 2020; Işık et al. 2020) and (Bhagat et al., 2013). However, in the existing literature limited research exists that explore the effects of uncertainty utilizing the EPU proxy on household prices (Saleem et al., 2017), business growth Qu & Chen, (2014), gold (Raza et al. 2018; Fang et al. 2018) and market equities/ shares (Xia et al., 2020)(J. C. Wang, 2020). The research that has been done on how uncertainty affects Pakistan's macroeconomic variables is extremely scarce. The works of Fatima & Waheed, (2014) & Farooq & Yasmin, (2017), Choudhary et al., (2020) & Zareen & Amin, (2022) and Qamruzzaman, (2022) are among the most significant contributors to this field in this regard. The groundbreaking work that (Baker et al., 2016) accomplished, scholars have begun focusing their attention on a metric that is derived from economic uncertainty concerns. The research that has been done, at this point has concentrated almost entirely on the effects of uncertainty through the use of standard models like the vector autoregressive model (VAR) and the generalized autoregressive conditional heteroscedasticity (GARCH).

Pakistan is a developing nation that is now facing sluggish economic growth as a result of recurring political upheaval, an unpredictable political atmosphere, and economic policies. Pakistan is also a country that has experienced political unrest on multiple occasions. This sluggish development has made the currently unpredictable state of the economy and the discontinuity in economic decision-making much worse. The economy of Pakistan is plagued by high levels of uncertainty as a direct effect of the precarious state of its monetary and financial infrastructure. Inadequate thought has also been given to the terrible impacts that may result from uncertain economic policies. EPU shocks come on suddenly and without any previous warning because of the asymmetric nature of the EPUs themselves. If the effect of the rise in uncertainty is symmetric, then the consequences on economic growth will be transient. This is because symmetrical effects are more likely to be positive. If there are asymmetric effects, consisting of a substantial increase in comparison to a significant reduction, then economic development will be continually restricted. As a consequence of this, it is categorically essential to examine the

asymmetric effects that EPU has on the expansion of Pakistan's economy. Hence, we postulate the following hypothesis.

**H<sub>1</sub>:** Private sector investment reduced in Pakistan due to higher levels of policy uncertainty.

**H<sub>2</sub>:** Consumer confidence and spending behaviors are expected to be negatively affected by economic policy uncertainty in Pakistan.

### 3. Stylized Fact

It should be noted that stylized facts do not represent a thorough study of all the implications of reforms or the fundamental reasons for them. It is our goal to deliver original graphics and to structure our visions in accordance with Pakistan EPU and Economic Growth. According to this study, the CPI and EPU are two indicators that have been closely related over the past decade in Pakistan. It can be concluded from this report that EPU has increased significantly, which reflects higher economic uncertainty. On the other hand, the CPI was also showing an upward trend, which indicates that inflationary pressures are on the rise. According to the research, policy uncertainty may affect inflation dynamics through EPU and CPI. Uncertainty in Economic Policy Trends During the time period being looked at, there are massive variation in the EPU Index. The amount of uncertainty variations, with some times being more stable than others. There are big spikes in economic uncertainty in the middle of 2016 and 2017, at the start of 2019, and again at the end of 2020 and the beginning of 2021. When big economic or political events happen around these times, they tend to change how business is done and how people behave, the impulse response of CPI over EPU is shown in Figure 1.

Increasing geopolitical tensions and pandemic-related disruptions have contributed to a worrying surge in EUP in Pakistan. Market volatility, reduced foreign investments, and cautious consumer spending are symptoms of this uncertainty. Economic stability and sustainable growth can be facilitated by addressing the root causes of uncertainty. Figure 2 illustrates a notable connection between EPU and political instability, as well as other uncertainties in Pakistan. Specifically, the EPU index exhibits a substantial spike in April 2022, coinciding with a significant event in the country, namely, the vote of no confidence. During this period, the political landscape experienced heightened uncertainty, which evidently had a definite impact on inflation and CPI. Providing insight into the Pakistani inflation dynamics, the CPI provides comprehensive analysis. Based on the findings of this research, the CPI continues to rise due to an increase in food and energy prices, leading to a persistent upward trend. The depreciation of currencies, disruptions in supply chains, and monetary policy adjustments have contributed to inflation. As a result of these findings, policymakers can use them to formulate appropriate measures that will address price stability, concerns about the cost of living, and the overall well-being of the population from an economic perspective. The CPI also goes up and down, but usually in a slow, steady way that shows inflationary forces over time. During the time period looked at, there are times when inflation is low and times when it is high as visualized in Figure 3.

