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# Economic Uncertainty and Monetary Policy Effectiveness: A Comparative Study Between High and Low Uncertainty Countries

Adel Bogari[1]

**Abstract**

*This study examines the impact of economic uncertainty on monetary policy effectiveness, as measured by inflation, in 21 countries observed during the period stretching from 1997 to 2022. The study uses a Generalized Method of Moments (GMM) model on full, high and low uncertainty countries. Our results indicate that uncertainty has a significant positive impact on inflation. The results also show that central banks have adopted a cautious approach in response to these shocks, and that monetary policy moderates the negative effects of economic uncertainty. Finally, we found similar results for countries with low vs. high economic uncertainty levels. The findings can be worthwhile to sketch proper monetary policy under uncertainty to lessen monetary policy effectiveness. This study suggests that it is important to note that, in times of high economic uncertainty, monetary policy can be effective when a reactive monetary policy acts as an economic stabilizer and inflation controller.This study is one of the very few studies investigating the relationship between economic uncertainty and monetary policy effectiveness. It does so using the Generalized Method of Moments (GMM) model in high uncertainty versus low uncertainty countries, thus contributing to our understanding of monetary policy effectiveness under uncertainty.*

**Keywords:** *Economic Uncertainty, Monetary Policy Effectiveness, Inflation, GMM.*

JEL Classification: D81, E52

## Introduction

Over the past decade, considerable uncertainty surrounding the management of economic policies has emerged. It revives interest in examining its repercussions on the economy as a whole, as well as on monetary policy effectiveness in particular. With this in mind, many researchers have set out to empirically develop economic uncertainty (EU) indicators using a variety of methods, with the aim of measuring its impact. For instance, the study of Baker et al., (2020) indicated that the prevailing current uncertainty showed significant higher levels than those of the 2008-2009 Great Recession, and reached similar levels observed during the Great Depression in the USA. The authors also equate the current economic slowdown with a high unparalleled uncertainty levels instigated by the Covid-19 pandemic. Alola & Uzuner, (2020) also confirm that Covid-19 had a significant impact on economic uncertainty. In addition, several studies have focused on designing a method to assess economic uncertainty, or at least an alternative to this measure. There are several approaches to quantifying economic uncertainty. For example, Baker et al. (2016) have constructed an individual EU index that quantifies uncertainty on the basis of several factors, mostly previous measures of uncertainty. Overall, the authors' attempt to collect all sources of economic uncertainty with this index, has made it attractive and widely cited by researchers across disciplines, making it a benchmark for economists and one of the best measures of uncertainty. Pursuing a series of improvements, the founders gradually included new countries and sub-indices that consider specific uncertainty types or sources. The different measurement tools then gave rise to a vast economic literature exploring the impact of uncertainty associated with economic policies on economic activity. Subscribing to this perspective, several studies have highlighted its significant impact on households, investors and governments. This uncertainty has a significant impact on their investment, employment and consumption decisions, slowing down these key processes (Bloom, 2009).These decisions are crucial because they directly affect future income flows, whether from labor or capital. It is therefore essential to take into account the impact of uncertainty shocks, as this offers a relevant perspective for evaluating and quantifying different potential scenarios on the evolution of key economic variables. Recent theoretical and empirical research has highlighted that economic uncertainty plays a crucial role in understanding the effects of a crisis whose boundaries are often ill-defined. Recent studies even propose that uncertainty plays a pivotal role in the

[1] College of Business Administration, Al-Baha University, Saudi Arabia, Email: aabogari@bu.edu.sa.

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contraction of economic activity during the current recession, as well as in shaping future recovery prospects (Baker et al., 2020; Leduc & Liu, 2016; Nain & Kamaiah, 2020). A pertinent question arises, particularly in the aftermath of the recent financial crisis: Does monetary policy become less effective in times of high uncertainty? Insights from Bernanke (1983), Dixit & Pindyck (1994), Bloom (2009) and more recently (Altig et al., 2020; Çekin et al., 2020; Wang & Lee, 2022) reveal the adverse impact of Economic Policy Uncertainty (EPU) on the effectiveness of monetary policy. However, there is limited literature exploring the relationship between EPU and monetary policy effectiveness, especially across countries experiencing high and low levels of EPU. This gap warrants exploration through the following hypothesis:

*H1: Economic policy uncertainty exhibits a negative and statistically significant correlation with monetary policy effectiveness.*

