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THE EFFECT OF UNCERTAINTY ON INFLATION: EVIDENCE IN ASEAN

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ABSTRACT

A number studies have been conducted to establish the relationship between uncertainty and macroeconomic variables, such as inflation. Subsequently, economists constructed a time-varying uncertainty index, which is referred to as the World Uncertainty Index (WUI). This study aims to identify the effect of time-varying uncertainty subject to inflation in ASEAN. Using yearly dataset of the WUI as a proxy for the global level of domestic uncertainty, inflation, gross domestic product (GDP), foreign direct investment (FDI), and exchange rate from 2015 to 2019 for all ASEAN Member States (AMS), a two-step System Generalized Method of Moments (Sys-GMM) was employed to estimate the dynamic relationship and the short- and long-run effect of the socioeconomic uncertainty proxies with respect to inflation in ASEAN. The results indicated that uncertainty had positively and significantly affect inflation in the short-run estimation, along with GDP. Meanwhile, in the long-run estimation, it was only GDP that affected inflation, rather than uncertainty.

Keywords: *ASEAN, Economic Uncertainty, Inflation*
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Introduction

Uncertainty remains a significant factor in financial and economic decision-making (Bloom, 2016; Baker et al., 2016). Several studies have been conducted to identify the effect of uncertainty on macroeconomic variables. There is a correlation between uncertainty, macroeconomic variables, and share prices (Adarov, 2021). In addition, evidence suggests that uncertainty is a consequence of the business cycle (Anzuini et al., 2020). The effect of time-varying uncertainty on the macroeconomy have attracted considerable attention in recent years (Canh et al., 2020). Global economic policy uncertainty determines the level of shock that the economy is exposed to (Ayeni & Fanibuyan, 2022).

One of the consequences of uncertainty in macroeconomic variables is its impact on inflation (Ha et al., 2023). Uncertainty can affect inflation through various channels. Economics agent tend to adopt a 'wait-and-see' approach before taking riskier actions. This may result in

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a decline in the demand for goods and services, which could potentially give rise to deflation. Uncertainty can also impede the ability of central banks to manage inflation by adjusting interest rates. Disruptions in trade due to uncertain policies might lead to shortages of goods and higher production costs, which could subsequently lead to price inflation. Furthermore, in the event of currency depreciation due to uncertainty, the prices of imported goods might increase. In periods of uncertainty, people might anticipate that prices will remain low, which can influence the pricing strategies of companies and the wage negotiations of workers. Finally, the uncertainty surrounding government spending and taxation policies can influence the amount of money that people and businesses spend, which in turn affects demand and supply, and ultimately inflation.

The Association of South East Asian Nations (ASEAN) has experienced a relatively stable economic growth over the past few years. A number of ASEAN member states, such as Vietnam, the Philippines, and Indonesia, have experienced robust GDP growth rates, supported by strong domestic demand and investments in infrastructure and manufacturing sectors. Verico (2022) stated that it is not limited to a stable and conducive social and economic climate through expanding cooperation and economic dynamism that created a virtuous cycle. Nevertheless, this economic integration is expected to persist over the long run. However, to achieve a sustainable economic growth, ASEAN member states should maintain their inflation at a level that does not impede economic growth.

The dynamic and rapidly changing global uncertainty also affects ASEAN in several economic sectors. Although the ASEAN economy has consistently outperformed the global economy, it must agile and flexible in addressing various emerging trends and issues that constantly arise in an increasingly uncertain global environment (ASEAN Secretariat, 2019). The implementation of the transmission of monetary policy shocks in times of uncertainty allows for the examination of the impact of crises, wars, and shocks on selected macroeconomic variables, including inflation. Trabelsi & Ben Khaled (2023) found that global uncertainty accounts for approximately 12% of inflationary pressures, as evidenced by the variance decomposition used in the study.