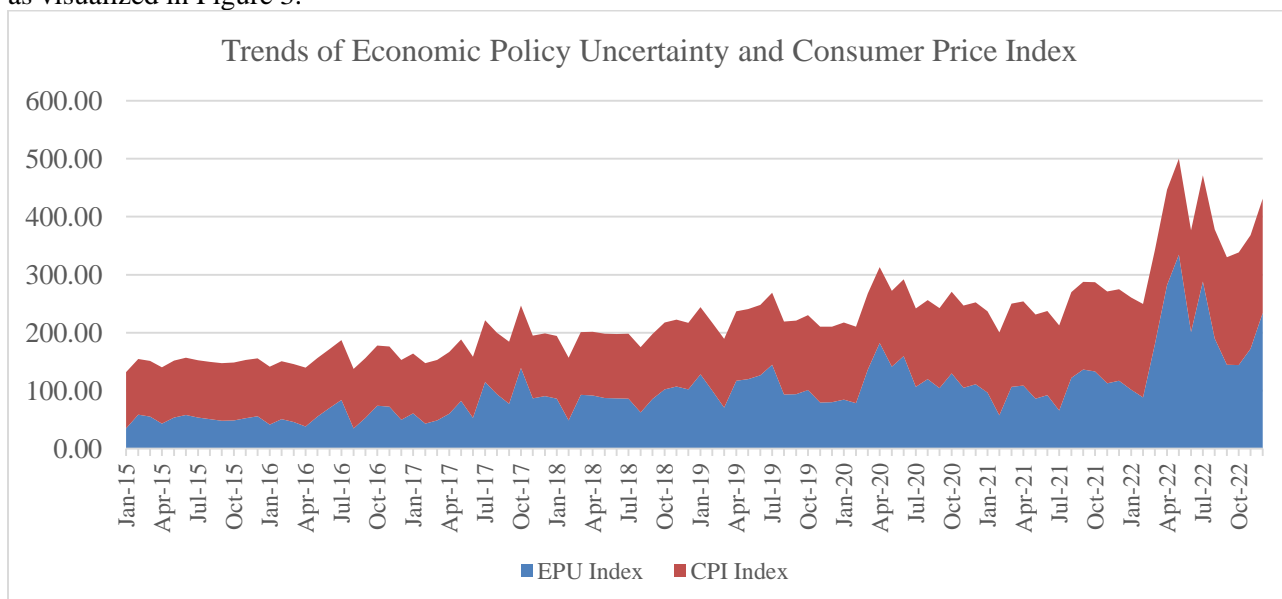




Figure 1: Trends of Economic Policy Uncertainty and Consumer Price Index

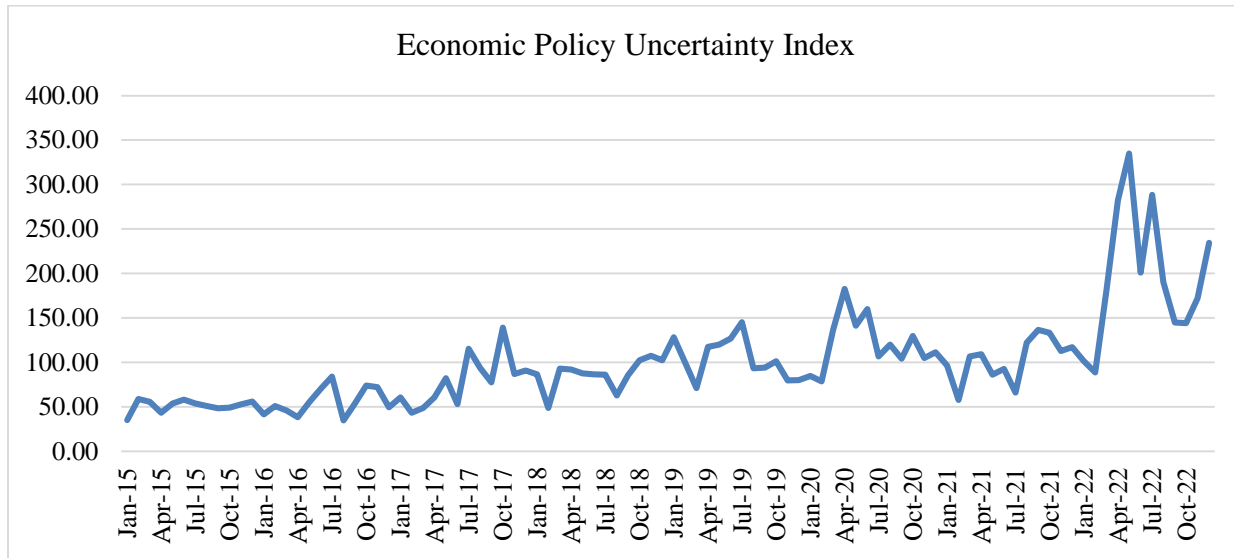


Figure 2: Economic Policy Uncertainty

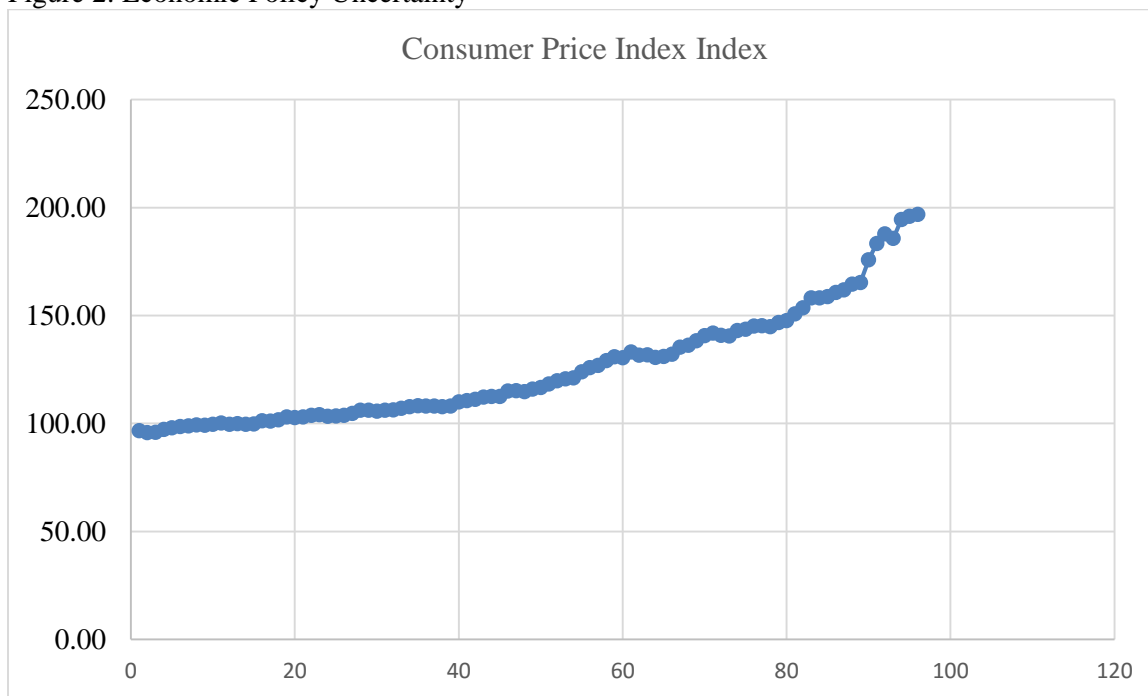


Figure 3: Consumer Price Index

## 4. Methodology

### 4.1 Data collection and Data Source

This study aims to highlight the association of both the policy uncertainty and the CPI utilizing time series analyses. The time span of the data is 2015 to 2022, sourced from economic database of the Pakistan Bureau of Statistics, <https://www.pbs.gov.pk/>.

### 4.2 Variables Descriptions, Definitions, and Measurements

Tracking inflation can be done through different methods, utilizing a wide array of price indexes. A statistical instrument known as a price index is used to examine the degree to which there has been a shift in the Aggregate Price Level from one year to the next. All three types of price indices that are compiled in Pakistan use the year 2000-01 as their base year. These are the CPI, the SPI, and the WPI. The Consumer Price Index, known as the CPI,

is a frequently used indicator of changes in retail prices since it displays the amount of money that individual households need to spend in order to obtain a predetermined basket of goods and services. The CPI in Pakistan tracks the retail prices of 374 different items and services across 35 of the country's most important cities. This index is used to gauge the overall trends in urban living expenses. Economic policy uncertainty is the result of decisions taken by governments on regulatory, monetary, and fiscal policy management. These decisions influence the economic environment and the outcomes of economic interactions, which leads to what is known as "economic policy uncertainty" (EPU). Businesses and other economic actors reassess their choices if there is increased ambiguity regarding the policies that are in place. The index developed by Baker, Bloom, and Davis (2016) is used in the process of quantifying EPU.

Table 1: Variable definition and data sources

Variables	Sybmol	Definition	Reference
<b>Economic Policy Uncertainty</b>	EPU	Economic policy uncertainty index	Policy uncertainty index and (M. A. Choudhary, F. Pasha, and M. Waheed (2020)
<b>Consumer Price Index</b>	CPI	Average price change of a household basket of goods and services over time, demonstrating inflation	Pakistan Bureau of Statistics

### 4.3 Estimation Techniques and Empirical Strategies

It is possible to summarize the generalized empirical model as follows:

$$CPI_t | EPU$$

After converting all of the variables into natural logarithms, the following empirical equation is created in order to analyze the impact of EPU on consumer price indexes.

$$CPI_t = \beta_1 + \beta_2 EPU + \varepsilon_{it}$$

Where CPI stands for the consumer price index and EPU stands for the economic policy uncertainty: The CPI is calculated by adding the EPI and beta.