A number of researchers have investigated the mechanisms through which uncertainty-related disturbances are transmitted to the real world. Bearing on this, the economics and financial literature has identified several major channels, namely the real option channel, studied by Bloom (2009) & Altig (2020), who explored how investment decisions are affected by economic uncertainty, The precautionary savings effect, examined by Leduc & Liu (2016), who examined how individuals and companies respond to uncertainty by increasing their savings level to guard against possible future shocks, and financial markets, which can play a role in transmitting economic policy uncertainty by amplifying financial frictions, such as the risk premium and asymmetric information, following uncertainty shocks, as suggested by (Brogaard & Detzel, 2015) , and (Bordo et al., 2016)

The complexity of economic uncertainty naturally leads us to question its interaction with monetary policy effectiveness. It has a significant impact on the way economies function and prosper. In particular, the objectives of central banks, such as price stability, are strongly affected by uncertainty level prevailing in the economic environment. Central banks' decisions on interest rates, quantitative easing and other monetary policy tools are deeply affected by their perception of uncertainty (Mansoor et al., 2020). This complex interplay between uncertainty and central banks' objectives raises crucial questions about monetary policy effectiveness. Indeed, to understand how uncertainty affects monetary policy effectiveness, it is essential to explore in depth how uncertainty can push central banks to deviate from their objectives and affect their strategic decisions. In this complex economic context, it is essential to ask how economic uncertainty can affect the way monetary policy operates.

This paper is structured into four sections. Section 2 reviews the literature on economic uncertainty. It specifically explores the different measures of uncertainty, identifies the factors that contribute to its variation, and examines the effect of uncertainty fluctuations on economic decisions. Section 3 presents the theoretical background of the study. We discuss the transmission channels of monetary policy, exploring the mechanisms by which this policy affects the economy. Then, section 4 presents the GMM model, the data used and the descriptive statistics. Section 5 discusses the estimates and results. Section 6 concludes the paper.

*Theoretical Background*

Ther literature suggests a relationship between monetary policy effectiveness and uncertainty, which operates through two main channels: interest rates non-linearities and the credit transmission mechanism. According to non-linearities theory, during periods of heightened uncertainty, monetary policy effectiveness diminishes due to factors such as real option effects, precautionary savings, and uncertainty-driven pricing mechanisms (Vavra, 2014; Bloom, 2014) Additionally, a future decline in monetary policy effectiveness is anticipated because firms tend to adopt a cautious approach, delaying investment decisions to mitigate the expenses associated with irreversible investments, aligning with real options theory (Bloom 2009, 2014). Precautionary savings theory further suggests that investors opt to save rather than spend amid prevailing uncertainty Bloom (2014). Moreover, the uncertainty-dependent pricing mechanism elucidates the diminished effectiveness of monetary policy through continual adjustments in business prices in response to uncertainty Vavra (2014). Consequently, economic agents exhibit reduced responsiveness to policy shocks in situations characterized by uncertainty and unpredictability. Consequently, central banks may resort to more aggressive measures to attain their monetary policy goals, such as price stability, maximum

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employment, and currency stability. Numerous empirical studies, including those by Bloom (2009), Aastveit et al., (2017), Balcilar et al., (2022) (Castelnuovo & Pellegrino, 2018) and Lien et al., (2021) support this perspective. For instance, Aastveit et al. (2017) investigated the macroeconomic impact of monetary policy changes across varying states of uncertainty in the US using an interactive vector autoregression model. Subsequently, their research expanded to encompass the economies of Canada, the United Kingdom, and Norway, by introducing the US uncertainty measure as an interactive variable. Their findings indicate that the influence of monetary policy on an economy diminishes significantly during periods of heightened uncertainty, particularly observed in Canada and the United States. Furthermore, Balcilar et al. (2020) delved into the impact of US policy uncertainty on the effectiveness of monetary policy in the Eurozone, revealing support for the contingent policy inefficiency hypothesis concerning US policy uncertainty. Additionally, Çekin et al., (2020) explore the effectiveness of unconventional monetary policies across eight OECD countries (Canada, Germany, France, Italy, Japan, Spain, the United Kingdom, and the United States) that implemented such measures following the 2007 financial crisis due to the zero-interest rate dilemma. In contrast to the concept of interest rates non-linearities, the credit transmission channel theory posits that monetary policy shocks wield greater effectiveness and potency on economies during financial crises, as companies face liquidity constraints stemming from elevated external financing premiums (Lau et al., 2024).