Prior studies have indicated that the assessment of the relationship between uncertainty due to economic and political shocks and inflation is still in the preliminary stages and has not yet reached a conclusion (Caldara et al., 2022; Haque & Magnusson, 2020; Jones & Olson, 2013). Leduc & Liu (2016) showed that increased uncertainty leads to increased unemployment and reduced spending and consumption, and exerts a deflationary impact on general price levels, creating a demand shock in the macroeconomy. Istiak & Alam (2019) argued that EPU and oil prices have a non-negligible effect on inflation expectations. Their findings further showed that the effects of uncertainty or increased oil prices on inflation may differ depending on whether the period precedes or follows a financial crisis. Meinen & Roehe (2018) used the structural vector autoregressive (SVAR) approach to illustrate the ambiguous response of inflation to uncertainty. Meanwhile, Chowdhury & Sarkar (2015) tested the Friedman-Ball hypothesis (Friedman, 1997; Ball, 1992) which states that high inflation leads to high inflation uncertainty. However, the empirical evidence supporting this hypothesis is inconclusive.

As the investigation into the relationship between inflation and uncertainty remains unresolved, this study aims to develop a broader perspective on the effect of uncertainty on inflation. The focus of this study is on ten ASEAN member states. This is because ASEAN is predicted to become a new source of global economic growth, and thus must achieve

stability in its economic growth (HV et al., 2014). This study contributes to the identification of the relationship between uncertainty and inflation through the use of an index, namely the World Uncertainty Index. The index consists of words from the Economist Intelligence Unit (EIU) report which provide an illustrative representation of a country's condition in times of uncertainty. The existing literature on inflation dynamics in the ASEAN region, nonetheless, remains limited, and mainly focuses on country-specific analyses using different model specifications, data samples, and estimation techniques (Dany-Knedlik & Garcia, 2018).

Overall, this research aims to identify the relationship between uncertainty and inflation from two perspectives. The first is to identify the relationship in the short-run estimation, while, the second is to identify the relationship in the long-run estimation. Both estimations used the two-step System GMM to address potential endogeneity issues between variables. In addition to the endogeneity issue, ASEAN data frequently demonstrate dynamic patterns over time. GMM is particularly suitable for dynamic panel data models that include lagged values of variables. This allows for the capture of temporal dependencies and persistence in economic relationships within the ASEAN region.

Literature Review

Measurement of Uncertainty

Romer (2012) provides an analysis of the effect of uncertainty on future investment profitability. Uncertainty is presented by q or the expectation that evolves over time, which is known as Tobin's q. The firm's maximization problem implies that q is a summary of all information about the future that is relevant to a firm's investment decision. As a consequence, the firm's objective is to increase its capital stock if q is high and to reduce if q is low. Barrero et al. (2018) constructed a model to measure short- and long-run uncertainty, presuming that it is a potential factor shaping aggregate economic outcomes. The model is identical to Romer's estimation of short-run uncertainty as presented below. The long-run volatility likely depends on the short-run movement. The initial equation for short-run e is as follows.

$$q(t) = \int_{\tau=t}^{\infty} e^{-r(\tau-t)} E_t[\pi(K(\tau))]d\tau \quad (1)$$

Furthermore, if later time is added to the equation and iterated, the expectation for future probability can be written as follows.

$$E_t[\dot{q}(t)] = rq(t) - \pi(K(t)) \quad (2)$$

where the equation 2 is a different form of $E_t\left[\int_{\tau=t+\Delta t}^{\infty} e^{-r[\tau-(t+\Delta t]} E_{t+\Delta t}[\pi(K(\tau))]d\tau\right]$.

Therefore, investment at any time is likely to be reduced if the expected return cannot be achieved.

Bloom (2016) observed that uncertainty has recently been a significant factor contributing to slower economic growth in several countries, with the potential to impact the economic growth. In the context of uncertainty, households are presented with a portfolio choice between K(t) and riskless bonds. However, prior findings suggested that uncertainty has no effect on investment because firms invest as long as the value of new capital exceeds the cost of acquiring it (Romer, 2012). Schinckus (2009) also found that uncertainty has a direct impact on the economy. Trung (2019) suggested that uncertainty has a detrimental effect on the economic growth, both in advanced and developing markets.