### 4.4 Non Linear Autoregressive Distributed Lag (NARDL)

Numerous studies have used the conventional cointegration framework of error correction modeling that can be found in the currently available body of literature, to learn more about the long-run liaison between uncertainty and the variables that affect them. As we already explained, the aim of this research is to consider the asymmetric link between the economic uncertainties and CPI. The study uses the method of (Wen et al., 2022) the (ARDL) and the (NARDL) method that was developed by the famous scholar Shin et al. (2014) to achieve the research objectives. The NARDL method is an extension of the standard ARDL model that is not symmetrical. This is because it shows both short-term and long-term differences in a trait being studied. Despite this, the NARDL approach maintains all of the benefits that are associated with the standard ARDL model. The fact that asymmetry and co-integration may be estimated with just a single equation is the primary advantage offered by this application. In addition to this, it can be utilized with variables that have mixed order I(0) or I(1) stationarity in addition to small sample sizes ((Ibrahim, 2015; Iqbal et al., (2015) & Ibrahim, (2015); Ahmad et al., 2018; Akber & Paltasingh, 2019; Ghosh, 2020). As a direct consequence of this finding, the model of the study is described in the following way.

$$CPI_{it} = \alpha_0 + \alpha_1(EPU) + \varepsilon_t \tag{1}$$

In addition to this, we also make use of CPI and EPU. The asymmetric form of equation (1) given above is expressed in the following way.

$$CPI_{it} = \beta_0 + \beta_1 POS_t + \beta_1 NEG_t + \beta_2 NEG_t + \mu_t \tag{2}$$

The numbers  $\beta_1$ ,  $\beta_2$ , and  $\mu_t$  in the equation above represent the parameters, whereas the third number represents the error term. In the equation, the words POS<sub>t</sub> and NEG<sub>t</sub> reflect the components of asymmetry in the model, and the following equations present their values:

$$POS_t = \sum_{j=1}^t \Delta EPU_j^+ = \sum_{j=1}^t MAX(\Delta EPU_j, 0) \tag{i}$$

And

$$NEG_t = \sum_{j=1}^t \Delta EPU_j^- = \sum_{j=1}^t \text{Min}(\Delta EPU_j, 0) \quad (ii)$$

Where the POS<sub>t</sub> represents the changes in EPU that are on the positive side, and the NEG<sub>t</sub> represents the changes in EPU that are on the negative side. Earlier, we established that EPU's impact on CPI can be asymmetric, and the equation (2) accounts for this phenomenon with the β<sub>1</sub> and β<sub>2</sub>. The alternative hypothesis, which states that β<sub>1</sub> ≠ β<sub>2</sub>, indicates that there is an asymmetry among the variable CPI and the variable EPU fluctuations and movements. However, the null hypothesis which is β<sub>1</sub> = β<sub>2</sub> does not specify any asymmetry.