## Literature Review

Following the 2008-2009 global financial crisis, numerous macroeconomic inquiries have honed in on economic uncertainty, a focus that has intensified amidst the Covid-19 pandemic. Thorough literature reviews have underscored the imperative for both governments and businesses to acknowledge economic uncertainty as a critical risk indicator. Governments must recognize uncertainty as a risk factor, given its association with elevated unemployment rates, sluggish economic growth, and diminished investment within an economy. Previous research has scrutinized the influence of economic uncertainty on the effectiveness of monetary policy. For instance, Aastveit et al. (2017) utilized the Structural VAR (SVAR) model pioneered by Towbin & Weber, (2013) to evaluate the repercussions of a restrictive monetary shock on output, prices, consumption, and investment amidst fluctuating levels of uncertainty. Their findings indicate that monetary policy exhibits significantly greater efficacy during periods of low uncertainty. Similarly, Caggiano et al. (2015) delved into the effectiveness of monetary policy in response to an uncertainty shock. Their results suggest that monetary policy proves more impactful during periods of economic expansion than during the initial stages of a recession. However, uncertainty tends to escalate during recessions, implying that monetary policy effectiveness diminishes amidst heightened uncertainty. These findings align with the principles of "real options" theory, which posits that uncertainty can impair monetary policy effectiveness due to fixed costs and the partial irreversibility of investment and hiring. Companies often perceive investment and hiring opportunities as options, and heightened uncertainty can augment the value of deferral options. Additionally, uncertainty can influence consumption decisions, as economic agents opt for precautionary saving during periods of heightened uncertainty.

Further studies, such as those conducted by Aastveit et al. (2017) have gauged the impact of economic uncertainty on the transmission of monetary policy shocks. Utilizing quarterly data spanning from 1970Q1 to 2016Q2 and employing an interactive VAR model, the authors found that monetary policy shocks in the US exert a lesser influence on economic activity when uncertainty is high, aligning with the tenets of "real options theory". Recently, Nain & Kamaih (2020) employed a non-linear VAR model to investigate the impact of monetary policy shocks under varying levels of uncertainty. Their findings underscored the influence of uncertainty on monetary policy effectiveness, revealing that the effects of monetary policy shocks are less pronounced during periods characterized by high uncertainty compared to those of low uncertainty. Similarly, Moudud-Ul-Huq & Akter (2024) analyzed the implementation of monetary policy by central banks amid uncertain conditions. They examined the transmission of monetary policy shocks under uncertainty utilizing the New Global Uncertainty Index, aiming to assess the effects of crisis, war, and pandemic shocks on selected macroeconomic variables. Their analysis, spanning from 1999 to 2022, involved unit root tests, a structural vector autoregression model, and Granger causality tests with quarterly data. The results indicated a unidirectional relationship between the money market rate and global uncertainty, while a bidirectional relationship was observed between the latter and the monetary aggregate

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(M2). Short-term effects were observed from global uncertainty to inflation, with variance decomposition revealing that global uncertainty accounted for approximately 12% of inflationary pressures in the long term. Furthermore, Behera et al. (2023) conducted a literature review highlighting that uncertainty shocks in the eurozone exert negative effects on demand, potentially amplifying existing deflationary pressures. Although uncertainty negatively impacts inflation, it does not disrupt the transmission of central bank monetary policy, suggesting continued effectiveness even amidst high uncertainty. Nonetheless, policymakers must consider uncertainty in their decision-making processes to effectively fulfill their responsibilities. Balcilar et al. (2022) investigated monetary policy effectiveness across five major Asian countries utilizing a spillover estimation approach based on the quantile vector regression (QVAR) model. Their analysis revealed that the spillover index of interest rates on industrial production and the consumer price index varies with high and low uncertainty levels. Results from their study provided partial evidence supporting economic theory, suggesting a decline in monetary policy effectiveness during periods of heightened economic uncertainty. Additionally, asymmetric effects of policy uncertainty and lending rates on macroeconomic indicators were observed, with monetary policy shocks proving more potent during periods of high uncertainty. Corrêa & Lopes, (2023) assessed the impact of uncertainty on monetary policy outcomes in Brazil post-adoption of inflation targeting. Using the vector autoregressions method with an endogenous threshold (TVAR) and four distinct indicators to determine regimes of high or low macroeconomic uncertainty, they found that uncertainty tended to rise during recessionary periods. Moreover, interest rate shocks had a diminished effect on overall output during periods of greater instability, with the most significant impact of uncertainty manifested in reduced inflation control, particularly during turbulent periods. Consequently, uncertainty may impede the transmission of monetary policy in Brazil, especially concerning price adjustments. Pellegrino et al. (2023) utilized a non-linear VAR model and a sophisticated identification strategy to explore the robust response of real activity to a financial uncertainty shock during and post the Great Recession. Their analysis estimated that the uncertainty shock of 2008 explained around 60% of production loss over the 2008-2014 period. Furthermore, they demonstrated the Federal Reserve's successful role in mitigating production loss during the Great Recession through effective monetary policy measures. Their findings also revealed that the monetary policy rule implemented during the Great Recession yielded economic outcomes closer to those of flexible prices compared to the rule describing the Federal Reserve's conduct in normal times.