Liow (2015) highlighted the considerable volatility of uncertainty in emerging markets between the 2007 global financial crisis and the 2009 European debt crisis, demonstrating the relationship between direction and pattern of volatility. However, the impact of the European sovereign debt crisis was less pronounced than that of the collapse of Lehman Brothers. Constantinescu et al. (2020) suggested that an increase in policy uncertainty can result in a reduction in trade through GDP growth. Furthermore, uncertainty might also affect trade directly by influencing firms' decisions to serve foreign markets or to source inputs internationally through their investment activities. This is consistent with Romer (2012) who stated that uncertainty may arise from asymmetric information among investors. Ahir et al. (2022) suggested that most countries in the world, especially those categorized as emerging economies, have a significantly higher risk of uncertainty.

Empirical Studies on Uncertainty and Inflation

The relationship between uncertainty and inflation is a complex and multifaceted topic that has been extensively studied in the fields of economics and finance. Uncertainty is defined as the lack of predictability or the presence of risk and ambiguity in economic conditions, policy changes, or other factors that can affect economic decisions. Inflation, on the other hand, is defined as the general increase in the prices of goods and services in an economy over time.

Ananzeh (2015) observed a positive relationship between inflation rate and uncertainty using the generalized autoregressive conditional heteroskedasticity (GARCH) model. Gilchrist et al. (2017) found that financial distortions prompt firms to increase prices in response to adverse financial or demand shocks. This is because uncertainty plays an important role in the upward bias observed in household inflation expectations (Haidari & Nolan, 2022). Viorica et al. (2014) observed a positive relationship between inflation and uncertainty in a group of countries, namely Hungary, Poland, the Czech Republic, and Slovakia.

In contrast with the aforementioned findings, Caporale & Gil-Alana (2023) suggested a structural break coinciding with the European Monetary Unit (EMU). Wang (2023) found that economic policy uncertainty has a comparatively minimal impact on inflation rates, with the effect of each unit of economic policy uncertainty being particularly subtle.

Moreover, the correlation between uncertainty and inflation as evidenced by numerous studies is predominantly positive and the two variables are likely to affect each other in two ways. Karahan (2012) found that inflation remains a significant factor determining inflation uncertainty, especially in developing countries such as Turkey. The finding aligns with Ball's (1992) hypothesis, which states that during periods of high inflation, the public is uncertain about future monetary policy due to a lack of information regarding future policy.

ASEAN as A Regional Economic Integration

ASEAN was established on August 8, 1967 with five original member countries, namely Indonesia, Malaysia, Singapore, Thailand, and Philippines. Subsequently, Myanmar, Laos, Vietnam, Brunei Darussalam, and Cambodia were admitted as additional members. This multilateral body of agreement has committed to transforming Southeast Asia's economic integration through trade and investment activities. The 1967 Bangkok Declaration provides an objective analysis of the issues that led to the establishment the ASEAN, including the need to accelerate economic growth, promote regional peace and stability, and encourage active collaboration (Hill & Jayant, 2010).

In order to be more cooperative and integrated, ASEAN has concluded several agreements and held numerous discussions with the objective of promoting convergence to achieve sustainable growth, including the ASEAN Economic Community (AEC) which was established at the end of 2015. Prior economic cooperation projects include the ASEAN Industrial Project (AIP), the ASEAN Industrial Complementation (AIC), and the ASEAN Preferential Trade Agreement (PTA) for trade liberalization. Unfortunately, the project did not achieve its objective. Therefore, in 2015, it was decided that the AEC Blueprint as submitted in November 2007 at the 13th ASEAN Summit was implemented. In order to facilitate its economic transformation, an open economy represents a viable strategy for ASEAN. The open economy presents an excellent opportunity for ASEAN to benefit from positive spillover effects resulting from various forms of cooperation. As a result, the establishment of an open economy and the pursuit of economic convergence are prerequisites for ASEAN to achieve a more robust and progressive regional economic integration (Verico, 2022).

Data and Research Methods

Data

This study focuses on the uncertainty index of ASEAN Member States in relation to the inflation rate in ASEAN. The use of WUI as a proxy for uncertainty is justified by the fact that the index encompasses a broad range of uncertainty, including economic and political uncertainty, in contrast to other indices (Anglingkusumo & Iyke, 2024). In addition, GDP growth, FDI inflows, and exchange rate were included to enhance the model.