The modified form of Eq. (2) in a NARDL bound test context is illustrated below, as stated by Shin et al. (2014).

$$\Delta CPI_t = \gamma_0 + \gamma_1 CPI_{t-1} + \gamma_2 POS_{t-1} + \gamma_3 NEG_{t-1} + \sum_{i=1}^{n1} \delta_i \Delta CPI_{t-i} + \sum_{j=1}^{n2} (\rho_j \Delta POS_{t-j} + \vartheta_j \Delta NEG_{t-j}) + \varepsilon_t \quad (iii)$$

In the equation that was just presented, the parameters γ<sub>1</sub>, γ<sub>2</sub> and γ<sub>3</sub> represent the long-run, while the parameters δ<sub>i</sub>, ρ<sub>j</sub> and θ<sub>j</sub> represent the short-run parameters. In Equation 3, the null hypothesis that there is no cointegration between the variables, which states that γ<sub>1</sub> = γ<sub>2</sub> = γ<sub>3</sub> = 0, is evaluated against the alternative hypothesis, which states that there is cointegration among the variables and reads as follows: γ<sub>1</sub> ≠ γ<sub>2</sub> ≠ γ<sub>3</sub> ≠ 0. If the derived F-test statistic is higher than the corresponding upper bound critical values, then there will be cointegration among the variables. Cointegration will occur if this is the case. As a result, the hypothesis of no effect is not supported. In a manner analogous to the first scenario, there won't be any cointegration in the second scenario if the predicted F-statistic is lower than the critical values for the corresponding lower bound. As a result, we are not going to dismiss H<sub>0</sub>.

The next thing that has to be done is to collect certain short-run parameters together with an error correction term (ECT) in order to determine the necessary rate of adjustment. The model for the short run is presented in the following.

$$\Delta CPI_t = \sigma ECT_{t-1} + \sum_{i=1}^{n1} \delta_i \Delta CPI_{t-i} + \sum_{j=1}^{n2} (\rho_j \Delta POS_{t-j} + \vartheta_j \Delta NEG_{t-j}) + \varepsilon_t \quad (iv)$$

The error correction term is denoted by ECT<sub>t-1</sub>. It figure out the rate at which the deviation from equilibrium must be changed to long-run equilibrium followed by short-run. It also figure out the deviation from equilibrium that happened after the shock. Lastly, the Wald test will be used to find out if there are differences between the short run and the long run correlation.

Table 2: Unit-root tests

Variables	Augmented Dickey-Fuller test (intercept)			Phillips-Perron test (intercept)		
	Level	1 <sup>st</sup> diff	Decision	Level	1 <sup>st</sup> diff	Decision
<b>CPI</b>	-0.14	- 8.23**	I(1)	-4.08	- 6.23**	I(1)
<b>EPU</b>	- 6.02**	-	I(0)	-5.29**	-	I(0)

Note: \*\*Indicates that statistical significance at 5%

One of the things that must be done before an econometric study of time series data can be done is to look at the relevant series to figure out the order of integration. The enhanced Dickey-Fuller (ADF) and Phillips-Perron (PP) stationarity tests are used to do this. In the table 2, results of the unit-root tests demonstrated that there is a mixed order of integration. The stationarity of the EPU is checked at the first difference, I(0), and the IPI is found at the next difference, I(1).

Table 3: Bounds test for Cointegration

	ARDL Model	NARDL Model
F-statistic	7.58**	8.90**
Critical values	4.99	3.35
Upper bound I(1)		
Lower bound I(0)	3.94	4.77

Note: \*\*Indicates that the value is statistically significant at 5%

The table 3 presents the empirical results of the bound test for both the ARDL and the NARDL. The ARDL model has F-statistic value of 7.58, while the NARDL model has F-statistic value of 8.90. Both values are higher than the critical values for the upper bound and the critical values for the lower bound significance level at 5%. Therefore, this verifies that the co-integration exists, that means we can move on to the next step.

Table 4: Short-run results of the NARDL model (dependent variable: CPI)

Variable	ARDL results		NARDL results	
	Coefficient	Std. error	Coefficient	Std. error
C	0.768***	0.341	6.012	9.001
ΔEPU	- 0.063**	0.051	-	-
ΔEPU+			- 0.121***	0.024
ΔEPU-			0.037	0.056
ECT	- 0.051***	0.013	- 0.058***	0.034
Wald test (asymmetry)			5.001 (0.01)	

Table 5: Long-run results of the NARDL model (dependent variable: CPI)

Variables	ARDL result in NARDL results			
	Coefficient	Co Std. error	Coefficient	Co Std. error
CPI (-1)	0.0214	0.348	-4.08	0.237
EPU	- 3.620**	1.478	-	-
EPU+	-	-	-10.1	0.876
EPU-	-	-	-0.506	0.598
Wald test (asymmetry)			1.598(0.198)	

p-value reported in the parenthesis ()