Numerous studies have presented divergent empirical findings supporting the credit transmission channel theory. For instance, Wang & Lee (2022) and Çekin et al. (2020) discovered that monetary shocks exert a more pronounced impact on output during periods of restricted credit or heightened financial strain compared to normal circumstances. Moreover, they found that contractionary monetary shocks have a more significant effect than expansionary monetary shocks, utilizing a threshold VAR model. Using Markov switching models, Garcia & Schaller, (2002) and Lo & Piger (2005) concluded that monetary policy exerts a stronger impact during economic downturns than during periods of growth. More recently, Fry-Mckibbin & Zheng, (2016) investigated the influence of monetary policy under low and high financial stress in the US economy using the threshold VAR model. Their findings suggested that expansionary monetary policy has a comparatively greater effect on output during times of heightened financial stress than during normal economic conditions. Additionally, Castelnuovo & Pellegrino (2018) demonstrated that monetary policy exhibits a significantly amplified effect on output, inflation, and various macroeconomic indicators including credit, asset prices, uncertainty, and consumer confidence during financial crises across twenty developed economies. Similar conclusions were drawn by Burgard et al. (2019) indicating that monetary policy can serve as a potent tool for economic stimulation during crisis periods in the eurozone. However, these effects of expansionary monetary policy tend to be short-lived.

The empirical methodology employed in most of the aforementioned studies revolves around a multivariate constant-coefficient mean-based vector autoregressive model. This approach focuses on modeling interactions solely based on the mean of the relevant conditional distribution, neglecting interactions across other aspects. The linear constant-coefficient vector autoregressive model primarily aims at predicting variables under study based solely on mean distribution, overlooking the sequence of diverse and minor shocks that could significantly impact the economic model's structure. Furthermore, these multivariate

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models tend to underestimate the mean, thereby indicating contagion of larger economic shocks during both recessionary and expansionary periods.

In contrast, Caggiano et al. (2020) introduced a novel approach to capture asymmetric volatility contagion effects among seven sub-sector stock indices in the US. They assessed negative and positive volatility contagion effects by considering the direction of returns over the study period. While their method is appealing for detecting asymmetry, estimating volatility contagion during favorable and adverse economic conditions still relies on a multivariate mean-based vector autoregressive model. This suggests that mean-based models require adjustment to effectively capture the impact of significant shocks at extreme points of the distribution. The quantile vector autoregressive (QVAR) model offers an extension of the linear VAR approach and possesses the capability to capture more nuanced effects compared to mean-based models. Unlike mean-based models, the QVAR model isn't confined to the conditional mean, allowing it to incorporate state-dependent shocks at various quantiles, providing a comprehensive understanding of inter-variable relationships (Montes-Rojas, 2017). Consequently, this study introduces a fresh perspective to the literature concerning how real economic indicators react to interest rate fluctuations under varying levels of uncertainty. An influential study in this realm is that of Bloom et al. (2014), who developed and calibrated a dynamic stochastic general equilibrium model incorporating non-convex adjustment costs to explore the dependence of expansive policy effects on uncertainty. Similarly, Vavra (2014) formulated a model featuring fixed price adjustment costs consistent with micro price data, demonstrating that heightened firm-level volatility predicts weakened policy effects. Our contribution lies in empirically evaluating, using macroeconomic data, the interaction between monetary policy effectiveness and the level of uncertainty within an economy. Several authors have engaged in debates regarding policy efficacy during recessions, such as Lo & Piger (2005), who observed that policy exerts greater influence during recessions than during economic booms. Conversely, Behera et al. (2023) found that policy effectiveness diminishes during recessions. The primary findings of this study align with previous research, indicating differential responses to monetary policy shocks under conditions of high and low economic uncertainty. Numerous scholars, such as Vavra (2014) and Tillmann (2020), have delved into this matter, uncovering indications of diminished responses from monetary policy during periods characterized by heightened uncertainty. Nonetheless, uncertainty itself can influence the efficacy of monetary policy, as evidenced by Tillmann (2020), who observed that when uncertainty is high, the impact of a policy tightening decision weakens, leading to a subdued response in long-term interest rates. However, these findings overlook the transmission of monetary policy to inflation, as Tillmann (2020) primarily focuses on uncertainty pertaining to monetary policy itself. Additionally, Aastveit et al. (2017) demonstrated that political uncertainty curtails the transmission of the Fed's monetary policy onto investment and consumption. This dampening effect of monetary policy during uncertain times is corroborated by studies from Castelnuovo and Pellegrino (2018) and (Cesa-Bianchi et al., 2020). Moreover, Andrade et al. (2019) discovered that ambiguity diminishes the effectiveness of forward guidance. Research has also underscored that the impact of uncertainty shocks varies depending on economic conditions. For instance, the repercussions of negative uncertainty intensify during periods when the economy is at the zero lower bound (Caggiano et al., 2017) or in times of recession (Caggiano et al., 2014). Consequently, there is evidence pointing towards several nonlinearities when evaluating the role of economic uncertainty.