The data set comprised 10 ASEAN member states, namely Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam from 2015 to 2019. Including Brunei Darussalam and Singapore will not result in a biased estimation because the proxy is based on the perception reported by the EIU. The two countries are considered high-income economies compared to other ASEAN members states. However, as previously stated in the literature review, the use of WUI captures their perception not solely from an economic perspective, but also from a social standpoint. Furthermore, the WUI captures on how the governments of ASEAN member states enacted the policy. All macroeconomic variables were obtained from World Bank. The WUI data were obtained from Policy Uncertainty. Overall, the summary of the data in this study is presented in Table 1.

Table 1: Data Summary

Variable	Definition	Unit	Source
World Uncertainty Index (WUI)	The World Uncertainty Index is a measure that tracks global uncertainty by text mining the country reports of the Economist Intelligence Unit	Index	Policy Uncertainty
INF	Inflation, consumer prices (CPI) annually	Percentage (%)	World Bank
GDP	Percentage of government spending to GDP	Percentage (%)	World Bank
FDI	Foreign direct investment, net inflows (BoP, current US$)	Nominal	World Bank
Exchange Rate (ER)	LCU per US$, period average	Nominal	World Bank

Relationship between Uncertainty and Inflation

Panel data is a more powerful tool than cross-sectional or time series data alone because it combines the strength of both. In addition, it is employed to address the heterogeneity issue, provide more informative data, accommodate greater variability, and reduce collinearity among the variables, thereby enhancing efficiency (Nazlioglu et al., 2013).

In 1991, Arellano-Bond first developed a method for treating panel data with a dynamic system, which was later known as the Generalized Method of Moments (GMM). This method suggests that the dependent variable is not only affected by other variables in the same period, but also by the variable itself in the previous period. The lagged variable of the dependent variable was indicative of a dynamic system. The use of dynamic panel data was predicated on the notion that the dependent variable in a given year can be affected by the dependent variable from the previous year. Hence, the Arellano-Bond GMM estimator is preferable due to its capacity to transform the standard covariance matrix into a robust output. According to Li & Luedtke (2023), the robust estimator is more effective when employed in a two-step estimation process rather than a one-step estimation process based on the AR(2) probability score. If the AR(2) probability score is above the 10% significant rate, the null hypothesis can be accepted, indicating that there is no autocorrelation in the estimation, and *vice versa*.

Uncertainty can influence inflation among consumers, businesses, and policymakers. If people expect higher inflation in the future, they may alter their spending patterns to mitigate the potential impact of higher prices in the future. This increase in current demand can lead to higher inflation.

This study adopted the econometric model from Sanida & Rahayu (2022) and Salim et al. (2021) with modifications based on Canh et al. (2020). The panel model in this study can be written as follows.

$$INF_{i,t} = \alpha_0 + \alpha_1 INF_{i,t-1} + \alpha_2 WUI_{i,t} + \alpha_3 GDP_{i,t} + \alpha_4 \ln FDI_{i,t} + \alpha_5 \ln ER_{i,t} + \varepsilon_{i,t} \quad (3)$$

This study used the two-step System GMM to reduce the bias associated with fixed effects in short panels and to address the issue of endogeneity in dynamic panel data (Canh et al., 2020).

Results and Discussion

The inflation rates in ASEAN experienced a dynamical fluctuation, with Myanmar experiencing a relatively weaker economy between 2015 and 2019 compared to other member states. Factors such as domestic economic conditions, monetary policy, fiscal policies, exchange rate dynamics, and external influences play a role in shaping inflation rates.