\*\*Indicates that statistically significant at a 5% level

Table 6: Residual diagnostic and model stability test

The test applied value		p-
Breusch–Godfrey	LM	test
0.811		
Breusch–Pagan–Godfrey		test
0.574		
Variance	inflation	factor
1.287		test
Ramsey	RESET	test
0.500		

Note: p-value reported in the parenthesis ()

\*\*\*, \*\*Indicates that statistically significant at 1% and 5% level respectively

In the table 4 & 5, the long-term estimates from the ARDL (symmetric) and NARDL (asymmetric) models are presented. During the study, the ARDL model was used to explain the difference between how EPU has symmetric and asymmetric effects. Based on the results of the short-run ARDL, the predicted coefficient of EPU turned out to be negative, that is statistically significant at the 5% level. It demonstrates that, if EPU boost up by 1%, CPI should

go down by 6.3%. The results are in line with many previous studies Handley & Limão, et al. (2015), Barrero et al., (2017) and Chen et al., (2019), finding of these studies supported the notion that EPU is negatively impacted on CPI. The study demonstrates the negative nexus between EPU and CPI.

The figures from NARDL show that the link between the EPU and the CPI is not always strong. The output of the Wald test statistic display that there is short-run inequality, and they also show that the null hypothesis that EPU and CPI have the same effect on inflation is not consistent. When EPU goes down, the CPI goes up, but when EPU goes up, the CPI goes down. Based on the projected coefficient for the positive shock of EPU, which is 0.121CPI, a 1% rise in EPU is expected to cause a 12.1% drop in CPI. This is because the expected coefficient is a positive number. The EPU's negative shock has a positive effect, even though it is very small. This shows that the earlier drop in EPU did not have much of an effect on Pakistan's CPI. Because Pakistan's economy is weak, its sectors aren't diverse, and government is unstable, a rise in EPU shocks has a big effect on the CPI. However, when EPU changes in a positive way, the CPI doesn't change in the same scale. Because of this, there is a chance that the CPI will go up again, but it might not happen right away. Also, the results support the idea that EPU shocks aren't the same on both sides. This is because EPU shocks happen quickly and are caused by things that nobody predicted. Both models have relative ECT values of 0.051 and 0.058, respectively. This demonstrates that when EPU is present, the CPI moves at a moderate rate toward its long-run equilibrium, somewhere between 5.1% and 5.8%.

Table 6 presented stability test of the models. The findings of the diagnostic tests provide evidence that the model is stable, which confirm that there is no autocorrelation. Table 6 presents the results obtained by using the ARDL and NARDL models over extended periods of time. It has established that the projected long-run coefficient of EPU has a negative value and that this value is substantial at 5%. This illustrates that there is a connection between 1% increase in EPU and 3.7% decline in EPU. On the other hand, the NARDL model suggest that both positive and negative Disturbances from the EPU have a negative and minor impact on the CPI. Research finding also reveals that the EPU has an asymmetrical impact, both in the short term and over the long run, on CPI. In both the short-term and the long-term results of the ARDL model, found that the elasticity values were statistically greater in size and that they had a negative sign. In contrast, the positive and negative shocks of both the short-run resistances of EPU are shown to be positive and negative in the results of the NARDL model, indicating that there is a negative relation between these two. However, looking at the issue from a long-run perspective which reveals a totally different picture. In light of the aforementioned information, we are draw the conclusion that EPU has had a major effect on Pakistan's CPI. In order to alleviate the potentially negative effects of uncertainty, it is necessary to take steps to secure important elements such as efficient government policy, political stability, and favorable trade conditions.

## 5. Conclusion, Recommendations & Future Directions

The CPI in Pakistan has been a talk of the town since last one decade due to volatility in the economic indicators. These swings have affected the economic health of the country. Existing research typically ignores the impact that economic uncertainty has when analyzing particular components of these rapid shifts in macroeconomic data. The newly constructed EPU index is used in this study to conduct an analysis that determines how the influence of economic uncertainty would play role in the Pakistan's consumer price index for the years 2015 to 2022. The ARDL and NARDL models are utilized in order to investigate the asymmetric influence that economic uncertainty has on output over the long and short horizons, respectively. Following a thorough examination of all of the available evidence, we have arrived to realize that EPU has a considerable influence in either a good or a negative direction, on Pakistan's consumer price index. Additionally, asymmetric behavior is not something that the EPU exhibits until possibly in the very short run. The experimental outcomes of the research reveal that the CPI is more vulnerable to policy uncertainty in the short and long run equally.

Taking into account the patterns that have emerged in the past, the relatively limited recovery that took place during the most recent recovery cycle was due to the high level of uncertainty that lingered for the entirety of that cycle. Businesses and consumers are more inclined to put off making decisions for the future when there are upsurge in the level of uncertainty, which in turn leads to a drop in the quantity of economic actions. Consequently, when there is less uncertainty in the environment, there is a likelihood that economic activity would improve; however, this does not necessarily happen quickly, as it was the case in Pakistan. The empirical evidence that presented in this study implies that economic uncertainty has unequal impacts, and it also suggests that a reduction in uncertainty does not necessarily reflect an increase in the offset. Both of these hypotheses are supported by the findings of our study. The effects of uncertainty have resulted in a gradual decrease in the CPI, which is a direct consequence. In

conclusion, the current political and economic climate in Pakistan has contributed to a rise in the degree to which the country is experiencing an upsurge in the level of economic uncertainty that putting pressure on prices index. The policy thinks tank of Pakistan need to be aware of the possibility that the EPU will have an effect on the CPI in their country. In order to win the confidence of households as well as investors, it is first and foremost necessary for the political system of the nation to be maintained in a state of stability. Both consumers and businesses will find it simpler and cheaper to obtain loans at more favorable interest rates. In order to accomplish countries long-term objectives, the second step that a country should be taken in term the best coordination of stakeholders to draw a framework of economic policies. In addition, policymakers need to maintain the ability to move swiftly and be nimble in the occurrence of a main economic crisis, and they also need to be able to forecast any future changes that may occur in the policy-regulatory environment. Both of these requirements are necessary in order for them to be effective. As a result, the total levels of uncertainty will be decreased as a direct result of this.