## Methodology

The empirical model is as follows:

$$EPM = a_0 + a_1 EU_{it} + a_2 (MP_{it} \times EU_{it}) + a_3 CV_{it} + \mu i + \vartheta t + v_{it} \quad (1)$$

In equation (1) EPM, EU, MP, CV, μi , ϑt, vit and i, t, stand for monetary policy effectiveness, economic uncertainty, monetary policy, and the control variables, countries and time, respectively. (MP×EU) is the main independent variable representing the interaction term between monetary policy and economic uncertainty. Monetary policy effectiveness is measured by inflation. Stable inflation fosters consumer and investor confidence, encouraging spending and investment. However, uncontrolled inflation can erode savings and cause economic uncertainty, affecting purchasing and investment decisions. Economic

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uncertainty (EU) denotes a situation in which the future economic environment is difficult to predict, characterized by a high degree of risk and unknowns. This uncertainty can disrupt monetary policy effectiveness and affect central banks' objectives and decisions. The variable (EU*MP) measures how uncertainties in the economy affect the ability of monetary policy to function effectively, by disrupting the decisions taken by the central bank to control money supply and inflation. In addition to the main variables, many other factors can affect the ultimate target of monetary policy. Therefore, based on the previous studies namely of Çekin et al. (2020), Arce-Alfaro & Blagov (2023) and Lopes & Corrêa (2023) it is necessary to choose control variables to improve the explanatory power of the model, including consumption level (CL), Gross fixed capital formation (GFCF), export level (EL), monetary policy (MP), fiscal policy (PF).

**Table 1.** Delivers A Description of The Variables Chosen.

| Acronym | Variables | Role | Source |
|---|---|---|---|
| INF | Inflation rate | Dependent | https://databank.worldbank.org/. |
| EU | Economic policy uncertainty | Independent | https://www.policyuncertainty.com/. |
| MP | Monetary Policy (Nominal Interest Rate | Independent | https://databank.worldbank.org/. |
| MP*EU | The interaction term between monetary policy and economic uncertainty. | Independent | https://www.policyuncertainty.com/. https://databank.worldbank.org/. |
| GFCF | Gross fixed capital formation (% of GDP) | Control | https://databank.worldbank.org/. |
| EL | Exports of goods and services (% of GDP) | Control | https://databank.worldbank.org/. |
| CL | Final consumption expenditure (% of GDP) | Control | https://databank.worldbank.org/. |
| GFCE | Government final consumption expenditure (% of GDP) | Control | https://databank.worldbank.org/. |

Our annual dataset spans from 1997 to 2022 and encompasses 21 countries, including Brazil, Canada, Chile, France, Germany, Ireland, Korea, Russia, Singapore, the UK, Australia, Colombia, Greece, India, Italy, Japan, the Netherlands, Spain, the USA, Sweden, and Mexico. It's important to note that the selection of these countries was influenced by data availability, especially concerning the EU variable.

In our study, we categorize the countries into two groups based on their levels of economic uncertainty: those characterized by high economic uncertainty and those with low economic uncertainty. To do this, we first calculated the average economic indicators for each country and then determined the overall average across all countries for comparison purposes. Comparing each country's average with the overall average, those with averages surpassing the overall average were categorized as having high economic uncertainty, while those with averages below were labeled as having low economic uncertainty.

To initiate our descriptive analysis, we explore the key characteristics and variability of the variables within our model. We achieve this by examining the mean, standard deviation, maximum value, and minimum value of each variable. The comprehensive descriptive data can be found in Table 1.

For instance, the annual mean of the inflation variable stands at 3.568, indicating a moderate average inflation rate throughout the reviewed period. However, the high standard deviation of 5.168 suggests significant fluctuation around this mean. Inflation rates varied notably, ranging from deflation of -4.625 to a peak of 72.387, indicating periods of economic instability possibly triggered by various factors such as economic shocks, alterations in monetary policy, or shifts in supply and demand dynamics. These

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fluctuations underscore the importance of vigilant monitoring and the development of adaptable economic policies to stabilize the economy amidst such variations.