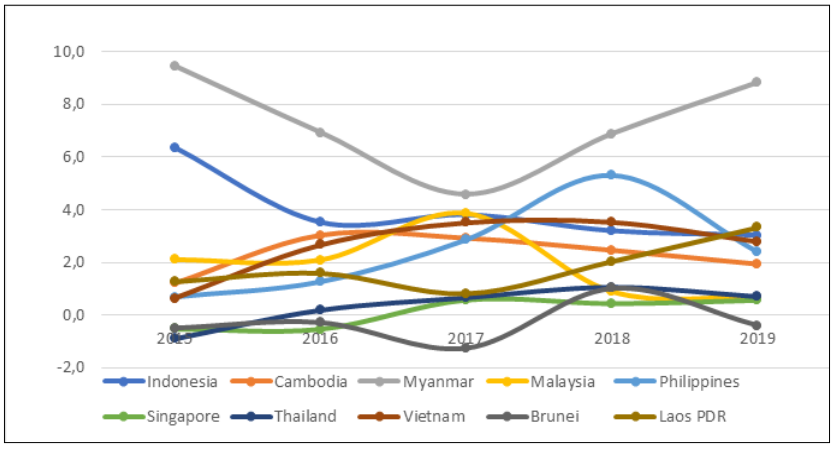

Figure 1: Inflation Rates of ASEAN Member States from 2015 to 2019

The inflation rates of ASEAN member states showed a moderate increase from 2015 to 2019. Among the ASEAN member states, Myanmar exhibited the highest inflation rate, particularly in 2015 when it peaked at 11.5% largely due to the implementation of expansionary macroeconomic policies that led to rapid credit growth. In 2018, all member states experienced

an increase in inflation. This was because some emerging market economies were particularly vulnerable as a result of strengthening of the US dollar and a reduction in the level of risk that global financial investors were prepared to accept (Celasun et al., 2012). The World Bank (2018) also revealed that both commodity exporting and importing economies in the region were expected to experience intensified capacity constraints and price pressures over the next two years, which would likely result in a further increase in inflation rates. Figure 1 illustrates the decline in the inflation rate during the 2019 period. This is because monetary policy had been tightened in response to inflation in the previous year.

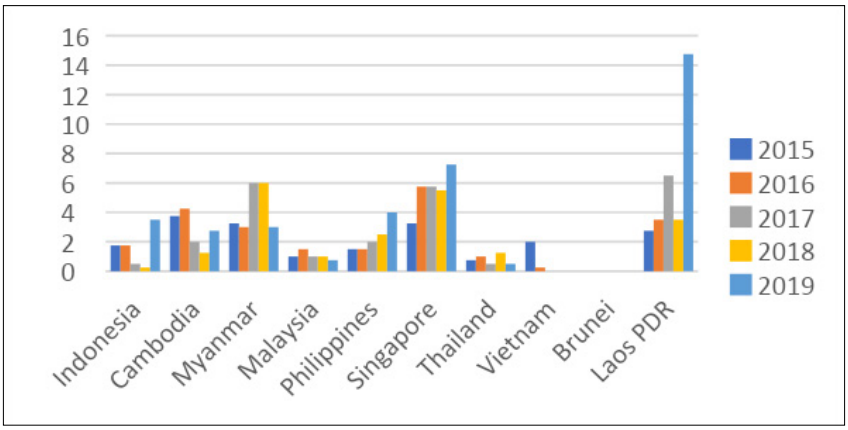

Figure 2: World Uncertainty Index of ASEAN Member States from 2015 to 2019

The percentages of the dynamics of uncertainty can be seen in Figure 2. Countries that showed an increasing trend in uncertainty are Cambodia, Indonesia, Laos, and the Philippines. Conversely, Thailand, Vietnam, Malaysia, Myanmar, and Singapore showed a declining trend of uncertainty. Brunei Darussalam's uncertainty remained stable from 2015 to 2019. The ASEAN Economic Community (AEC) which commenced at the end of 2015 has affected the dynamics of uncertainty in ASEAN. During the period of this study, there were several notable periods.

In 2017, approximately half of the ASEAN member states experienced an increasing trend of uncertainty in comparison to the previous year. This was because the humanitarian crisis in Myanmar's Rakhine state continued to be a significant challenge for ASEAN. As an ASEAN member state, Myanmar's situation had a particularly detrimental impact on the region. In contrast to the increasing trend, the Philippines experienced a significant decline in uncertainty in 2017. The opportunity to serve as ASEAN Chairman in early January of that year reflected the country's aspirations for a united ASEAN in collaboration with its global partners. A number of political events had a detrimental impact on the ASEAN member states as most of them were entering the presidential campaign period.