To gain the comprehensive understanding the impact of EPU on the broader economic environment in Pakistan, many other macroeconomic indicators, including unemployment rates and GDP growth can also be examined to know systematic insights of the impact EPU on CPI. It is necessary to conclude whether positive and negative EPU shocks have asymmetric impacts on the CPI in Pakistan, considering the potential differences that effect both inflationary and deflationary pressures in the economy as a result of the shocks. It is possible that this could improve the ability of policymakers to devise targeted measures during times of uncertainty and make them more effective.

## References

- Ahmad, M., Khan, Z., Ur Rahman, Z., & Khan, S. (2018). Does financial development asymmetrically affect CO<sub>2</sub> emissions in China? An application of the nonlinear autoregressive distributed lag (NARDL) model. *Carbon Management*, 9(6), 631–644. <https://doi.org/10.1080/17583004.2018.1529998>
- Akber, N., & Paltasingh, K. R. (2019). Is public investment complementary to private investment in Indian agriculture? Evidence from the NARDL approach. *Agricultural Economics*, 50(5), 643–655. <https://doi.org/10.1111/AGEC.12515>
- Aoki, K. (2001). Optimal monetary policy responses to relative-price changes. *Journal of Monetary Economics*, 48(1), 55–80. [https://doi.org/10.1016/S0304-3932\(01\)00069-1](https://doi.org/10.1016/S0304-3932(01)00069-1)
- Ateeb Akhter Shah, S., Kaneez, F., & Arshad, R. (2021). The Impact of Economic Policy Uncertainty on Consumer Confidence in Pakistan. *The Lahore Journal of Economics*, 26(2), 19–32. <https://doi.org/10.35536/lje.2021.v26.i2.a2>
- Athari, S. A., Kirikkaleli, D., Yousaf, I., & Ali, S. (2022). Time and frequency co-movement between economic policy uncertainty and inflation: Evidence from Japan. *Journal of Public Affairs*, 22(S1). <https://doi.org/10.1002/pa.2779>
- Baker, S. R., Bloom, N., Davis, S. J., Jorring, A., Kost, K., Al-Kuwari, A., Biffar, S., Boehnke, J., Dashkeyev, V., Deriy, O., Dinh, E., Ezure, Y., Gong, R., Jindal, S., Kim, R., Klosin, S., Koh, J., Lajewski, P., Nebiyu, D., ... Terry, S. (2015). *Measuring Economic Policy Uncertainty*. <https://doi.org/10.3386/W21633>
- Balcilar, M., Gupta, R., Kyei, C., Wohar, M., Balcilar, M., Gupta, R., Kyei, C., & Wohar, M. (2015). *Does Economic Policy Uncertainty Predict Exchange Rate Returns and Volatility? Evidence from a Nonparametric Causality-in-Quantiles Test*. <https://econpapers.repec.org/RePEc:pre:wpaper:201599>
- Barrero, J. M., Bloom, N., Wright, I., Uncertainty, L. R., & Sachs, G. (2017). *NBER WORKING PAPER SERIES SHORT AND LONG RUN UNCERTAINTY*. <http://www.nber.org/papers/w23676>
- Bekiros, S., Gupta, R., & Paccagnini, A. (2015). Oil price forecastability and economic uncertainty. *Economics Letters*, 132, 125–128. <https://doi.org/10.1016/J.ECONLET.2015.04.023>
- Bhagat, S., Ghosh, P., & Rangan, S. P. (2013). Economic Policy Uncertainty and Economic Growth in India. *SSRN Electronic Journal*. <https://doi.org/10.2139/SSRN.2246882>
- Bloom, N. (2009). The Impact of Uncertainty Shocks. *Econometrica*, 77(3), 623–685. <https://doi.org/10.3982/ECTA6248>
- Bloom, N., Floetotto, M., Jaimovich, N., Saporta-Eksten, I., Terry, S. J., Alpana, S., Engel, E., Smets, F., Swanson, E., & Andrus, A. (2012). *Really Uncertain Business Cycles*. <https://doi.org/10.3386/W18245>
- Chang, T., Chen, W. Y., Gupta, R., & Nguyen, D. K. (2015). Are stock prices related to the political uncertainty index in OECD countries? Evidence from the bootstrap panel causality test. *Economic Systems*, 39(2), 288–300. <https://doi.org/10.1016/j.ecosys.2014.10.005>