Furthermore, the variable representing the interaction between monetary policy and economic uncertainty (MP*EU)* displays a mean value of 249.312. This indicates that, on average, the interaction between monetary policy and economic uncertainty operated at this level throughout the study period. However, the substantial standard deviation of 149.899 suggests considerable variation in this interaction over time. Ranging from a minimum of 0 to a maximum of 1282.882, these fluctuations emphasize the extent of variability in the interaction. A heightened level of interaction between monetary policy and economic uncertainty (MPEU) can potentially exert a negative impact on the economy. For instance, expansionary monetary policies may adversely affect the economy if implemented amidst high economic uncertainty.

**Table 1.** Descriptive Statistics

| Variables | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|
| **INF** | 3.568 | 5.168 | -4.625 | 72.387 |
| **EU** | 130.627 | 76.818 | 27.001 | 669.01 |
| **MP*EU** | 249.312 | 149.899 | 0 | 1282.882 |
| **GFCF** | 3.209 | 9.263 | -38.972 | 100.938 |
| **EL** | 4.847 | 7.165 | -23.383 | 39.166 |
| **CL** | 2.479 | 3.155 | -11.835 | 19.325 |
| **GFCE** | 2.56 | 3.023 | -7.312 | 18.322 |

Source: The authors

Before proceeding with the estimations, it is essential to evaluate correlation among the independent variables. This step is crucial for identifying multicollinearity, a phenomenon that occurs when variables strongly correlate with each other. Addressing multicollinearity is important as it can distort coefficient estimates and make the results unstable, thereby complicating their interpretation. To detect multicollinearity, we examine the correlation matrix presented in Table 2.

The correlation matrix reveals that all correlation coefficients are below 0.7, except for the "consumption level" variable, which exhibits a high correlation of 0.79, and the "export level" variable. While these two variables display a notable correlation, it doesn't necessarily indicate a severe multicollinearity issue among the independent variables in the model. It's crucial to note that correlation alone does not automatically imply multicollinearity.

**Table 2.** Correlation Matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| (1) INF | 1.000 | | | | | | |
| (2) EU | -0.014 | 1.000 | | | | | |
| (3) MP*EU | -0.141 | 0.972 | 1.000 | | | | |
| (4) GFCF | 0.193 | -0.140 | -0.164 | 1.000 | | | |
| (5) EL | 0.132 | -0.202 | -0.231 | 0.367 | 1.000 | | |
| (6) CL | 0.355 | -0.203 | -0.240 | 0.564 | 0.398 | 1.000 | |
| (7) GFCE | 0.160 | -0.123 | -0.144 | 0.277 | 0.125 | 0.573 | 1.000 |

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Source: The authors

## Results and Interpretation

Table 3 presents a summary of our findings regarding the impact of economic uncertainty on monetary policy effectiveness. We employed the Generalized Method of Moments (GMM), a statistical estimation method that addresses endogeneity and error correlation issues in econometric models. Our analysis reveals that economic uncertainty (EU) exerts a positive and significant effect on inflation (INF), consistent with findings from previous studies. This suggests that economic uncertainty may contribute to upward pressure on inflation levels.

While existing literature has predominantly focused on the relationship between inflation expectations and household economic behavior, there is also considerable interest in exploring the role of inflation-related economic uncertainty. For instance, Binder (2017)observed that consumers, when faced with heightened inflation uncertainty, exhibit reluctance in purchasing durable goods, indicative of a precautionary savings channel. Similarly, experimental evidence provided by Armantier et al. (2015)suggests that individuals base their investment decisions on their inflation expectations and the degree of uncertainty. Additionally, Lopes & Corrêa (2023) demonstrated that greater inflation uncertainty is associated with increased caution in household consumption, investment, and borrowing behavior.

The interaction variable between economic uncertainty and monetary policy (EU*MP) exhibits a negative and significant relationship with inflation (INF). This implies that when economic uncertainty is high and monetary authorities adopt clear inflation control objectives, inflation tends to decrease. Clear inflation control objectives positively impact inflation expectations, thereby reducing economic and financial uncertainty and enhancing the predictability of monetary policy measures. Such an approach, akin to that of central banks, mitigates inflation's response to temporary fluctuations in supply and demand, fostering an economic environment less sensitive to uncertainty. These findings are consistent with those of Lopes & Corrêa (2023) and Caggiano et al. (2017)

Moreover, the positive correlation between gross fixed capital formation (GFCF) and inflation (INF) can be attributed to the fact that increases in domestic investment can exert upward pressure on price levels. Consequently, as GFCF rises, companies may adjust their prices to meet growing demand, thereby contributing to inflation.