Figure 2 also shows a decline in uncertainty for Thailand from 2015 to 2019. A decline in socioeconomic uncertainty commenced in 2017. However, when compared to other member states, Thailand's proportion of uncertainty was higher than that of any member states. According to World Bank report, the country experienced a high level of uncertainty due to stagnant growth, an increasing trend of natural disasters, and political instability.

The effect of uncertainty on inflation is presented in Table 4 and Table 5. Prior to undertaking the estimation process, the possibility of the presence of unit root and collinearity issue was investigated. The results showed that all variables used in the estimations were stationary and the regression results were not biased nor spurious. Furthermore, there is no indication that the data were problematic. The estimation results of unit root and collinearity are presented in Table 2 and Table 3.

Table 2: Descriptive Statistics

Variable	Obs.	Mean	Std. dev.	Min.	Max.
INF	50	2.27	2.39	-1.26	9.45
WUI	50	2.49	2.67	0	14.75
GDP	50	5.09	2.36	-2.48	10.51
lnFDI	50	22.44	1.54	18.82	25.38
lnER	50	5.35	3.73	0.30	10.04

Table 2 provides insight into the variables under consideration. The deflation rate in Brunei Darussalam was 1.26% in 2017. According to the Oxford Business Group (2017), the low cost of food products contributed to the relatively modest inflation rate, partly due to higher output from the agricultural sector.

Meanwhile, the highest inflation rate was observed in Myanmar, reaching 9.45% in 2015. In Myanmar, the inflation rates fluctuated from 1990 to 2017 due to the transition in the economic system. Finck & Tillmann (2019) stated that the primary driver of inflation in Myanmar is budget deficit. Specifically, the inflation in 2015 was caused by the National League of Democracy Party's ascension to power. Therefore, budget deficit had a positive and significant effect on inflation in Myanmar.

Variable that this study focused on was uncertainty, which was proxied by the WUI. The mean score of uncertainty across all ASEAN member states is 2.49%. This score can be interpreted as indicating that from 2015 to 2019, the word "uncertainty" appeared 2,490 times on average per year in the reports of ASEAN member states for every 10,000 words in the reports. Brunei Darussalam, compared to other ASEAN member states, is distinguished by a politically stable government, macroeconomic stability, low taxes, low energy costs, low crime, and a pristine environment (OECD, 2016). These led to a 0% rate of domestic uncertainty within the country, despite the implementation of several strategies to maintain an optimal climate. The country with the highest uncertainty captured through the WUI in 2019 was Laos at 14.75%. This is caused by natural disasters that slowed Laos's economic growth and accentuated the need to address structural vulnerabilities (International Monetary Fund, 2019).

The data indicated that the economic growth ranged from -2.48% to 10.51%. Brunei Darussalam experienced a decline in economic growth when global oil and gas prices increased in 2016. The highest GDP growth was observed in Myanmar in 2017 as a result of the government's efforts to liberalize the economy through revised regulations and a development strategy designed to encourage the private sector (Tang & Li, 2021).

Foreign direct investment (FDI) in natural log (lnFDI) represents the annual growth of average FDI inflows to ASEAN member states. In 2019, Singapore experienced the highest growth of FDI inflows to their country at 25.38%. According the World Investment Report released by UNCTAD (2020), Singapore experienced a record-breaking year for FDI in 2019, with an increase of 15.5% to approximately USD 92.1 billion. The lowest growth of FDI inflows among all 10 ASEAN member states was experienced by Brunei Darussalam at 18.82% in 2016. According to the OECD (2016), the decline in oil and gas prices presented a challenge to the economy. Like many resource-driven countries, Brunei Darussalam focused its attention on sectors such as mining and quarrying while neglecting others.