- Chen, J., Jin, F., Ouyang, G., Ouyang, J., & Wen, F. (2019). *Oil price shocks, economic policy uncertainty, and industrial economic growth in China*. <https://doi.org/10.1371/journal.pone.0215397>
- Choudhary, M., Ali, W., Choudhary, M. A., Pasha, F., & Waheed, M. (2020). *Munich Personal RePEc Archive Measuring Economic Policy Uncertainty in Pakistan Measuring Economic Policy Uncertainty in Pakistan 1. 100013*.
- Christou, C., Gupta, R., & Hassapis, C. (2017). Does economic policy uncertainty forecast real housing returns in a panel of OECD countries? A Bayesian approach. *The Quarterly Review of Economics and Finance*, 65, 50–60. <https://doi.org/10.1016/J.QREF.2017.01.002>
- Chu, L. K., Doğan, B., Abakah, E. J. A., Ghosh, S., & Albeni, M. (2023). Impact of economic policy uncertainty, geopolitical risk, and economic complexity on carbon emissions and ecological footprint: an investigation of the E7 countries. *Environmental Science and Pollution Research*, 30(12), 34406–34427.
- Economic Survey Pakistan. (2018). *Ministry of Finance Government of Pakistan* /. [https://www.finance.gov.pk/survey\\_1819.html](https://www.finance.gov.pk/survey_1819.html)
- Farooq, A., & Yasmin, B. (2017). Fiscal policy uncertainty and economic growth in Pakistan: Role of financial development indicators. *Journal of Economic Cooperation and Development*, 38(2), 1–26.
- Fatima, A., & Waheed, A. (2014). Economic uncertainty and growth performance: A macroeconomic modeling analysis for Pakistan. *Quality and Quantity*, 48(3), 1361–1387. <https://doi.org/10.1007/S11135-013-9841-5/METRICS>
- Fernández-Villaverde, J., Guerrón-Quintana, P., Kuester, K., Rubio-Ramírez, J., Bloom, N., Leeper, E., Nason, J., Ricco, G., Chimowitz, J. T. M., & Kianian, B. (2015). Fiscal Volatility Shocks and Economic Activity. *American Economic Review*, 105(11), 3352–3384. <https://doi.org/10.1257/AER.20121236>
- Ghosh, S. (2020). Asymmetric impact of COVID-19 induced uncertainty on inbound Chinese tourists in Australia: insights from nonlinear ARDL model. *Quantitative Finance and Economics 2020 2:343*, 4(2), 343–364. <https://doi.org/10.3934/QFE.2020016>
- Handley, K., & Limão, N. (2015). Trade and Investment under Policy Uncertainty: Theory and Firm Evidence. *American Economic Journal: Economic Policy*, 7(4), 189–222. <https://doi.org/10.1257/POL.20140068>
- Hassett, K. A., & Metcalf, G. E. (1994). *Investment with Uncertain Tax Policy: Does Random Tax Policy Discourage Investment?* <https://papers.ssrn.com/abstract=227009>
- Hirata, H., Ayhan, M., Otrók, K. C., Terrones, M. E., Perri, F., Rey, H., Rossi, B., Svensson, L., West, K., Kose, M. A., & Otrók, C. (2012). *given to the source. Global House Price Fluctuations: Synchronization and Determinants*. <http://www.nber.org/papers/w18362>
- Ibrahim, M. H. (2015). Oil and food prices in Malaysia: a nonlinear ARDL analysis. *Agricultural and Food Economics*, 3(1), 1–14. <https://doi.org/10.1186/S40100-014-0020-3/FIGURES/5>
- International Monetary Fund. (2022). *Update Of The Consumer Price Index Manual*. International Monetary Fund. <https://www.imf.org/en/Data/Statistics/cpi-manual>
- Iqbal, M. A., Iqbal, A., Afzal, S., Akbar, N., Abbas, R. N., & Zaman Khan, H. (2015). In Pakistan, Agricultural Mechanization Status and Future Prospects. *J. Agric. & Environ. Sci*, 15(1), 122–128. <https://doi.org/10.5829/idosi.ajeaes.2015.15.1.12500>
- Jafri, H. R., Khan, I. H., & Javaid, A. (2018). The Effect of Macroeconomic Uncertainty on Consumption Expenditure in Case of Pakistan. *European Online Journal of Natural and Social Science*, 7(1), 86–98.
- Kang, W., & Ratti, R. A. (2013). Oil shocks, policy uncertainty and stock market return. *Journal of International Financial Markets, Institutions and Money*, 26(1), 305–318. <https://doi.org/10.1016/J.INTFIN.2013.07.001>
- Karnizova, L., & Li, J. C. (2014). Economic policy uncertainty, financial markets and probability of US recessions. *Economics Letters*, 125(2), 261–265. <https://doi.org/10.1016/J.ECONLET.2014.09.018>
- Khan, S. A., & Qureshi, M. S. (2020). The Effect of Political Uncertainty on Consumer Price Inflation: Evidence from Pakistan. *Journal of Economic Studies*, 37(4), 432–452. <https://www.investopedia.com/insights/what-is-international-trade/>
- Kirikaleli, D. (2020). Does political risk matter for economic and financial risks in Venezuela? *Journal of Economic Structures*, 9(1), 1–10. <https://doi.org/10.1186/S40008-020-0188-5/FIGURES/6>
- Kirikaleli, D., Athari, S. A., & Ertugrul, H. M. (2021). The real estate industry in Turkey: a time series analysis ± 耳其房地产业：时间序列分析. *Service Industries Journal*, 41(5–6), 427–439. <https://doi.org/10.1080/02642069.2018.1444033>