Similarly, there is a significant positive correlation between exports level (EL) and inflation (INF), indicating that higher export levels are generally associated with upward trends in inflation. Additionally, a significant positive correlation exists between consumption level (CL) and inflation (INF).

Regarding the Government final consumption expenditure (% of GDP) (GFCE), there is a clear and significant negative correlation with inflation (INF). This implies that extended public spending curb inflation growth. These results align with Fasanya et al. (2021) who posited that an expansionary monetary policy reacts positively to inflation and the gap between actual and expected economic activity.

In Table 3, countries experiencing high economic uncertainty exhibit a positive and significant correlation between economic uncertainty (EU) and inflation (INF), suggesting that increased economic uncertainty may contribute to higher inflation levels in these countries. This observation is consistent with hypotheses proposed by Arce-Alfaro & Blagov (2023), although empirically demonstrating this relationship can be challenging.

Furthermore, all five models demonstrate a negative and significant relationship between the interaction variable (EU*MP) and inflation, consistent with the findings of Arce-Alfaro & Blagov (2023) and Burgard et al. (2019), indicating that monetary policy significantly influences inflation. Additional estimation of the policy reaction function has led to the development of a monetary policy rule aimed at controlling inflation, with adjustments in monetary policy instruments, such as interest rates, in response to inflation or real economic growth.

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**Table 3.** Estimation Results for The Full Sample Versus the Sample of High Uncertainty Countries

| | Full Sample | Sample of high uncertainty countries | | | | |
|---|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
| Lag INF | 0.25*** | 0.19 | 0.29* | 0.10 | 0.43** | 0.19 |
| | (0.01) | (0.19) | (0.16) | (0.22) | (0.17) | (0.21) |
| EU | 0.09*** | 0.10*** | 0.08*** | 0.09*** | 0.07** | 0.08*** |
| | (0.01) | (0.02) | (0.02) | (0.03) | (0.03) | (0.03) |
| MP*EU | -0.05*** | -0.05*** | -0.04*** | -0.05*** | -0.03*** | -0.04*** |
| | (0.00) | (0.01) | (0.01) | (0.02) | (0.01) | (0.01) |
| GFCF | 0.02** | | 0.04*** | 0.04*** | 0.04*** | 0.04*** |
| | (0.01) | | (0.00) | (0.00) | (0.00) | (0.00) |
| EL | 0.02*** | | | -0.06 | -0.06 | -0.06 |
| | (0.01) | | | (0.05) | (0.05) | (0.05) |
| CL | 0.15*** | | | | 0.21 | 0.21 |
| | (0.05) | | | | (0.13) | (0.13) |
| GFCE | -0.22*** | | | | | -0.16** |
| | (0.04) | | | | | (0.07) |
| Constant | 2.04*** | 1.57 | 1.36 | 5.69** | -0.13 | 3.14*** |
| | (0.14) | (1.65) | (0.95) | (2.49) | (4.11) | (0.88) |

*** p<0.01, ** p<0.05, * p<0.1

Source: The authors

Table 4 reveals that economic uncertainty exerts a positive and significant influence on inflation (INF), indicating that as economic uncertainty escalates, inflation is more likely to rise. This phenomenon is particularly pronounced in countries with low economic inertia, where inflation tends to be more volatile and susceptible to economic shocks, especially those stemming from economic uncertainty. This heightened sensitivity is attributed to the greater flexibility of economic markets in these countries, allowing prices and wages to adjust more swiftly to changes in the economic landscape. Consequently, in times of uncertainty, economic agents are inclined to make decisions that could potentially fuel inflation.

These findings resonate with those of studies such as Phan et al. (2021) and Castelnuovo & Pellegrino (2018), which have demonstrated that inflation tends to surge more rapidly during periods of heightened uncertainty, with minimal response observed during periods of low uncertainty. Similarly, Aastveit et al. (2017) have noted that irrespective of the volatility regime, prices initially increase in response to monetary tightening, before gradually receding.

In the analysis of countries with low economic uncertainty across the five models, a negative and significant correlation emerges between the interaction of economic uncertainty and monetary policy (EU*MP) and inflation (INF). This implies that in contexts of low economic uncertainty, monetary policy exerts a dampening effect on inflation. This underscores the significance of monetary policy credibility and its role in maintaining price stability. According to Balcilar et al. (2020), monetary policy credibility is pivotal for several reasons, including mitigating the costs associated with deflation, ensuring low inflation levels, bolstering the defense of currency parities when necessary, and fostering increased public support for Central Bank autonomy.