The unit root test was subsequently employed for all the data following Im et al. (2023) and the Harris-Tzavalis test. IPS tests are the most widely used methods for panel data unit

root tests in the literature (Li & Liu, 2005). The Harris–Tzavalis test assumes that the number of panels tends towards infinity, while the number of time periods remains fixed. The null hypothesis is that the series contains a unit root, while the alternative is that the series is stationary. A robustness test was conducted to ascertain the reliability of the variables and the estimation process. This was also carried out to assess the heteroskedasticity. The presence of outliers can lead to the model becoming heteroskedastic, thereby rendering OLS is no longer Best Linear Unbiased Estimator(BLUE) (Wooldridge, 2013).

Table 3: Correlation between Variables

	INF	WUI	GDP	lnFDI	lnER
INF	1.00				
WUI	0.15	1.00			
GDP	0.46	0.15	1.00		
lnFDI	0.02	0.08	0.17	1.00	
lnER	0.51	0.11	0.66	-0.05	1.00

Notes: lnFDI is FDI inflows, while lnER is annual ER in natural log. Variables such as GDP, WUI, and INF were not treated like the previous two variables due to their adjustments and control issues.

According to Gujarati (2004), variables are considered to be free from collinearity issues if the number does not exceed the 0.8 threshold. As shown in Table 3, there are no indications that the data are problematic. In addition, uncertainty appears to have a positive effect on inflation rates.

Table 4 presents the estimation results in the short run. Meanwhile, Table 5 provides the estimation results in the long run. We use 5 years data from 2015-2019 with approximately 50 data out of 10 countries. The data set comprised of five years of data from 50 to 40 because GMM uses internal instruments (lagged dependent/independent variables) to estimate the dynamic panel data models. Thus, the observations used for estimation were reduced.

Table 4: Short-Run Estimation

	(1)	(2)	(3)
Variables	**Two-Step System GMM**	**PLS**	**FE**
Constant	-24.40	0.952	-51.33
	(28.41)	(3.142)	(30.81)
L.INF	-0.255	0.572***	0.128
	(0.818)	(0.110)	(0.159)
WUI	0.407**	0.0457	0.0152
	(0.165)	(0.0713)	(0.107)
GDP	1.018***	0.143	0.0804
	(0.378)	(0.133)	(0.174)
lnFDI	0.767	-0.0507	-0.208
	(1.207)	(0.142)	(0.476)
lnER	0.674	0.0710	10.74**
	(0.537)	(0.0770)	(5.132)
Observations	40	40	40
R-squared	-	0.681	0.181
Hansen Test	0.827	-	-
AR(2)	0.292	-	-
Number of countries	10	10	10

Standard errors in parentheses: *** p < 0.01, ** p < 0.05, * p < 0.1

Table 4 shows that a 1% increase in uncertainty can result in a 0.4% increase in inflation. This is consistent with Cascaldi-Garcia et al. (2023) who stated that unexpected increases in inflation uncertainty led to higher outputs and prices, which is consistent with a demand shift, and the central bank reacts by tightening the monetary policy. Ascari et al. (2022) demonstrated that shocks that elevate inflation expectations have a more pronounced impact than those that reduce inflation expectations. Furthermore, Angeletos et al. (2018) found that a shock to short-run expectations to real variables can be attributed to a sentiment shock due to higher-order beliefs. The uncertainty in ASEAN member states occurred from 2015 to 2019. Uncertainty can influence inflation expectations among consumers, businesses, and policymakers. If people anticipate higher inflation in the future, they may alter spending patterns more now to avoid higher prices in the future. This increase in current demand can result in higher inflation. The working hypothesis of Viorica et al. (2014) is that groups of countries with a similar political and economic background are likely to be exhibit a similar causal relationship between inflation and inflation uncertainty.

An increase in GDP will likely affect the inflation to increase for approximately 1%. This finding is consistent with Sanida & Rahayu (2022) who found that GDP and interest rate at the significance (α) level of 5% had a positive and significant effect on inflation in ASEAN countries from 2011 to 2019. Bhat & Laskar (2016) and Ehigiamusoe et al. (2019) also found that GDP had a positive effect on inflation.

The results of the fixed-effect model showed a positive and significant growth in the exchange rate growth. An increase in exchange rate growth could affect inflation by 10%. This revealed that in ASEAN member states, an appreciation of their local currency would affect their purchasing power, especially with regard to imported goods. As a result, export would slow down and domestic prices would decrease. Consequently, the appreciation of local currency led to a stronger purchasing power at the domestic level (Ping, 2011).