- Knight, F. H. (1921). *Risk, Uncertainty and Profit*. <https://papers.ssrn.com/abstract=1496192>
- Matsumura, M. (2022). What price index should central banks target? An open economy analysis. *Journal of International Economics*, 135, 103554. <https://doi.org/10.1016/J.JINTECO.2021.103554>
- Munir, K., & Riaz, N. (2020). Dynamics of inflation and inflation uncertainty in Pakistan. *International Journal of Monetary Economics and Finance*, 13(2), 130–145. <https://doi.org/10.1504/IJMEF.2020.107679>
- Oliver Baker. (2022). *eCommerce Website Cost in the UK [Full Cost Breakdown 2023]*. <https://www.intelivita.co.uk/blog/ecommerce-website-cost>
- Pakistan Bureau of Statistics. (n.d.). *Pakistan Bureau of Statistics*.
- Pástor, L., & Veronesi, P. (2012). Uncertainty about Government Policy and Stock Prices. *The Journal of Finance*, 67(4), 1219–1264. <https://doi.org/10.1111/J.1540-6261.2012.01746.X>
- PBS. (1998). Demographic Indicators -1998 Census. *Pakistan Bureau of Statistics (PBS)*, 1998. [http://www.pbs.gov.pk/sites/default/files/tables/DEMOGRAPHIC\\_INDICATORS - 1998 CENSUS.pdf](http://www.pbs.gov.pk/sites/default/files/tables/DEMOGRAPHIC_INDICATORS_-_1998_CENSUS.pdf)
- PBS. (2021). *Pakistan Bureau of Statistics*. <https://www.pbs.gov.pk/node/3331>
- PDMA CAPACITY BUILDING. (2014). *Capacity Building through curriculum development , conduct various trainings for Provincial and District Disaster Management Authorities and Line Department government officials*. 1–6.
- Pigou, A. C., & Keynes, J. M. (1921). J. M. Keynes. A Treatise on Probability. *The Economic Journal*, 31(124), 507–511. <https://doi.org/10.2307/2223083>
- Qamruzzaman, M. (2022). Nexus between Economic Policy Uncertainty and Institutional Quality: Evidence from Indian and Pakistan. *Macroeconomics and Finance in Emerging Market Economies*, 00(00), 1–20. <https://doi.org/10.1080/17520843.2022.2026035>
- Qu, L., & Chen, Y. (2014). The Impact of e-commerce on China's Economic Growth. *The Thirteenth Wuhan International Conference on E-Business*, 65–72.
- Reboredo, J. C., & Uddin, G. S. (2016). Do financial stress and policy uncertainty have an impact on the energy and metals markets? A quantile regression approach. *International Review of Economics & Finance*, 43, 284–298. <https://doi.org/10.1016/J.IREF.2015.10.043>
- Ren, Y., Guo, Q., Zhu, H., & Ying, W. (2020). The effects of economic policy uncertainty on China's economy: evidence from time-varying parameter FAVAR. *Applied Economics*, 52(29), 3167–3185. <https://doi.org/10.1080/00036846.2019.1707475>
- Saleem, H., Jiandong, W., Muhammad, B., Khan, |, & Khan, M. B. (2017). *The impact of economic policy uncertainty on the innovation in China: Empirical evidence from autoregressive distributed lag bounds tests*. <https://doi.org/10.1080/23322039.2018.1514929>
- Shahbaz, M., Wahid, A. N. M., & Haider, A. (2010). Empirical psychology between wholesale price and consumer price indices: The case of Pakistan. *Singapore Economic Review*, 55(3), 537–551. <https://doi.org/10.1142/S0217590810003882>
- Subhani, M., Gul, A., & Osman, A. (2010). *Relationship between consumer price index (CPI) and KSE-100 index trading volume in pakistan and finding the endogeneity in the involved data*. i(29712). <https://mpra.ub.uni-muenchen.de/id/eprint/29712>
- Tabassam, A. H., Hashmi, S. H., & Rehman, F. U. (2016). Nexus between Political Instability and Economic Growth in Pakistan. *Procedia - Social and Behavioral Sciences*, 230, 325–334. <https://doi.org/10.1016/J.SBSPRO.2016.09.041>
- Tam, P. S. (2018). Global trade flows and economic policy uncertainty. *https://doi.org/10.1080/00036846.2018.1436151*, 50(34–35), 3718–3734. <https://doi.org/10.1080/00036846.2018.1436151>
- Vision 2025, G. (2017). *www.pc.gov.pk PA K I S T A N V I S I O N 2 0 2 5 i*. <https://fics.seecs.edu.pk/Vision/Vision-2025/Pakistan-Vision-2025.pdf>
- Wang, J. C. (n.d.). *The Impact of Policy Uncertainty on U . S . Employment : Industry Evidence* (Issue 13, pp. 1–28).
- Wang, Q., & Sun, X. (2017). Crude oil price: Demand, supply, economic activity, economic policy uncertainty and wars – From the perspective of structural equation modelling (SEM). *Energy*, 133, 483–490. <https://doi.org/10.1016/J.ENERGY.2017.05.147>
- Wen, J., Khalid, S., Mahmood, H., & Yang, X. (2022). Economic policy uncertainty and growth nexus in Pakistan: a new evidence using NARDL model. *Economic Change and Restructuring*, 55(3), 1701–1715.



<https://doi.org/10.1007/s10644-021-09364-2>

Woodford, M. (2010). Optimal Monetary Stabilization Policy. *Handbook of Monetary Economics*, 3(C), 723–828.

<https://doi.org/10.1016/B978-0-444-53454-5.00002-5>

Xia, D., Zheng, X., Liu, L., Wang, C., & Ma, H. (2020). C-Chirp: Towards Symmetric Cross-technology Communication over Asymmetric Channels. *Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks Workshops*, 1–28.

<https://doi.org/10.1109/SECON48991.2020.9158411>

Zareen, S., & Amin, D. A. (2022). Impact of Policy Uncertainty on Trade and Welfare Evidence From Pakistan and China. *Journal of Pakistan-China Studies (JPCS)*, 3(1), 18–36. <https://doi.org/10.55733/jpcs.v3i1.44>