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**Table 4.** Results For Low Uncertainty Countries

| Variables | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Lag INF | 0.49*** | 0.72*** | 0.37*** | 0.22 | 0.49*** |
| | (0.06) | (0.13) | (0.10) | (0.75) | (0.07) |
| EU | 0.07*** | 0.02 | 0.09*** | 0.13 | 0.07*** |
| | (0.01) | (0.03) | (0.01) | (0.09) | (0.01) |
| MP*EU | -0.04*** | -0.02* | -0.04*** | -0.05 | -0.03*** |
| | (0.00) | (0.01) | (0.01) | (0.05) | (0.01) |
| GFCF | | 0.01 | 0.01 | 0.01 | 0.01 |
| | | (0.02) | (0.02) | (0.02) | (0.02) |
| EL | | | 0.06*** | 0.06*** | 0.06*** |
| | | | (0.01) | (0.01) | (0.01) |
| CL | | | | 0.30*** | 0.30*** |
| | | | | (0.09) | (0.09) |
| GFCE | | | | | 0.13*** |
| | | | | | (0.02) |
| Constant | 1.24*** | 2.40* | 0.44 | -2.01 | 0.29 |
| | (0.26) | (1.45) | (1.04) | (4.52) | (0.73) |

*** p<0.01, ** p<0.05, * p<0.1

Source: The authors

## Conclusion

The economic crises of 2007-2008 and the subsequent Covid-19 pandemic have sparked inquiries into the underlying causes of sluggish economic recovery. Studies investigating this phenomenon have consistently pointed to the pronounced influence of heightened uncertainty levels on economic dynamics. Particularly in the aftermath of the global financial crisis, scholarly attention has shifted towards understanding the interplay between uncertainty, economic activity, and the efficacy of monetary policy. A wealth of empirical research has demonstrated the adverse effects of uncertainty on economic activity, corroborating theoretical frameworks proposed by scholars such as Aastveit et al. (2017), Castelnuovo & Pellegrino (2018), and Andrade et al. (2019), which suggest a detrimental impact of economic uncertainty on the effectiveness of monetary policy. Notably, studies like Tillmann (2020) have underscored how heightened uncertainty diminishes the effectiveness of monetary policy actions, leading to subdued responses in long-term interest rates.

Against this backdrop, our study delved into the nexus between economic uncertainty and monetary policy effectiveness, leveraging annual data spanning the period from 1997 to 2022. Employing the Generalized Method of Moments (GMM) model, our analysis revealed discernible effects of uncertainty levels on the efficacy of monetary policy. From our findings, several key conclusions can be drawn. Firstly, we established that economic uncertainty exerts a notable influence on the effectiveness of monetary policy, especially during the recent economic upheavals triggered by the Covid-19 crisis. Notably, heightened economic uncertainty tends to exacerbate inflationary pressures. Furthermore, our investigation extended to comparing the impact of economic uncertainty on various economic dimensions across countries characterized by high versus low levels of uncertainty. Our results underscored the significant role of economic uncertainty in driving inflationary trends, regardless of the country's uncertainty status, emphasizing the imperative of implementing monetary policies geared towards addressing economic imbalances. These findings align closely with those reported by Balcilar et al. (2020) and Wang & Lee, (2022). However, our analysis also shed light on the pivotal role played by monetary policy in mitigating the adverse repercussions of heightened uncertainty on economic dynamics.

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**Implications for Policy**

During periods of heightened economic uncertainty, a responsive monetary policy can serve as a stabilizing force and a means of managing inflation. Research by Corrêa & Lopes, (2023), Istiak & Serletis, (2020) and Burgard et al. (2019) underscores the potential of monetary policy as a potent instrument for stimulating economic activity during crises, albeit with potentially transient effects. Nonetheless, our findings suggest that monetary policy holds promise in alleviating the adverse impacts of economic uncertainty.

**Limitations and Opportunities for Future Research**

This study was conducted across countries experiencing varying levels of economic uncertainty, limited by data availability, resulting in a sample of only 21 economies. Additionally, challenges in accessing historical data for some key variables constrained the study period to the years 1997-2022.

Despite these limitations, this study paves the way for future investigations to delve deeper into the repercussions of economic uncertainty. Subsequent studies could explore how central banks adapt their monetary policy strategies in response to the nature and magnitude of economic uncertainty, considering potential disparities between emerging and developed economies. Moreover, there is scope for examining the effectiveness of fiscal policies in addressing economic uncertainty, potentially through case studies analyzing the interplay between monetary and fiscal policy measures, particularly amidst recurrent economic, political, and health-related crises.

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