Once the short-run equation has been estimated, the long-run estimation was calculated based on the significant variables in the short-run, namely uncertainty (WUI) and economic growth (GDP). The results of the long-run estimation are presented in Table 5.

Table 5: Long-Run Estimation

Variable	Coef.
WUI	0.324
GDP	0.811*

Standard errors in parentheses: *** p < 0.01, ** p < 0.05, * p < 0.1

As uncertainty is a short-run phenomenon, it did not affect inflation in the long-run. The variable that was found to affect inflation in the long run is GDP, with possibility of the effect on inflation is estimated to be 0.8% at 10% significance level. In the long run, the rate of inflation is determined by two factors: the rate of money growth and the rate of economic growth (University of Minnesota, 2016).

Conclusion

In conclusion, while uncertainty does affect inflation, the effect is only observed in the short run. In the long-run, the only variable that affects inflation is economic growth. In the long run, the rate of inflation is determined by two factors: the rate of money growth and the rate of economic growth (University of Minnesota, 2016). In contrast, Angeletos et al. (2018) found that a shock to short-run expectations of real variables can be a attributed to a sentiment shock due to higher-order beliefs.

ASEAN as a regional economic integration is still confronted with challenges in the near future, especially regarding it's the prevailing uncertainty. The reason for this is that the uncertainty is likely manifest at any time, and the integration system in ASEAN is not particulary responsive to uncertain climates or conditions (Hill & Jayant, 2010).

The key findings of this study are that in general, uncertainty has affected inflation in ASEAN. In fact, ASEAN must continue to manage their growth to achieve sustainable growth and stable environment through a stable inflation rate and stable monetary policy. Trabelsi and Khaled (2023) found out that global uncertainty accounts for approximately 12% of inflation pressures, as indicated by the variance decomposition used in the study.

Several recommendations were offered based on the results of this study. Firstly, policymakers should pay close attention to the subject to uncertainty as proxied by World Uncertainty Index. The effect of heightened uncertainty on the economy may be multifaceted and manifest through various channels. The index is applicable to all member states to maintain a manageable climate on in times of uncertainty because this index initially observes the effect at the country level.

Secondly, a clear communication between governments, central banks, policymakers, and stakeholders should be strengthen. A clear inflation target set by the central bank can help anchor inflation expectations and guide policy actions to prevent runaway inflation. Thirdly, the governments of ASEAN member countries should pursue responsible fiscal policies that ensure sustainability and avoid excessive deficit spending, which can contribute to inflationary pressures.

In the light of the aforementioned considerations, this study has several limitations. The use of the World Uncertainty Index (WUI) as a proxy for uncertainty is a relatively common practice in estimation, particularly in the context of real sector estimation. However, this index is at least capable of capturing the degree of the uncertainty fluctuations when the concept of uncertainty itself remains abstract. Therefore, this study represents an initial attempt to introduce uncertainty the concept to inflation in Southeast Asia, with a particular focus on the ASEAN member states from 2015 to 2019. During this period, the ASEAN economy was very stable with minimal shocks occurring between the time periods. Therefore, the results of this study are likely to provide a comprehensive explain of how the uncertainty index can capture the dynamic effects of uncertainty on inflation rates in the region. It is also important to note that the specific policy recommendations may vary depending on the unique economic conditions and challenges faced by individual ASEAN countries. A comprehensive approach that considers both demand-side and supply-side factors is essential for effective policy management to maintain uncertainty at manageable levels while controlling inflation.

Limitations of The Study

Has already mentioned in the last paragraph of conclusion.

Declaration

All authors have read and agreed to the published version of the manuscript.

Conflict of Interest

The authors declare that there is no significant competing financial, professional, or personal interests that might have affected this article.

Availability of Data and Materials

Research data and materials can be provided via open data repositories (World Bank Data and Policy Uncertainty). Data sharing is not applicable for this study as no new data were created or analyzed in this study.

Authors' Contribution

ATPM and KV conceptualized this study; ATPM wrote the original draft; KV edited the manuscript.

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